



**Australian Government**

# **MAR Maritime Training Package**

**Release 6.0**

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# MAR Maritime Training Package

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## Links

Companion Volume implementation guide can be found in VetNet -  
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## MAR10120 Certificate I in Maritime Operations (General Purpose Hand Near Coastal)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in entry-level positions in the maritime industry as a General Purpose Hand on deck or in the engine room of a vessel less than 80 metres within the exclusive economic zone (EEZ) or in the engine room only for a vessel with propulsion power less than 3000 kW.

## Licensing/Regulatory Information

This level of qualification is currently cited as meeting some of the requirements for certification as a General Purpose Hand Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D.

Certification will require achievement of the MAR10120 Certificate I in Maritime Operations (General Purpose Hand Near Coastal) and an Australian Maritime Safety Authority (AMSA) approved first aid certificate.

People seeking certification should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 9 units

9 core units

### Core units

HLTAID011	Provide first aid
MARB033	Assist with routine maintenance of a vessel
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARG011	Work effectively as part of a crew on a vessel up to 80 metres
MARN010	Apply general purpose hand skills aboard a vessel
MARO010	Perform basic lookout duties

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR10318 Certificate I in Maritime Operations (General Purpose Hand Near Coastal).

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MAR10318 Certificate I in Maritime Operations (General Purpose Hand Near Coastal)**

## **Modification History**

Release 1. New qualification.

## **Qualification Description**

This qualification is suitable for people working in entry level positions in the maritime industry as a General Purpose Hand on deck or in the engine room of a vessel up to 80 metres within the exclusive economic zone (EEZ) or in the engine room only for a vessel with propulsion power up to 3000 kW.

### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as a General Purpose Hand Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D. Certification will require achievement of the MAR10318 Certificate I in Maritime Operations (General Purpose Hand Near Coastal) and an Australian Maritime Safety Authority (AMSA) approved first aid certificate; people seeking certification should check with AMSA.

## **Entry Requirements**

Not applicable.

## **Packaging Rules**

Total number of units = 8 units

8 core units

MARB001	Assist with routine maintenance of a vessel
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARG001	Work effectively as part of a crew on a vessel up to 80 metres

MARN001                      Apply general purpose hand skills aboard a vessel

MARO001                      Perform basic lookout duties

## **Qualification Mapping Information**

This qualification is equivalent to MAR10313 Certificate I in Maritime Operations (General Purpose Hand).

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR10418 Certificate I in Maritime Operations (Coxswain Grade 2 Near Coastal)

## Modification History

Release 1. First release of this qualification.

## Qualification Description

This qualification applies to people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certificate of competency to:

- command and operate the engines of a vessel:
  - <12 m in length
  - with propulsion power that is unlimited for an outboard engine or <100 kW for an inboard engine
  - that is not carrying passengers
  - that is in sheltered waters or within 5 nautical miles (nm) from point of departure, shore base or aquaculture lease
- command and operate the engines of a vessel:
  - as a tender or auxiliary vessel within 3 nm of a parent vessel within the exclusive economic zone (EEZ)
  - with propulsion power that is unlimited for an outboard engine or <100 kW for an inboard engine
  - that is not carrying passengers.

## Licensing/Regulatory Information

This qualification is required to obtain an AMSA certificate of competency as a Coxswain Grade 2 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D.

AMSA certification will require:

- achieving MAR10418 Certificate I in Maritime Operations (Coxswain Grade 2 Near Coastal)
- sea service consisting of:
  - 7 days qualifying sea service and a completed AMSA approved task bookor
  - 60 days qualifying sea service
- meeting the medical and eyesight requirements specified in the NSCV Part D and
- assessment by an AMSA approved assessor using the AMSA mandated practical assessment (AMPA) conducted on a vessel  $\geq 5.0$  m in length.



## Entry Requirements

Not applicable.

## Packaging Rules

**Total number of units = 8 units**

8 core units

### Core units

MARC037	Operate inboard and outboard motors
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARI003	Comply with regulations to ensure safe operation of a vessel up to 12 metres
MARJ006	Follow environmental work practices
MARK007	Handle a vessel up to 12 metres
MARN008	Apply seamanship skills aboard a vessel up to 12 metres

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR10413 Certificate I in Maritime Operations (Coxswain Grade 2 Near Coastal).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR20116 Certificate II in Maritime Operations (Linesperson)

## Modification History

Release 1. New qualification.

## Qualification Description

This qualification is suitable for people working in the maritime industry as a Linesperson engaged in a range of tasks in mooring and unmooring operations.

No licensing, legislative or certification requirements apply to this qualification at the time of publication.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 11**

11 core units

### Core units

BSBWOR301 Organise personal work priorities and development

HLTAID003 Provide first aid

MARB025 Maintain mooring equipment

MARB026 Apply knowledge of marine terminology and port procedures

MARC019 Transmit and receive information by marine VHF radio within Australian Territorial Waters

MARC022 Perform mooring and unmooring activities

MARC031 Shift mooring lines using mechanical means

MARE002	Communicate during mooring and unmooring activities
MARF017	Follow work health and safety, and emergency procedures during mooring and unmooring activities
MARF026	Follow port and terminal security procedures
TLID1001	Shift materials safely using manual handling methods

## Qualification Mapping Information

This qualification replaces **but** is not equivalent to MAR10213 Certificate I in Maritime Operations (Linesperson).

MAR10213 replaces TDM10207 Certificate I in Transport & Distribution (Maritime Operations - Shorebased Linesperson).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MAR20120 Certificate II in Maritime Operations (Linesperson)

### Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

### Qualification Description

This qualification is suitable for people working in the maritime industry as a Linesperson engaged in a range of tasks in mooring and unmooring operations.

#### Licensing/Regulatory information

No licensing, legislative or certification requirements apply to this qualification at the time of publication.

### Entry Requirements

There are no entry requirements for this qualification.

### Packaging Rules

**Total number of units = 11**

11 core units

#### Core units

BSBPEF301	Organise personal work priorities
HLTAID011	Provide first aid
MARB025	Maintain mooring equipment
MARB026	Apply knowledge of marine terminology and port procedures
MARC059	Transmit and receive information by marine VHF radio within Australian Territorial Waters
MARC022	Perform mooring and unmooring activities
MARC031	Shift mooring lines using mechanical means
MARE002	Communicate during mooring and unmooring activities

MARF017	Follow work health and safety, and emergency procedures during mooring and unmooring activities
MARF026	Follow port and terminal security procedures
TLID1001	Shift materials safely using manual handling methods

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR20116 Certificate II in Maritime Operations (Linesperson).

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR20318 Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal)**

### **Modification History**

Release 1. First release of this qualification.

### **Qualification Description**

This qualification applies to people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certificate of competency to command and operate the engines of a vessel:

- <12 m in length
- with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine
- that is in inshore waters or designated waters

or

- as a tender or auxiliary vessel within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

### **Licensing/Regulatory Information**

This qualification is required to obtain an AMSA certificate of competency as a Coxswain Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D.

AMSA certification will require:

- achieving MAR20318 Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal)
- a Marine Radio Operators VHF Certificate of Proficiency
- sea service consisting of:
  - 30 days qualifying sea service and a completed AMSA approved task book;

or

- 240 days qualifying sea service
- meeting the medical and eyesight requirements specified in the NSCV Part D and
- assessment by an AMSA approved assessor using the AMSA mandated practical assessment (AMPA) conducted on a commercial vessel  $\geq 5.0$  m in length.

### **Entry Requirements**

Not applicable.

## Packaging Rules

**Total number of units = 13 units**

13 core units

### Core units

HLTAID003	Provide first aid
MARB027	Perform basic servicing and maintenance of main propulsion unit and auxiliary systems
MARC037	Operate inboard and outboard motors
MARC038	Operate main propulsion unit and auxiliary systems
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARH013	Plan and navigate a passage for a vessel up to 12 metres
MARI003	Comply with regulations to ensure safe operation of a vessel up to 12 metres
MARJ006	Follow environmental work practices
MARK007	Handle a vessel up to 12 metres
MARN008	Apply seamanship skills aboard a vessel up to 12 metres

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR20313 Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR20418 Certificate II in Maritime Operations (Marine Engine Driver Grade 3 Near Coastal)**

### **Modification History**

Release 1. First release of this qualification.

### **Qualification Description**

This qualification applies to people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certificate of competency in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <750 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer or
- worker in the engine room of vessels <80 m long with propulsion power <3000 kW.

#### **Licensing/Regulatory Information**

This qualification is required to obtain an AMSA certificate of competency as a Marine Engine Driver Grade 3 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D.

AMSA certification will require:

- achieving MAR20418 Certificate II in Maritime Operations (Marine Engine Driver Grade 3 Near Coastal)
  - sea service consisting of:
    - 20 days qualifying sea service and a completed AMSA approved task book
- or
- 60 days qualifying sea service
  - meeting the medical and eyesight requirements specified in the NSCV Part D and
  - assessment by an AMSA approved assessor using the AMSA mandated practical assessment (AMPA).

### **Entry Requirements**

Not applicable.



## Packaging Rules

**Total number of units = 13 units**

13 core units

### Core units

BSBWOR203	Work effectively with others
HLTAID003	Provide first aid
MARB028	Service marine internal combustion engines, and propulsion and auxiliary systems
MARC033	Complete engine room tasks
MARC034	Maintain hull out of water
MARC035	Operate and maintain extra low and low voltage electrical systems and equipment
MARC036	Operate deck machinery
MARC039	Operate marine internal combustion engines, and propulsion and auxiliary systems
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARJ006	Follow environmental work practices

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR20413 Certificate II in Maritime Operations (Marine Engine Driver Grade 3 Near Coastal).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30118 Certificate III in Maritime Operations (Marine Engine Driver Steam)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for a Chief Engineer of a vessel that has steam as its main method of propulsion with propulsion power up to 750 kW within the exclusive economic zone (EEZ). This qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver (Steam) by the Australian Maritime Safety Authority (AMSA). Certification will require achievement of other requirements; people seeking certification should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 12 units

12 core units

Core units

MARB032	Undertake basic maintenance of electrical systems
MARB015	Maintain firefighting appliances
MARC040	Manage fuel systems
MARC042	Operate electrical systems
MARC023	Operate and maintain a boiler
MARC024	Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment
MARC025	Operate and maintain engines for auxiliary systems other than steam auxiliary systems
MARF027	Apply basic survival skills in the event of vessel abandonment

MARF028 Follow procedures to minimise and fight fires on board a vessel

MARF029 Meet work health and safety requirements

MARF030 Survive at sea using survival craft

MARJ006 Follow environmental work practices

## **Qualification Mapping Information**

This qualification replaces and is equivalent to MAR30115 Certificate III in Maritime Operations (Marine Engine Driver Steam).

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30120 Certificate III in Marina Operations

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in the marina industry performing a range of tasks such as berthing, mooring and storage of vessels and a range of boatyard tasks connected to sailing, cruising and general boating.

### Licensing/Regulatory Information

No licensing, legislative or certification requirements apply to this qualification at the time of publication.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 17

11 core units plus

6 elective units

The elective units can be selected from the elective units list below – up to 2 of these 6 elective units may be selected from any endorsed Training Package where the unit is packaged in a qualification at the same level or one level higher.

Imported units must be relevant to the job role, work outcome and enterprise and individual needs.

### Core units

BSBOPS203	Deliver a service to customers
BSBSTR301	Contribute to continuous improvement
BSBTWK201	Work effectively with others
MARB021	Perform routine tasks in a marina
MARB022	Refuel a vessel

MARB023	Maintain marina infrastructure
MARF023	Apply safe work practices in a marina
MARF024	Classify marina infrastructure, vessels and staffing structure
MARF025	Respond to marina emergencies
MEM50003	Follow work procedures to maintain the marine environment └ MEM13015 Work safely and effectively in manufacturing and engineering
MEM50004	Maintain quality of environment by following marina codes └ MEM13015 Work safely and effectively in manufacturing and engineering └ MEM16006 Organise and communicate information └ MEM50003 Follow work procedures to maintain the marine environment

### **Elective units**

BSBCMM211	Apply communication skills
BSBWHS411	Implement and monitor WHS policies, procedures and programs
HLTAID011	Provide first aid
MARB024	Undertake basic boatyard operations
MARC059	Transmit and receive information by marine VHF radio within Australian Territorial Waters
MARF027	Apply basic survival skills in the event of vessel abandonment
MARN008	Apply seamanship skills aboard a vessel up to 12 metres
MEM11010	Operate mobile load shifting equipment └ MEM11011 Undertake manual handling └ MEM13015 Work safely and effectively in manufacturing and engineering └ MEM16006 Organise and communicate information

## **Qualification Mapping Information**

This qualification replaces and is equivalent to MAR30318 Certificate III in Marina Operations.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30215 Certificate III in Maritime Operations (Marine Surveying)

## Modification History

Release 1. First release of this qualification in the MAR Maritime Training Package.

Release 2. Codes of imported units have been updated to include most current.

## Qualification Description

This qualification is suitable for people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

This qualification is currently cited as meeting some of the requirements for accreditation as a statutory marine surveyor of domestic commercial vessels by the Australian Maritime Safety Authority (AMSA).

Accreditation will require achievement of other requirements, people seeking accreditation should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 9 units**

9 core units

### Core units

MARF006	Observe personal safety and social responsibility
MARM001	Apply knowledge of safety management system legal framework in the workplace
MARM002	Apply vessel construction theory to marine survey tasks
MARM003	Identify factors that affect a commercial vessel's fitness for purpose

MARM004	Work in the marine surveying sector
BSBADM307	Organise schedules
BSBWOR301	Organise personal work priorities and development
PSPGOV314A	Contribute to conflict management
PSPREG201A	Carry out inspections and monitoring under guidance

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR30613 Certificate III in Maritime Operations (Marine Surveying).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MAR30218 Certificate III in Maritime Operations (Integrated Rating)

## Modification History

Release 1. New qualification.

## Qualification Description

This qualification is suitable for people working in the rating stream in the maritime industry as a crew member on a ship, carrying out maintenance and lookout duties on decks and in ship engine rooms. Integrated ratings steer a vessel under the direction of the officer of the watch, and work on deck and in the engine room under the direction of the officer of the watch. This qualification meets the competency requirements of an Integrated Rating as described in Marine Orders 70 and 73 (2014) under the Australian Navigation Act 2012 administered by the Australian Maritime Safety Authority (AMSA). Other requirements include sea-service, a declaration of medical fitness and completion of a task record book. People seeking AMSA certification should check the requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 22

22 core units

Core units

HLTAID003      Provide first aid

MARB016      Contribute to routine engine maintenance on a vessel

MARB017      Perform routine maintenance and repairs on a vessel

MARC027	Contribute to the operation of engine equipment and associated propulsion plant
MARC028	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC029	Perform rigging on board a vessel
MARC030	Use and care for hand and power tools
MARC032	Perform dogging on board a vessel
MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving appliances
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF018	Assist in an emergency response
MARF019	Operate emergency equipment and apply emergency procedures

MARJ006	Follow environmental work practices
MARK005	Steer a vessel under direction of the Master
MARN007	Use seamanship skills on board a vessel
MARO005	Contribute to monitoring and controlling a safe engine watch
MARO006	Contribute to monitoring and controlling a safe navigational watch
MSMPER200	Work in accordance with an issued permit
MSMPER205	Enter confined space

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR30116 Certificate III in Maritime Operations (Integrated Rating)

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30220 Certificate III in Maritime Operations (Integrated Rating)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people who work in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certification in the capacity of:

- Navigational Watch Rating (STCW Reg II/4)
- Engine Room Watch Rating (STCW Reg III/4)
- Able Seafarer Deck (STCW Reg II/5)
- Able Seafarer Engine (STCW Reg III/5)
- Integrated Rating (STCW Reg II/4, III/4 and II/5, III/5).

***Please note: RTO to insert on the testamur, the specialist unit group selected from the group choice below.***

## Licensing /Regulatory Information

Legislative and regulatory requirements are applicable to this qualification.

- This qualification is currently cited as meeting some of the requirements for certification by the AMSA as Able Seafarer Deck, Able Seafarer Engine and Integrated Rating as defined in Marine Orders and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

This qualification is required to obtain an AMSA certificate of competency as an Integrated Rating as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-II/4, A-II/5, A-III/4 and A-III/5 (Certificate III in Maritime Operations Integrated Rating)
- holding or have held certificates of competency as defined in Marine Order 73
- qualifying sea service as defined in Marine Order 73
- completing STCW short courses as defined in Marine Order 73
- holding a valid AMSA certificate of medical fitness
- meeting any other regulatory requirements as defined in Marine Order 73.

This qualification is required to obtain an AMSA certificate of competency as an Able Seafarer

Deck as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-II/4 and A-II/5 (Able Seafarer Deck)
- holding or have held certificates of competency as defined in Marine Order 73
- qualifying sea service as defined in Marine Order 73
- completing STCW short courses as defined in Marine Order 73
- holding a valid AMSA certificate of medical fitness
- meeting any other regulatory requirements as defined in Marine Order 73.

This qualification is required to obtain AMSA certificate of competency as an Able Seafarer Engine as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-III/4 and A-III/5 (Able Seafarer Engine)
- holding or have held certificates of competency as defined in Marine Order 73
- qualifying sea service as defined in Marine Order 73
- completing STCW short courses as defined in Marine Order 73
- holding a valid AMSA certificate of medical fitness
- meeting any other regulatory requirements as defined in Marine Order 73.

Seafarers seeking certification should check requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units to be completed:

- Able Seafarer Deck = 24 units: 17 core units, plus all units from Group A
- Able Seafarer Engine = 20 units: 17 core units, plus all units from Group B
- Integrated Rating = 27 units: 17 core units, plus all units from Group A and B

**Where a prerequisite is attached to a unit it is identified by the symbol ⊏.**

### Core units

HLTAID011	Provide first aid
MARA012	Contribute to basic cargo operations on liquefied gas tankers
MARA013	Contribute to basic cargo operations on oil and chemical tankers (basic oil

and chemical)

MARB045	Perform routine maintenance and repairs on a vessel
MARC057	Perform dogging on board a vessel
MARC060	Use and care for hand and power tools
MARF033	Assist in an emergency response
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF037	Follow vessel security procedures (security awareness training)
MARF041	Observe personal safety and social responsibility (PSSR)
MARF042	Operate emergency equipment and apply emergency procedures
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)
MARF046	Survive at sea in the event of vessel abandonment and personal survival techniques (PST)
MARJ006	Follow environmental work practices
MARN015	Use seamanship skills on board a vessel
MSMPER200	Work in accordance with an issued permit
MSMPER205	Enter confined space
	└ MSMPER200 Work in accordance with an issued permit

### **Group A: Able Seafarer Deck**

MARB025	Maintain mooring equipment
MARC022	Perform mooring and unmooring activities
MARC031	Shift mooring lines using mechanical means
MARC052	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC058	Perform rigging on board a vessel
MARK012	Steer a vessel under direction of the Master
MARO008	Contribute to monitoring and controlling a safe navigational watch

### **Group B: Able Seafarer Engine**

MARB035	Contribute to routine engine maintenance on a vessel
MARC045	Contribute to the operation of engine equipment and associated propulsion plant
MARO007	Contribute to monitoring and controlling a safe engine watch

## **Qualification mapping information**

This qualification replaces and is not equivalent to MAR30218 Certificate III in Maritime Operations (Integrated Rating).

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30318 Certificate III in Marina Operations

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package Release 3.0.

## Qualification Description

This qualification is suitable for people working in the marina industry performing a range of tasks such as berthing, mooring and storage of vessels and a range of boatyard tasks connected to sailing, cruising and general boating.

No licensing, legislative or certification requirements apply to this qualification at the time of publication.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 17

11 core units plus

6 elective units

The elective units can be selected from the elective units list below – up to 2 of these 6 elective units may be selected from any endorsed Training Package where the unit is packaged in a qualification at the same level or one level higher.

Imported units must be relevant to the job role, work outcome and enterprise and individual needs.

Core units

BSBCUS201	Deliver a service to customers
BSBINN201	Contribute to workplace innovation
BSBWOR203	Work effectively with others
MARB021	Perform routine tasks in a marina
MARB022	Refuel a vessel



MARB023	Maintain marina infrastructure
MARF023	Apply safe work practices in a marina
MARF024	Classify marina infrastructure, vessels and staffing structure
MARF025	Respond to marina emergencies
MEM50003B	Follow work procedures to maintain the marine environment
MEM50004B	Maintain quality of environment by following marina codes
Elective units	
AURREA2001	Apply environmental and sustainability best practice in a marine workplace
BSBCMM201	Communicate in the workplace
BSBWHS401	Implement and monitor WHS policies, procedures and programs to meet legislative requirements
HLTAID003	Provide first aid
MARB024	Undertake basic boatyard operations
MARC019	Transmit and receive information by marine VHF radio within Australian Territorial Waters
MARF027	Apply basic survival skills in the event of vessel abandonment
MARN008	Apply seamanship skills aboard a vessel up to 12 metres
MEM11010B	Operate mobile load shifting equipment

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR30315 Certificate III in Marina Operations

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30320 Certificate III in Maritime Operations (Marine Cookery)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for persons carrying out marine cook duties on a ship.

This qualification is currently cited as meeting some of the requirements for certification as a Marine Cook by the Australian Maritime Safety Authority (AMSA).

People seeking certification should check the requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 14**

14 core units

### Core units

HLTAID011	Provide first aid
MARF037	Follow vessel security procedures (security awareness training)
MARF041	Observe personal safety and social responsibility (PSSR)
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF046	Survive at sea in the event of vessel abandonment and personal survival techniques (PST)
SITHCCC002	Prepare and present simple dishes
	└ SITXFSA001 Use hygienic practices for food safety
SITHCCC005	Prepare dishes using basic methods of cookery
	└ SITXFSA001 Use hygienic practices for food safety

SITHCCC011	Use cookery skills effectively
	└ SITXFSA001 Use hygienic practices for food safety
SITHKOP001	Clean kitchen premises and equipment
	└ SITXFSA001 Use hygienic practices for food safety
SITXCCS006	Provide service to customers
SITXFSA001	Use hygienic practices for food safety
SITXINV002	Maintain the quality of perishable items
	└ SITXFSA001 Use hygienic practices for food safety
SITXINV004	Control stock
SITXWHS001	Participate in safe work practices

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR30415 Certificate III in Maritime Operations (Marine Cookery).

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR30415 Certificate III in Maritime Operations (Marine Cookery)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package Release 3.0.

## Qualification Description

This qualification is suitable for persons carrying out marine cook duties on a ship.

This qualification is currently cited as meeting some of the requirements for certification as a Marine Cook by the Australian Maritime Safety Authority (AMSA).

People seeking certification should check the requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 14**

14 core units

### Core units

MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
HLTAID003	Provide first aid
SITHCCC102	Prepare simple dishes
SITHCCC201	Produce dishes using basic methods of cookery
SITHCCC207	Use cookery skills effectively

SITHKOP101	Clean kitchen premises and equipment
SITXCCS303	Provide service to customers
SITXFSA101	Use hygienic practices for food safety
SITXINV202	Maintain the quality of perishable items
SITXINV401	Control stock
SITXWHS101	Participate in safe work practices

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR30713 Certificate III in Maritime Operations (Marine Cookery).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR30818 Certificate III in Maritime Operations (Marine Engine Driver Grade 2 Near Coastal)**

### **Modification History**

Release 1. First release of this qualification.

### **Qualification Description**

This qualification applies to people working in maritime industry seeking an Australian Maritime Safety Authority (AMSA) certificate of competency in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <750 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <1500 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer or
- worker in an engine room of a vessel <80 m long with propulsion power <3000 kW.

#### **Licensing/Regulatory Information**

This qualification is required to obtain an AMSA certification as a Marine Engine Driver Grade 2 Near Coastal NC as defined in the National Standard for Commercial Vessels (NSCV) Part D.

AMSA certification will require:

- achieving MAR30818 Certificate III in Maritime Operations (Marine Engine Driver Grade 2 NC
- sea service consisting of:
  - 180 days qualifying sea service and a completed AMSA approved task bookor
  - 360 days qualifying sea serviceor
  - 120 days qualifying sea service and a completed AMSA approved task book, while holding a Coxswain 1 (Cox 1), Coxswain 2 endorsed for 500 kW inboard propulsion (Cox 2 500 kW), or Marine Engine Driver Grade 3 (MED 3)or
  - 240 days qualifying sea service while holding a Cox 1, Cox 2 500 kW or MED 3or
  - 90 days qualifying sea service and a completed AMSA approved task book while holding a workshop skill equivalent qualification

or

- 180 days qualifying sea service while holding a workshop skill equivalent qualification
- meeting the medical and eyesight requirements specified in the NSCV Part D and
- assessment by an AMSA approved assessor using the AMSA mandated practical assessment (AMPA).

## Entry Requirements

Not applicable.

## Packaging Rules

**Total number of units = 17 units**

**17 core units**

### Core units

BSBWOR203	Work effectively with others
HLTAID003	Provide first aid
MARB031	Maintain marine internal combustion engines, propulsion plant and auxiliary systems
MARB032	Undertake basic maintenance of electrical systems
MARC033	Complete engine room tasks
MARC034	Maintain hull out of water
MARC035	Operate and maintain extra low and low voltage electrical systems and equipment
MARC036	Operate deck machinery
MARC039	Operate marine internal combustion engines, and propulsion and auxiliary systems
MARC040	Manage fuel systems
MARC041	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems
MARC042	Operate electrical systems
MARF027	Apply basic survival skills in the event of vessel abandonment

MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARJ006	Follow environmental work practices

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR30813 Certificate III in Maritime Operations (Marine Engine Driver Grade 2 Near Coastal).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MAR30918 Certificate III in Maritime Operations (Master up to 24 metres Near Coastal)**

### **Modification History**

Release 1. First release of this qualification.

### **Qualification Description**

This qualification applies to people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certificate of competency in the capacity of:

- master on commercial vessels up to 24 m in length within the exclusive economic zone (EEZ) or
- chief mate or deck watchkeeper on vessels up to 35 m in length within the EEZ or
- chief mate or deck watchkeeper on vessels up to 80 m in length in inshore waters.

### **Licensing/Regulatory Information**

This qualification is required to obtain an AMSA certificate of competency as a Master <24 metres NC as defined in the National Standard for Commercial Vessels (NSCV) Part D.

AMSA certification of competency will require:

- achieving MAR30918 Certificate III in Maritime Operations (Master <24 m Near Coastal)
- a Marine Radio Operators Certificate of Proficiency
- sea service consisting of:
  - 120 days qualifying sea service and a completed AMSA approved task book

or

- 600 days qualifying sea service
- meeting the medical and eyesight requirements specified in the NSCV Part D and
- assessment by an AMSA approved assessor using the AMSA mandated practical assessment (AMPA) conducted on a commercial vessel  $\geq 7.5$  m in length.

### **Entry Requirements**

Not applicable.

### **Packaging Rules**

**Total number of units = 15 units**

15 core units

**Core units**

BSBFLM303	Contribute to effective workplace relationships
HLTAID003	Provide first aid
MARB029	Perform routine maintenance on a vessel up to 24 metres
MARB030	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARH015	Manage and maintain a navigational watch on board vessels up to 80 metres
MARH016	Plan and navigate a passage for a vessel up to 80 metres
MARH017	Use wheelhouse equipment for safe navigation
MARI004	Observe regulations to ensure safe operation of a vessel up to 80 metres
MARJ007	Monitor environmental management on a vessel
MARK008	Manoeuvre a vessel up to 24 metres within near coastal waters
MARN009	Perform seamanship operations on board a vessel up to 24 metres

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR30913 Certificate III in Maritime Operations (Master up to 24 metres Near Coastal).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR31018 Certificate III in Maritime Operations (Master Inland Waters)

## Modification History

Release 1. First release of this qualification.

## Qualification Description

This qualification applies to people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certificate of competency in the capacity of:

- master on commercial vessels <24 m in length in inland waters.

### Licensing/Regulatory Information

This qualification is required to obtain an AMSA certificate of competency as a Master Inland Waters as defined in the National Standard for Commercial Vessels (NSCV) Part D.

AMSA certification will require:

- achieving MAR31018 Certificate III in Maritime Operations (Master Inland Waters)
- sea service consisting of:
  - 60 days qualifying sea service and a completed AMSA approved task book

or

- 120 days qualifying sea service
- meeting the medical and eyesight requirements specified in the NSCV Part D and
- assessment by an AMSA approved assessor using the AMSA mandated practical assessment (AMPA) conducted on a commercial vessel  $\geq 7.5$  m in length.

## Entry Requirements

Not applicable.

## Packaging Rules

**Total number of units = 13 units**

13 core units

### Core units

HLTAID003 Provide first aid

BSBFLM303 Contribute to effective workplace relationships

MARB029	Perform routine maintenance on a vessel up to 24 metres
MARB030	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARH014	Apply weather information when navigating inland waters as Master
MARH015	Manage and maintain a navigational watch on board vessels up to 80 metres
MARI004	Observe regulations to ensure safe operation of a vessel up to 80 metres
MARJ007	Monitor environmental management on a vessel
MARK008	Manoeuvre a vessel up to 24 metres within near coastal waters
MARN009	Perform seamanship operations on board a vessel up to 24 metres

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR31013 Certificate III in Maritime Operations (Master Inland Waters).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR40118 Certificate IV in Maritime Operations (Marine Surveying)

## Modification History

Release 1. First release of this qualification in the MAR Maritime Training Package.

Release 2. Codes of imported units have been updated to include most current.

## Qualification Description

This qualification is suitable for people working in the maritime industry as a domestic commercial vessel surveyor assistant. This qualification is currently cited as meeting some of the requirements for accreditation as a surveyor of domestic commercial vessels by the Australian Maritime Safety Authority (AMSA). Accreditation will require achievement of other requirements; people seeking accreditation should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 14 units

14 core units

Core units

MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARM002	Apply vessel construction theory to marine survey tasks
MARM005	Assess compliance with marine environment protection requirements
MARM006	Assist in the survey of commercial vessels
MARM007	Assist in the survey of vessel mechanical features
MARM008	Evaluate vessel stability
MARM009	Implement a systematic approach to the audit of safety management

systems

MARM010	Survey lifesaving appliances, fire and other safety systems
CHCCOM002	Use communication to build relationships
PSPGEN038	Identify and treat risks
PSPGEN042	Exercise delegations
PSPREG003	Apply regulatory powers

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR40115 Certificate IV in Maritime Operations (Marine Surveying).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MAR40120 Certificate IV in Maritime Operations (Chief Integrated Rating)**

## **Modification History**

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## **Qualification Description**

This qualification is suitable for people who work in the maritime industry as:

- Chief Integrated Rating.

## **Licensing/Regulatory Information**

- This qualification is cited as meeting some of the requirements for certification by the Australian Maritime Safety Authority (AMSA) as a Chief Integrated Rating as defined in Marine Orders.

This qualification is required to obtain AMSA certificate of competency as a Chief Integrated Rating as defined in Marine Orders.

AMSA certification of competency will require:

- completing an approved program of study appropriate for the grade of certificate (MAR40120 Certificate IV in Maritime Operations Chief Integrated Rating)
- holding or have held certificates of competency as defined in Marine Order 73
- qualifying sea service as defined in Marine Order 73
- completing STCW short courses as defined in Marine Order 73
- holding a valid AMSA certificate of medical fitness
- meeting any other regulatory requirements as defined in Marine Order 73.

Seafarers seeking certification should check requirements with AMSA.

## **Entry Requirements**

There are no entry requirements for this qualification

## **Packaging Rules**

Total number of units to be completed:

- Chief Integrated Rating = 31 core units

**Where a prerequisite is attached to a unit it is identified by the symbol  $\perp$ .**

**Core units**

HLTAID011	Provide first aid
MARA012	Contribute to basic cargo operations on liquefied gas tankers
MARA013	Contribute to basic cargo operations on oil and chemical tankers (basic oil and chemical)
MARB025	Maintain mooring equipment
MARB035	Contribute to routine engine maintenance on a vessel
MARB036	Implement vessel planned maintenance system
MARB043	Manage stores for planned maintenance system
MARB045	Perform routine maintenance and repairs on a vessel
MARC022	Perform mooring and unmooring activities
MARC031	Shift mooring lines using mechanical means
MARC045	Contribute to the operation of engine equipment and associated propulsion plant
MARC052	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC057	Perform dogging on board a vessel
MARC058	Perform rigging on board a vessel
MARC060	Use and care for hand and power tools
MARF033	Assist in an emergency response
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF037	Follow vessel security procedures (security awareness training)
MARF041	Observe personal safety and social responsibility (PSSR)
MARF042	Operate emergency equipment and apply emergency procedures
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)
MARF044	Prevent, control and fight fires on board a vessel (advanced firefighting)
MARF046	Survive at sea in the event of vessel abandonment and personal survival



	techniques (PST)
MARG010	Supervise a crew
MARJ006	Follow environmental work practices
MARK012	Steer a vessel under direction of the Master
MARN015	Use seamanship skills on board a vessel
MARO007	Contribute to monitoring and controlling a safe engine watch
MARO008	Contribute to monitoring and controlling a safe navigational watch
MSMPER200	Work in accordance with an issued permit
MSMPER205	Enter confined space
	└ MSMPER200 Work in accordance with an issued permit

## Qualification Mapping Information

This qualification replaces and is not equivalent to MAR40218 Certificate IV in Maritime Operations (Chief Integrated Rating).

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR40218 Certificate IV in Maritime Operations (Chief Integrated Rating)

## Modification History

Release 1. New qualification.

## Qualification Description

This qualification is suitable for people working in the maritime industry in charge of the Integrated Ratings on a ship, who are responsible for implementing the planned maintenance system and maintaining relevant stores. This qualification meets the competency requirements of a Chief Integrated Rating as described in Marine Orders 70 and 73 (2014) under the Australian Navigation Act 2012 administered by the Australian Maritime Safety Authority (AMSA). Other requirements include sea-service, a declaration of medical fitness and completion of a task record book. People seeking AMSA certification should check the requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

Total number of units = 27

27 core units

Core units

HLTAID003	Provide first aid
MARB016	Contribute to routine engine maintenance on a vessel
MARB017	Perform routine maintenance and repairs on a vessel
MARB018	Implement vessel planned maintenance system
MARB019	Manage stores for planned maintenance system
MARC027	Contribute to the operation of engine equipment and associated propulsion plant
MARC028	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC029	Perform rigging on board a vessel

MARC030	Use and care for hand and power tools
MARC032	Perform dogging on board a vessel
MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving appliances
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF018	Assist in an emergency response
MARF019	Operate emergency equipment and apply emergency procedures
MARG005	Supervise a crew
MARJ006	Follow environmental work practices
MARK005	Steer a vessel under direction of the Master
MARN007	Use seamanship skills on board a vessel
MARO005	Contribute to monitoring and controlling a safe engine watch
MARO006	Contribute to monitoring and controlling a safe navigational watch
MSMPER200	Work in accordance with an issued permit
MSMPER205	Enter confined space
TAEASS402	Assess competence

## Qualification Mapping Information

This qualification supersedes and is equivalent to MAR40116 Certificate IV in Maritime Operations (Chief Integrated Rating).

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR40220 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal)**

### **Modification History**

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

### **Qualification Description**

This qualification is suitable for people working in the maritime industry operating as Chief Engineer on vessels with propulsion power up to 1500 kW and Second Engineer on vessels with propulsion power up to 3000 kW in the exclusive economic zone (EEZ).

### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver Grade 1 Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D.

Certification will require achievement of the MAR40220 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal), qualifying sea service and completed Australian Maritime Safety Authority (AMSA) approved task book or qualifying sea service, or qualifying sea service and a workshop skill equivalent qualification, AMSA final assessment and an AMSA approved first aid certificate.

People seeking certification should check with AMSA.

### **Entry Requirements**

There are no entry requirements for this qualification.

### **Packaging Rules**

Total number of units = 29 units

29 core units

#### **Core units**

HLTAID011	Provide first aid
BSBTWK201	Work effectively with others
MARA024	Manage vessel stability

MARB032	Undertake basic maintenance of electrical systems
MARB034	Carry out basic welding, brazing, cutting and machining operations on a coastal vessel
MARB041	Manage refuelling
MARB047	Undertake maintenance of 240 to 440 voltage alternating current electrical systems
MARB048	Undertake maintenance of machinery, machinery systems and structural components
MARC033	Complete engine room tasks
MARC034	Maintain hull out of water
MARC035	Operate and maintain extra low and low voltage electrical systems and equipment
MARC036	Operate deck machinery
MARC039	Operate marine internal combustion engines, and propulsion and auxiliary systems
MARC040	Manage fuel systems
MARC041	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems
MARC042	Operate electrical systems
MARC049	Operate 240 to 440 voltage alternating current electrical systems
MARC050	Operate auxiliary machinery systems up to 1500 kW
MARC053	Operate marine internal combustion engines and associated systems up to 1500 kW
MARC054	Operate propulsion transmission systems up to 1500 kW
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARG009	Manage an engine room and small engineering team in emergencies

MARJ006	Follow environmental work practices
MARJ007	Monitor environmental management on a vessel
MARL046	Carry out engineering calculations
RIIWHS202E	Enter and work in a confined space

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR40518 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal).

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR40320 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal)**

### **Modification History**

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

### **Qualification Description**

This qualification is suitable for those sailing as Master on vessels up to 35 metres in length within the exclusive economic zone (EEZ) or a Mate on vessels up to 80 metres in length.

### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as a Master up to 35 metres Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D.

Certification as a Master less than 35 metres Near Coastal (as defined by the NSCV Part D) will require achievement of the MAR40320 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal), certification as a Master less than 24 metres Near Coastal, an appropriate radio certificate of proficiency, Australian Maritime Safety Authority (AMSA) final assessment and an AMSA approved first aid certificate.

People seeking certification should check with AMSA.

This level of qualification is also currently cited as meeting some of the requirements for certification as a Mate less than 80 metres Near Coastal as defined by the NSCV Part D. Certification as a Mate less than 80 metres Near Coastal will require achievement of the MAR40320 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal), qualifying sea service and completion of AMSA approved task book or qualifying sea service, an appropriate radio certificate of proficiency, AMSA final assessment and an AMSA approved first aid certificate.

People seeking certification should check with AMSA.

### **Entry Requirements**

There are no entry requirements for this qualification.

### **Packaging Rules**

Total number of units = 22 units

22 core units

## Core units

HLTAID011	Provide first aid
MARA022	Manage loading, discharging and stowing of cargo
MARA024	Manage vessel stability
MARB030	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
MARB046	Plan and supervise routine maintenance on a vessel up to 80 metres
MARC047	Manage a propulsion unit using appropriate engine systems and support services
MARC048	Monitor and manage vessel operations
MARC051	Operate deck machinery and steering gear on a vessel up to 80 metres
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARG007	Manage a small crew
MARH015	Manage and maintain a navigational watch on board vessels up to 80 metres
MARH016	Plan and navigate a passage for a vessel up to 80 metres
MARH017	Use wheelhouse equipment for safe navigation
MARH019	Forecast weather and oceanographic conditions
MARI004	Observe regulations to ensure safe operation of a vessel up to 80 metres
MARJ007	Monitor environmental management on a vessel
MARK009	Manoeuvre a vessel up to 80 metres
MARN013	Manage seaworthiness of a vessel up to 80 metres
RIIWHS202E	Enter and work in a confined space

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR40618 Certificate IV in Maritime



Operations (Master up to 35 metres Near Coastal).

## **Links**

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR40518 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal)**

### **Modification History**

Release 1. New qualification.

Release 2. Codes of imported units have been updated to include most current.

### **Qualification Description**

This qualification is suitable for people who work in the maritime industry operating as Chief Engineer on vessels with propulsion power up to 1500 kW and Second Engineer on vessels with propulsion power up to 3000 kW in the exclusive economic zone (EEZ).

#### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver Grade 1 Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D. Certification will require achievement of the MAR40513 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal), qualifying sea service and completed Australian Maritime Safety Authority (AMSA) approved task book or qualifying sea service or qualifying sea service and a workshop skill equivalent qualification, AMSA final assessment and an AMSA approved first aid certificate; people seeking certification should check with AMSA.

### **Entry Requirements**

Not applicable.

### **Packaging Rules**

Total number of units = 27 units

27 core units

BSBWOR203	Work effectively with others
MARA004	Manage vessel stability
MARB032	Undertake basic maintenance of electrical systems
MARB008	Carry out basic welding, brazing, cutting and machining operations on a coastal vessel
MARB009	Manage refuelling

MARB011	Undertake maintenance of 240 to 440 voltage alternating current electrical systems
MARB012	Undertake maintenance of machinery, machinery systems and structural components
MARC033	Complete engine room tasks
MARC034	Maintain hull out of water
MARC035	Operate and maintain extra low and low voltage electrical systems and equipment
MARC036	Operate deck machinery
MARC039	Operate marine internal combustion engines, and propulsion and auxiliary systems
MARC040	Manage fuel systems
MARC041	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems
MARC042	Operate electrical systems
MARC013	Operate auxiliary machinery systems up to 1500 kW
MARC015	Operate marine internal combustion engines and associated systems up to 1500 kW
MARC016	Operate propulsion transmission systems up to 1500 kW
MARC017	Operate 240 to 440 voltage alternating current electrical systems
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARG003	Manage an engine room and small engineering team
MARJ006	Follow environmental work practices
MARJ007	Monitor environmental management on a vessel
MARL001	Carry out engineering calculations

## Qualification Mapping Information

This qualification is equivalent to MAR40513 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1).

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR40618 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal)**

### **Modification History**

Release 1. New qualification.

### **Qualification Description**

This qualification is suitable for those sailing as Master on vessels up to 35 metres in length within the exclusive economic zone (EEZ) or a Mate on vessels up to 80 metres in length.

#### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as a Master up to 35 metres Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D. Certification as a Master less than 35 metres Near Coastal (as defined by the NSCV Part D) will require achievement of the MAR40613 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal), certification as a Master less than 24 metres Near Coastal, an appropriate radio certificate of proficiency, AMSA final assessment and an AMSA approved first aid certificate; people seeking certification should check with the Australian Maritime Safety Authority (AMSA). This level of qualification is also currently cited as meeting some of the requirements for certification as a Mate less than 80 metres Near Coastal as defined by the NSCV Part D. Certification as a Mate less than 80 metres Near Coastal will require achievement of the MAR40613 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal), qualifying sea service and completed AMSA approved task book or qualifying sea service, an appropriate radio certificate of proficiency, AMSA final assessment and an AMSA approved first aid certificate; people seeking certification should check with AMSA.

### **Entry Requirements**

Not applicable.

### **Packaging Rules**

Total number of units = 21 units

21 core units

MARA003	Manage loading, discharging and stowage of cargo
MARA004	Manage vessel stability
MARB030	Slip or dock a vessel and maintain hull on a vessel up to 80 metres

MARB010	Plan and supervise routine maintenance on a vessel up to 80 metres
MARC011	Manage a propulsion unit using appropriate engine systems and support services
MARC012	Monitor and manage vessel operations
MARC014	Operate deck machinery and steering gear on a vessel up to 80 metres
MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft
MARF010	Work safely in confined spaces on a vessel
MARG002	Manage a small crew
MARH015	Manage and maintain a navigational watch on board vessels up to 80 metres
MARH016	Plan and navigate a passage for a vessel up to 80 metres
MARH017	Use wheelhouse equipment for safe navigation
MARH006	Forecast weather and oceanographic conditions
MARI004	Observe regulations to ensure safe operation of a vessel up to 80 metres
MARJ007	Monitor environmental management on a vessel
MARK003	Manoeuvre a vessel up to 80 metres
MARN004	Manage seaworthiness of a vessel up to 80 metres

## Qualification Mapping Information

This qualification is equivalent to MAR40613 Certificate IV in Maritime Operations (Master up to 35 metres).

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR50115 Diploma of Maritime Operations (Engineer Watchkeeper)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people who work in the maritime industry as an Engineer Watchkeeper on a seagoing ship powered by main propulsion machinery of any propulsion power in any operating area.

This qualification is currently cited as meeting some of the requirements for certification as an Engineer Watchkeeper by the Australian Maritime Safety Authority (AMSA). People seeking certification should check requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 22 units**

18 core units, plus

4 elective units from the elective units list below:

- at least 1 unit must be from Group A
- the remaining units must be from Group A or Group B.

### Core units

MARE001	Communicate effectively when performing engineering duties
MARF003	Follow vessel security procedures
MARF008	Prevent and fight fires on board a vessel
MARF010	Work safely in confined spaces on a vessel
MARF022	Apply maritime resource management principles

MARG004	Provide leadership to crew
MARJ003	Ensure compliance with environmental management legislation
MARL002	Apply basic principles of naval architecture
MARL003	Demonstrate basic knowledge of marine auxiliary boilers
MARL004	Demonstrate basic knowledge of marine auxiliary machinery and equipment
MARL005	Demonstrate basic knowledge of marine control systems and automation
MARL007	Demonstrate basic knowledge of marine electrical systems
MARL009	Perform basic marine engineering calculations
MARL010	Apply basic principles of marine electrotechnology
MARL011	Apply basic principles of marine engineering thermodynamics
MARL012	Apply basic principles of marine mechanics
MARL037	Demonstrate knowledge of ships and ship routines
HLTAID003	Provide first aid

**Elective units: Group A**

MARL006	Demonstrate basic knowledge of marine diesel engines and systems
MARL013	Demonstrate basic knowledge of marine steam turbines and main boilers

**Elective units: Group B**

MARA001	Contribute to safe cargo operations on liquefied gas tankers
MARA002	Contribute to safe cargo operations on oil and chemical tankers



MARB013	Maintain and repair marine electrical and electronic equipment
MARB014	Maintain and repair shipboard machinery and equipment
MARC014	Operate deck machinery and steering gear on a vessel up to 80 metres
MARC018	Employ tools, equipment and materials in a shipboard context
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving applications
MARF009	Survive at sea in the event of vessel abandonment
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF013	Provide medical first aid on board a vessel

## Qualification Mapping Information

This qualification replaces MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper) – not equivalent.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR50120 Diploma of Marine Engineering

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certification in the capacity of:

- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited).

*Please note: RTO to insert on the testamur the job role and specialisation, if applicable, selected from the group choice below.*

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this qualification:

- This qualification is currently cited as meeting some of the requirements for certification by AMSA as an Engineer Class 3 Near Coastal as defined in Marine Order 505 (Certificates of competency – National Law) 2013.
- This qualification is currently cited as meeting some of the requirements for certification by AMSA as an Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) or Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) as defined in Marine Orders and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

This qualification is required to obtain AMSA certificate of competency as an Engineer Class 3 Near Coastal as defined in Marine Order 505 (Certificates of competency – National Law) 2013.

AMSA certification of competency will require:

- completing an approved program of study that meets Engineer Class 3 Near Coastal at Diploma level (MAR50120 Diploma of Marine Engineering - Engineer Class 3 Near Coastal)
- holding or have held certificates of competency as defined in National Standards for Commercial Vessels (NSCV) Part D
- qualifying sea service as defined in the NSCV Part D
- meeting the medical and eyesight requirements specified in NSCV Part D
- having passed a final AMSA assessment

- meeting any other regulatory requirements as defined in the NSCV Part D.

This qualification is required to obtain an AMSA certificate of competency as an Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulation STCW A-III/1 (MAR50120 Diploma of Marine Engineering - Engineer Watchkeeper)
- holding or have held certificates of competency as defined in Marine Order 72
- qualifying sea service as defined in Marine Order 72
- completing STCW short courses as defined in Marine Order 72
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 72.

This qualification is required to obtain an AMSA certificate of competency as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulation STCW A-III/6 (MAR50120 Diploma of Marine Engineering - Electro-Technical Officer)
- holding or have held certificates of competency or trade certificate as defined in Marine Order 72
- qualifying sea service as defined in Marine Order 72
- completing STCW short courses as defined in Marine Order 72
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 72.

Seafarers seeking certification should check requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

### Total number of units

- **Engineer Class 3 Near Coastal** = 19 core units.

- **Engineer Watchkeeper** = 28 units: 19 core units, plus all units from Group A.
- **Electro-Technical Officer** = 32 units: 19 core units, plus all units from Group B.
- **Electro-Technical Officer and Engineer Watchkeeper** = 34 units: 19 core units, plus all units from Group B, plus 2 units from Group A: MARL043 Apply basic principles of marine engineering thermodynamics and MARL044 Apply basic principles of marine mechanics.

### AMSA specialisation – Group C

- **Engineer Class 3 Near Coastal Specialist** = 21 units: 19 core units, plus 2 units from Group C.
- **Engineer Watchkeeper Specialist** = 30 units: 19 core units, plus all units from Group A, plus 2 units from Group C.
- **Electro-Technical Officer Specialist** = 34 units: 19 core units, plus all units from Group B, plus 2 units from Group C.
- **Electro-Technical Officer and Engineer Watchkeeper Specialist** = 36 units: 19 core units, plus all units from Group B, plus 2 units from Group A: MARL043 Apply basic principles of marine engineering thermodynamics and MARL044 Apply basic principles of marine mechanics, plus 2 units from Group C.

### Core units

#### Controlling the Operation of the Ship and Care for Persons on Board at the Operational Level (Part A)

HLTAID011	Provide first aid
MARF031	Apply leadership and team working capability
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF037	Follow vessel security procedures (security awareness training)
MARF041	Observe personal safety and social responsibility (PSSR)
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)

MARF044	Prevent, control and fight fires on board a vessel (advanced firefighting)
MARF046	Survive at sea in the event of vessel abandonment and personal survival techniques (PST)
MARF047	Monitor compliance with legislative requirements
MARJ008	Ensure compliance with pollution prevention requirements
RIIWHS202E	Enter and work in confined spaces

### **Marine Engineering at the Operational Level Mathematics (Part A)**

MARL045	Apply basic principles of naval architecture
MARL061	Perform basic marine engineering calculations

### **Marine Engineering at the Operational Level (Part A)**

MARL054	Demonstrate basic knowledge of marine auxiliary boilers
MARL055	Demonstrate basic knowledge of marine auxiliary machinery and equipment
MARL057	Demonstrate basic knowledge of marine diesel engines and systems

### **Electrical, Electronic and Control Engineering at the Operational Level (Part A)**

MARL056	Demonstrate basic knowledge of marine control systems and automation
MARL058	Demonstrate basic knowledge of marine electrical systems

### **Maintenance and Repair at the Operational Level (Part A)**

MARL060	Demonstrate knowledge of ships and ship routines
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## **GROUP A: Engineer Watchkeeper**

### **Marine Engineering at the Operational Level Mathematics (Part B)**

MARL043	Apply basic principles of marine engineering thermodynamics
MARL044	Apply basic principles of marine mechanics

### **Marine Engineering at the Operational Level (Part C)**

MARL059	Demonstrate basic knowledge of marine steam turbines and main boilers
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### **Maintenance and Repair at the Operational Level (Part B)**

MARB038	Maintain and repair marine electrical and electronic equipment
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**Electrical, Electronic and Control Engineering at the Operational Level (Part B)**

MARB044 Operate and maintain ship power systems exceeding 1,000 volts

MARL042 Apply basic principles of marine electrotechnology

**Controlling the Operational of the Ship and Care for Persons on Board at the Operational Level (Part B)**

MARA012 Contribute to basic cargo operations on liquefied gas tankers

MARA013 Contribute to basic cargo operations on oil and chemical tankers (basic oil and chemical)

MARF032 Apply medical first aid on board ship

**GROUP B: Electro-Technical Officer****Controlling the Operation of the Ship and Care for Persons on Board at the Operational Level (Part B)**

MARA012 Contribute to basic cargo operations on liquefied gas tankers

MARA013 Contribute to basic cargo operations on oil and chemical tankers (basic oil and chemical)

MARF032 Apply medical first aid on board ship

**Maintenance and Repair at the Operational Level**

MARB037 Maintain and repair bridge navigation equipment and ship communication systems

MARB040 Maintain control and safety systems of hotel equipment

MARB049 Use internal communication systems, operate computers and computer networks on ships

**Electrical, Electronic and Control Engineering at the Operational Level (Part C)**

MARL038 Apply advanced principles of marine electrotechnology

MARL049 Demonstrate advanced knowledge of marine control systems and automation

**Marine Engineering at the Operational Level (Part C)**

MARL059 Demonstrate basic knowledge of marine steam turbines and main boilers

**Maintain and Repair at the Operational Level (Part B)**

MARB038 Maintain and repair marine electrical and electronic equipment

**Electrical, Electronic and Control Engineering at the Operational Level (Part D)**

MARB044 Operate and maintain ship power systems exceeding 1,000 volts

MARL042 Apply basic principles of marine electrotechnology

MARL051 Demonstrate advanced knowledge of marine electrical systems

**GROUP C: Specialist Electives**

MARA011 Contribute to basic operations of ships in polar waters

MARA014 Contribute to basic operations of a ship subject to IGF Code

MARA018 Manage advanced chemical tanker cargo operations

MARA019 Manage advanced liquefied gas tanker cargo operations

MARA020 Manage advanced oil tanker cargo operations

MARA021 Manage advanced operations of a ship subject to IGF Code

MARB039 Maintain and repair shipboard machinery and equipment

MARC046 Employ tools, equipment and materials in a shipboard context

MARC056 Operate roll-on and roll-off machinery and equipment on board a vessel

MARF034 Carry out fast rescue craft operations

MARF040 Manage ship security (Ship Security Officer)

MARN012 Manage advanced operations of ships in polar waters

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR50115 Diploma of Maritime Operations (Engineer Watchkeeper) and MAR50613 Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal).

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR50215 Diploma of Maritime Operations (Marine Surveying)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in the maritime industry as a domestic commercial vessel marine surveyor.

This qualification is currently cited as meeting some of the requirements for accreditation as a surveyor of domestic commercial vessels by the Australian Maritime Safety Authority (AMSA).

Accreditation will require achievement of other requirements; people seeking accreditation should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 10 units**

10 core units

### Core units

MARM011	Calculate, assess and report on vessel trim and stability
MARM012	Conduct a range of surveys on domestic commercial vessels
MARM013	Conduct an audit of safety management systems
MARM014	Develop marine survey reports
MARM015	Participate in investigating marine incidents



MARM016	Survey hull and superstructure of a commercial vessel
MARM017	Survey vessel operational systems
MARM018	Undertake a periodic statutory survey
MARM019	Establish a marine surveyor practice
PUALAW003B	Give evidence in a judicial or quasi-judicial setting

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR50513 Diploma of Maritime Operations (Marine Surveying).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR50220 Diploma of Maritime Operations

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certification in the capacity of:

- Master less than 24 metres (foreign going)
- Chief Mate less than 3000 gross tonnage (GT)
- Master of commercial vessel less than 500 gross tonnage (GT)
- Mate less than 500 gross tonnage (GT)
- Master less than 80 metres Near Coastal
- Waterkeeper Deck
- Watchkeeper Deck less than 3000 gross tonnage (GT)

*Please note: RTO to insert on the testamur the job role and specialisation, if applicable, selected from the group choice below*

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this qualification:

- This qualification is currently cited as meeting some of the requirements for certification by AMSA as a Master less than 80 metres Near Coastal as defined in Marine Order 505 (Certificates of competency – National law) 2013.
- This qualification is currently cited as meeting some of the requirements for certification by AMSA as a Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck as defined in Marine Orders and the International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW).

This qualification is required to obtain an AMSA certificate of competency as a Master less than 80 metres Near Coastal as defined in Marine Order 505 (Certificates of competency – National law) 2013.

AMSA certification of competency will require:

- completing an approved program of study that meets Master less than 80 metres course at Diploma level (MAR50220 Diploma of Maritime Operations - Master less than 80 metres Near Coastal)
- holding or have held certificates of competency as defined in the National Standards for

### Commercial Vessels (NSCV) Part D

- holding a Marine Radio Operators certificate of proficiency as defined in NSCV Part D
- qualifying sea service as defined in NSCV Part D
- meeting the medical and eyesight requirements specified in NSCV Part D
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in NSCV Part D.

This qualification is required to obtain an AMSA certificate of competency as a Master of a commercial vessel less than 500 GT as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-II/1 and A-II/2 (MAR50220 Diploma of Maritime Operations - Masters less than 500 GT)
- holding or have held certificates of competency as defined in Marine Order 71
- qualifying sea service as defined in Marine Order 71
- completing STCW short courses as defined in Marine Order 71
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 71.

This qualification is required to obtain an AMSA certificate of competency as a Watchkeeper Deck as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulation STCW A-II/I (MAR50220 Diploma of Maritime Operations - Watchkeeper Deck)
- holding or have held certificates of competency as defined in Marine Order 71
- qualifying sea service as defined in Marine Order 71
- completing STCW short courses as defined in Marine Order 71
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 71.

Seafarers seeking certification should check requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

### Total number of units

- **Master less than 80 metres Near Coastal** = 22 units: 19 core units, plus all units from

### Group C

- **Masterless than 500 GT** = 26 units: 19 core units, plus all units from Group B
- **Watchkeeper Deck** = 22 units: 19 core units, plus all units from Group A

### AMSA specialisation

- **Masterless than 80 metres Near Coastal Specialist** = 24 units: 19 core units, plus all units from Group C, plus 2 units from Group D
- **Masterless than 500 gross tonnage (GT) Specialist** = 28 units: 19 core units, plus all units from Group B, plus 2 units from Group D
- **Watchkeeper Deck Specialist** = 24 units: 19 core units, plus all units from Group A, plus 2 units from Group D

### Core units

#### Navigation at the operational level

MARH022	Plan and conduct a passage and determine position
MARH023	Use of electronic chart display and information system to maintain the safety of navigation (ECDIS)
MARH024	Use of radar and other bridge equipment to maintain safety of navigation
MARK011	Manoeuvre the ship
MARO009	Maintain a safe navigational watch
MARO012	Transmit and receive information by visual signalling

#### Cargo handling and stowage at the operational level

MARA025	Monitor loading, unloading, securing and stowage of cargo
MARN011	Maintain seaworthiness of the ship (ship construction)

#### Controlling the operation of the ship and care for persons on board at the operational level

HLTAID011	Provide first aid
MARA017	Maintain seaworthiness of the ship (ship stability)
MARF031	Apply leadership and team working capability
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF037	Follow vessel security procedures (security awareness training)

MARF041	Observe personal safety and social responsibility (PSSR)
MARF044	Prevent, control and fight fires on board a vessel (advanced firefighting)
MARF046	Survive at sea in the event of vessel abandonment and personal survival techniques (PST)
MARF047	Monitor compliance with legislative requirements
MARJ008	Ensure compliance with pollution prevention requirements
RIIWHS202E	Enter and work in a confined space

### **Group A: Watchkeeper Deck**

#### **Controlling the operations of the ship and care for persons on board at the operational level**

MARF032	Apply medical first aid on board ship
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)
MARO011	Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)

### **Group B: Master less than 500 GT**

#### **Controlling of the operations of the ship and care for persons on board at the operational level**

MARD006	Monitor and control compliance with legislative requirements
MARF032	Apply medical first aid on board ship
MARF038	Manage provision of medical care on board a vessel
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)
MARG008	Manage a vessel and its crew
MARK010	Manoeuvre and handle a ship in all conditions
MARO011	Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)

### **Group C: Master less than 80 metres Near Coastal**

#### **Controlling the operation of the ship**

MARD004	Manage business and administration on vessels limited by tonnage or near coastal operations
MARD005	Manage operations and maintenance on vessels limited by tonnage or near coastal operations
MARH018	Apply command navigation procedures on vessels limited by tonnage or near coastal operations

### **Group D: Specialist Electives**

MARA011	Contribute to basic operations of ships in polar waters
MARA014	Contribute to basic operations of a ship subject to IGF Code
MARA018	Manage advanced chemical tanker cargo operations
MARA019	Manage advanced liquefied gas tanker cargo operations
MARA020	Manage advanced oil tanker cargo operations
MARA021	Manage advanced operations of a ship subject to IGF Code
MARC056	Operate roll on and roll off machinery and equipment on board a vessel
MARF034	Carry out fast rescue craft operations
MARF040	Manage ship security (Ship Security Officer)
MARN012	Manage advanced operations of ships in polar waters

## **Qualification Mapping Information**

This qualification replaces and is equivalent to:

MAR50315 Diploma of Maritime Operations (Watchkeeper Deck),

MAR50415 Diploma of Maritime Operations (Master up to 500 GT) and

MAR50713 Diploma of Maritime Operations (Master up to 80 metres Near Coastal).

## **Links**

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR50315 Diploma of Maritime Operations (Watchkeeper Deck)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package Release 3.0.

## Qualification Description

This qualification is suitable for people who work in the maritime industry as a Watchkeeper Deck.

This qualification meets some of the requirements for the certification as a Watchkeeper (Deck) as described in Marine Orders 70, 71 and 74 under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

People seeking certification should check the requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 25**

25 core units

### Core units

HLTAID003	Provide first aid
MARA005	Maintain vessel stability
MARA010	Manage loading, unloading and stowage of cargo
MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving appliances

MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF010	Work safely in confined spaces on a vessel
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF012	Control safe access to and on vessel
MARF013	Provide medical first aid on board a vessel
MARF014	Respond to emergencies
MARF022	Apply maritime resource management principles
MARG004	Provide leadership to crew
MARH008	Plan and conduct a passage
MARH009	Use an electronic chart display and information system to navigate safely
MARH010	Use bridge equipment to determine vessel position
MARJ003	Ensure compliance with environmental management legislation
MARJ004	Inspect and report defects and damage to vessel
MARK004	Perform basic vessel manoeuvres
MARN005	Maintain seaworthiness of a vessel
MARO002	Maintain a safe navigational watch
MARO003	Transmit and receive information by the global maritime distress and safety system
MARO004	Transmit and receive information by visual signalling



## Qualification Mapping Information

This qualification replaces and is equivalent to MAR50313 Diploma of Maritime Operations (Watchkeeper Deck).

MAR50313 replaces TDM50307 Diploma of Transport Distribution (Maritime Operations - Deck Watchkeeper).

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR50415 Diploma of Maritime Operations (Master up to 500 GT)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package Release 3.0.

## Qualification Description

This qualification is suitable for people who work in the maritime industry as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area.

This qualification is currently cited as meeting some of the requirements for certification as a Master <500 GT as described in Marine Order 70 and 71 (2014) under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

People seeking certification should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 29**

29 core units

### Core units

HLTAID003 Provide first aid

MARA005 Maintain vessel stability

MARA010 Manage loading, unloading and stowage of cargo

MARD001 Manage business and administration on vessels limited by tonnage or near coastal operations

MARD002 Manage operations and maintenance on vessels limited by tonnage or near coastal operations

MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving appliances
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF010	Work safely in confined spaces on a vessel
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF012	Control safe access to and on vessel
MARF013	Provide medical first aid on board a vessel
MARF014	Respond to emergencies
MARF015	Manage provision of medical care on board a vessel
MARF022	Apply maritime resource management principles
MARG004	Provide leadership to crew
MARH007	Apply command navigation procedures on vessels limited by tonnage or near coastal operations
MARH008	Plan and conduct a passage
MARH009	Use an electronic chart display and information system to navigate safely
MARH010	Use bridge equipment to determine vessel position
MARJ003	Ensure compliance with environmental management legislation
MARJ004	Inspect and report defects and damage to vessel
MARK004	Perform basic vessel manoeuvres
MARN005	Maintain seaworthiness of a vessel
MARO002	Maintain a safe navigational watch
MARO003	Transmit and receive information by the global maritime distress and safety system
MARO004	Transmit and receive information by visual signalling

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR50413 Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR50613 Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal)**

### **Modification History**

Release 1. New qualification.

### **Qualification Description**

This qualification is suitable for people who work in the maritime industry as a Chief Engineer on vessels with propulsion power up to 3000 kW in the exclusive economic zone (EEZ).

### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as an Engineer Class 3 Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D.

Certification will require achievement of the MAR50613 Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal), qualifying sea service and completed Australian Maritime Safety Authority (AMSA) approved task book or qualifying sea service or qualifying sea service and a workshop skill equivalent qualification, AMSA final assessment and an AMSA approved first aid certificate; people seeking certification should check with AMSA.

Certification will also require either MAR40513 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal) or a trade (as specified in NSCV Part D).

### **Entry Requirements**

Not applicable.

### **Packaging Rules**

**Total number of units = 15 units**

15 core units

MARE001            Communicate effectively when performing engineering duties

MARF003            Follow vessel security procedures

MARF006	Observe personal safety and social responsibility
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF010	Work safely in confined spaces on a vessel
MARJ003	Ensure compliance with environmental management legislation
MARL002	Apply basic principles of naval architecture
MARL003	Demonstrate basic knowledge of marine auxiliary boilers
MARL004	Demonstrate basic knowledge of marine auxiliary machinery and equipment
MARL005	Demonstrate basic knowledge of marine control systems and automation
MARL006	Demonstrate basic knowledge of marine diesel engines and systems
MARL007	Demonstrate basic knowledge of marine electrical systems
MARL008	Demonstrate basic knowledge of ships and ship routines
MARL009	Perform basic marine engineering calculations

## Qualification Mapping Information

This qualification is equivalent to MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR50713 Diploma of Maritime Operations (Master up to 80 metres Near Coastal)**

### **Modification History**

Release 1. New qualification.

### **Qualification Description**

This qualification is suitable for people who work in the maritime industry as a Master on vessels up to 80 metres operating in near coastal waters within the exclusive economic zone (EEZ).

### **Licensing/Regulatory Information**

This level of qualification is currently cited as meeting some of the requirements for certification as a Master up to 80 metres Near Coastal as defined by the National Standard for Commercial Vessels (NSCV) Part D.

Certification will require achievement of the MAR50713 Diploma of Maritime Operations (Master up to 80 metres Near Coastal), certification as a Master less than 35 metres Near Coastal, qualifying sea service and completed Australian Maritime Safety Authority (AMSA) approved task book or qualifying sea service, AMSA final assessment, an appropriate radio certificate of proficiency and an AMSA approved first aid certificate; people seeking certification should check with AMSA.

### **Entry Requirements**

MAR40613 Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal)

### **Packaging Rules**

**Total number of units = 25 units**

25 core units

MARA001	Contribute to safe cargo operations on liquefied gas tankers
MARA002	Contribute to safe cargo operations on oil and chemical tankers
MARA005	Maintain vessel stability
MARA006	Monitor loading, unloading and stowage of cargo

MARD001	Manage business and administration on vessels limited by tonnage or near coastal operations
MARD002	Manage operations and maintenance on vessels limited by tonnage or near coastal operations
MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF010	Work safely in confined spaces on a vessel
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF012	Control safe access to and on vessel
MARF014	Respond to emergencies
MARG004	Provide leadership to crew
MARH007	Apply command navigation procedures on vessels limited by tonnage or near coastal operations
MARH008	Plan and conduct a passage
MARH009	Use an electronic chart display and information system to navigate safely
MARH010	Use bridge equipment to determine vessel position
MARJ003	Ensure compliance with environmental management legislation
MARJ004	Inspect and report defects and damage to vessel
MARK004	Perform basic vessel manoeuvres
MARN005	Maintain seaworthiness of a vessel
MARO002	Maintain a safe navigational watch
MARO004	Transmit and receive information by visual signalling



## Qualification Mapping Information

No equivalent qualification.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MAR60115 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)**

### **Modification History**

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

### **Qualification Description**

This qualification is suitable for people who work as an Engineer Class 2 in the maritime industry on ships powered by main propulsion machinery of any propulsion power in any operating area.

This qualification forms some of the requirements for certification by the Australian Maritime Safety Authority (AMSA) as an Engineer Class 2 as described in Marine Orders 70-73 (2014) under the Navigation Act 2012.

People seeking certification should check requirements with AMSA.

### **Entry Requirements**

There are no entry requirements for this qualification.

### **Packaging Rules**

**Total number of units = 18 units**

13 core units, plus

5 elective units from the elective units list below:

at least 1 unit must be from Group A

the remaining units must be from Group A or Group B.

#### **Core units**

MARF010	Work safely in confined spaces on a vessel
MARF022	Apply maritime resource management principles
MARG004	Provide leadership to crew

MARL014	Apply intermediate principles of marine electrotechnology
MARL015	Apply intermediate principles of marine engineering thermodynamics
MARL016	Apply intermediate principles of marine mechanics
MARL017	Apply intermediate principles of naval architecture
MARL022	Demonstrate basic knowledge of ship construction
MARL023	Demonstrate basic knowledge of ship operation and maintenance
MARL024	Demonstrate intermediate knowledge of marine auxiliary boilers
MARL025	Demonstrate intermediate knowledge of marine auxiliary machinery and systems
MARL026	Demonstrate intermediate knowledge of marine control systems and automation
MARL028	Demonstrate intermediate knowledge of marine electrical systems

#### **Elective units: Group A**

MARL027	Demonstrate intermediate knowledge of marine diesel engines and systems
MARL029	Demonstrate intermediate knowledge of marine steam turbines and main boilers

#### **Elective units: Group B**

MARA001	Contribute to safe cargo operations on liquefied gas tankers
MARA002	Contribute to safe cargo operations on oil and chemical tankers
MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility

MARF007	Operate survival craft and other lifesaving appliances
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF013	Provide medical first aid on board a vessel
HLTAID003	Provide first aid

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2).

MAR60113 replaces and is equivalent to TDM60307 Advanced Diploma of Transport & Distribution (Marine Engineering - Class 2)

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR60120 Advanced Diploma of Marine Engineering (Class 1)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certification in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited)

on ships powered by main propulsion machinery of any propulsion power in any operating area.

*Please note: RTO to insert on the testamur the job role and specialisation, if applicable, selected from the group choice below*

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this qualification:

- This qualification is currently cited as meeting some of the requirements for certification by AMSA as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) as defined in Marine Orders and the International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW).

This qualification is required to obtain an AMSA certificate of competency as an Engineer Class 1 (STCW Chief Engineer Unlimited) as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-III/1 and A-III/2 (MAR60120 Advanced Diploma of Marine Engineering Class 1)
- holding or have held certificates of competency as defined in Marine Order 72
- qualifying sea service as defined in Marine Order 72
- completing STCW short courses as defined in Marine Order 72
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 72.

This qualification is required to obtain an AMSA certificate of competency as an Engineer Class 2 (STCW Second Engineer Unlimited) as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-III/1 and A-III/2 (MAR60120 Advanced Diploma of Marine Engineering Class 1)
- holding or have held certificates of competency as defined in Marine Order 72
- qualifying sea service as defined in Marine Order 72
- completing STCW short courses as defined in Marine Order 72
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 72.

Seafarers seeking certification should check requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

### Total number of units

- **Engineer Class 1 (Motor)** = 14 units: 13 core units, plus one unit from Group A
- **Engineer Class 1 (Steam)** = 14 units: 13 core units, plus one unit from Group B
- **Engineer Class 1 (Motor and Steam)** = 15 units: 13 core units, plus all units from Group C

### AMSA specification

- **Engineer Class 1 (Motor) Specialist** = 17 units: 13 core units, plus unit from Group A, plus 3 units from Group D
- **Engineer Class 1 (Steam) Specialist** = 17 units: 13 core units, plus unit from Group B, plus 3 units from Group D
- **Engineer Class 1 (Steam and Motor) Specialist** = 18 units: 13 core units, plus all units from Group C, plus 3 units from Group D

### Core units

#### Controlling the operation of the ship and care for persons on board at the management level

MARD006      Monitor and control compliance with legislative requirements

MARF039 Manage safety and security of vessel, crew and passengers

MARF045 Provide leadership and managerial capability

**Electrical, electronic and control engineering at the management level**

MARB044 Operate and maintain ship power systems exceeding 1,000 volts

MARL038 Apply advanced principles of marine electrotechnology

MARL049 Demonstrate advanced knowledge of marine control systems and automation

MARL051 Demonstrate advanced knowledge of marine electrical systems

**Marine engineering at the management level (mathematics)**

MARL039 Apply advanced principles of marine engineering thermodynamics

MARL040 Apply advanced principles of marine mechanics

**Marine engineering at the management level (Part A)**

MARL047 Demonstrate advanced knowledge of marine auxiliary boilers

MARL048 Demonstrate advanced knowledge of marine auxiliary machinery and systems

**Maintenance and repair at the management level**

MARL041 Apply advanced principles of trim, stability and stress

MARL053 Demonstrate advanced knowledge of ship operations and maintenance

**GROUP A: Motor**

**Marine engineering at the management level (Part B)**

MARL050 Demonstrate advanced knowledge of marine diesel engines and systems

**GROUP B: Steam**

**Marine engineering at the management level (Part C)**

MARL052 Demonstrate advanced knowledge of marine steam turbines and main boilers

**GROUP C: Motor and Steam**

**Marine engineering at the management level (Part D)**

MARL050 Demonstrate advanced knowledge of marine diesel engines and systems

MARL052 Demonstrate advanced knowledge of marine steam turbines and main boilers

### **GROUP D: Specialist Electives**

MARA011	Contribute to basic operations of ships in polar waters
MARA014	Contribute to basic operations of a ship subject to IGF Code
MARA018	Manage advanced chemical tanker cargo operations
MARA019	Manage advanced liquefied gas tanker cargo operations
MARA020	Manage advanced oil tanker cargo operations
MARA021	Manage advanced operations of a ship subject to IGF Code
MARB037	Maintain and repair bridge navigation equipment and ship communication systems
MARB040	Maintain control and safety systems of hotel equipment
MARB049	Use internal communication systems, operate computers and computer networks on ships
MARC056	Operate roll-on and roll-off machinery and equipment on board a vessel
MARF032	Apply medical first aid on board ship
MARF034	Carry out fast rescue craft operations
MARF038	Manage provision of medical care on board a vessel
MARF040	Manage ship security (Ship Security Officer)
MARN012	Manage advanced operations of ships in polar waters

## **Qualification Mapping Information**

This qualification replaces and is equivalent to MAR60115 Advanced Diploma of Maritime Operations (Marine Engineering Class 2) and MAR60215 Advanced Diploma of Maritime Operations (Marine Engineering Class 1).

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>





# **MAR60215 Advanced Diploma of Maritime Operations (Marine Engineering Class 1)**

## **Modification History**

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## **Qualification Description**

This qualification is suitable for people who work as an Engineer Class 1 in the maritime industry on ships powered by main propulsion machinery of any propulsion power in any operating area.

This qualification forms some of the requirements for certification by the Australian Maritime Safety Authority (AMSA) as an Engineer Class 1 as described in Marine Orders 70-73 (2014) under the Navigation Act 2012.

People seeking certification should check requirements with AMSA.

## **Entry Requirements**

There are no entry requirements for this qualification.

## **Packaging Rules**

**Total number of units = 17 units**

12 core units, plus

5 elective units from the elective units list below:

- at least 1 unit must be from Group A
- the remaining units must be from Group A or Group B.

### **Core units**

MARF010	Work safely in confined spaces on a vessel
MARF022	Apply maritime resource management principles
MARG004	Provide leadership to crew
MARL018	Apply advanced principles of marine electrotechnology

MARL019	Apply advanced principles of marine engineering thermodynamics
MARL020	Apply advanced principles of marine mechanics
MARL021	Apply advanced principles of naval architecture
MARL030	Demonstrate advanced knowledge of marine auxiliary boilers
MARL031	Demonstrate advanced knowledge of marine auxiliary machinery and systems
MARL032	Demonstrate advanced knowledge of marine control systems and automation
MARL034	Demonstrate advanced knowledge of marine electrical systems
MARL036	Demonstrate advanced knowledge of ship operation and maintenance

**Elective units: Group A**

MARL033	Demonstrate advanced knowledge of marine diesel engines and systems
MARL035	Demonstrate advanced knowledge of marine steam turbines and main boilers

**Elective units: Group B**

MARA001	Contribute to safe cargo operations on liquefied gas tankers
MARA002	Contribute to safe cargo operations on oil and chemical tankers
MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving appliances
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF013	Provide medical first aid on board a vessel
HLTAID003	Provide first aid

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR60313 Advanced Diploma of Maritime Operations (Marine Engineering Class 1).

MAR60313 replaces and is equivalent to TDM60207 Advanced Diploma of Transport & Distribution (Marine Engineering - Class 1).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MAR60220 Advanced Diploma of Maritime Operations (Master Unlimited)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package.

## Qualification Description

This qualification is suitable for people working in the maritime industry seeking an Australian Maritime Safety Authority (AMSA) certification in the capacity of:

- Master in the maritime industry on ships of any gross tonnage (GT) in any operating area
- Master less than 3000 gross tonnage (GT)
- Chief Mate less than 3000 gross tonnage (GT).

*Please note: RTO to insert on the testamur the job role and specialisation, if applicable, selected from the group choice below*

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this qualification:

- This qualification is currently cited as meeting some of the requirements for certification by AMSA as a Master Unlimited as defined in Marine Orders and the International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW).

This qualification is required to obtain an AMSA certificate of competency as a Master Unlimited as defined in Marine Orders and STCW.

AMSA certification of competency will require:

- completing an approved program of study that meets regulations STCW A-II/1 and A-II/2 (MAR60220 Advanced Diploma of Maritime Operations (Master Unlimited))
- holding or have held certificates of competency as defined in Marine Order 71
- qualifying sea service as defined in Marine Order 71
- completing STCW short courses as defined in Marine Order 71
- holding a valid AMSA certificate of medical fitness
- having passed a final AMSA assessment
- meeting any other regulatory requirements as defined in Marine Order 71.

Seafarers seeking certification should check requirements with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

### Total number of units

- **Master Unlimited** = 26 core units

### AMSA specialisation

- **Master Unlimited Specialist** = 29 units: 26 core units, plus 3 specialist units.

### Core units

#### Navigation at the management level

MARC055	Operate remote controls of propulsion plant, engineering systems and services
MARF036	Coordinate search and rescue operations
MARF039	Manage safety and security of vessel, crew and passengers
MARH020	Forecast weather and oceanographic conditions to plan a safe passage
MARH021	Manage the navigation of a vessel
MARH023	Use of electronic chart display and information system to maintain the safety of navigation (ECDIS)
MARH024	Use of radar and other bridge equipment to maintain safety of navigation
MARK010	Manoeuvre and handle a ship in all conditions
MARO009	Maintain a safe navigational watch

#### Cargo handling and stowage at the management level

MARB042	Manage reported defects, damage, repairs and maintenance of a vessel
MARN014	Plan and manage safe loading, unloading, securing and stowage of cargo

#### Controlling the operation of the ship and care for persons on board at the management level

HLTAID011	Provide first aid
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MARA023	Manage trim, stability and stress of a vessel
MARD006	Monitor and control compliance with legislative requirements
MARF032	Apply medical first aid on board ship
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF037	Follow vessel security procedures (security awareness training)
MARF038	Manage provision of medical care on board a vessel
MARF041	Observe personal safety and social responsibility (PSSR)
MARF043	Operate survival craft, rescue boats and life-saving appliances (proficiency in survival craft)
MARF044	Prevent, control and fight fires on board a vessel (advanced firefighting)
MARF046	Survive at sea in the event of vessel abandonment and personal survival techniques (PST)
MARG008	Manage a vessel and its crew
MARO011	Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)
MARO012	Transmit and receive information by visual signalling
RIIWHS202E	Enter and work in a confined space

### **Specialist Electives**

MARA011	Contribute to basic operations of ships in polar waters
MARA014	Contribute to basic operations of a ship subject to IGF Code
MARA018	Manage advanced chemical tanker cargo operations
MARA019	Manage advanced liquefied gas tanker cargo operations
MARA020	Manage advanced oil tanker cargo operations
MARA021	Manage advanced operations of a ship subject to IGF Code
MARC056	Operate roll on and roll off machinery and equipment on board a vessel
MARF034	Carry out fast rescue craft operations
MARF040	Manage ship security (Ship Security Officer)

MARN012      Manage advanced operations of ships in polar waters

## **Qualification Mapping Information**

This qualification replaces and is equivalent to MAR60315 Advanced Diploma of Maritime Operations (Master Unlimited).

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MAR60315 Advanced Diploma of Maritime Operations (Master Unlimited)

## Modification History

Release 1. This is the first release of this qualification in the MAR Maritime Training Package Release 3.0.

## Qualification Description

This qualification is suitable for people who work as a Master in the maritime industry on ships of any gross tonnage in any operating area.

This qualification is currently cited as meeting some of the requirements for certification as a Master (Unlimited) as described in Marine Orders 70 and 71(2014) under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

People seeking certification should check with AMSA.

## Entry Requirements

There are no entry requirements for this qualification.

## Packaging Rules

**Total number of units = 28**

28 core units

### Core units

HLTAID003	Provide first aid
MARA009	Manage stability of a vessel 500 gross tonnage or more
MARB020	Manage repairs and maintenance of a vessel 500 gross tonnage or more
MARC026	Operate remote controls of propulsion plant and engineering systems
MARD003	Manage legal requirements of a vessel

MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF007	Operate survival craft and other lifesaving appliances
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment
MARF010	Work safely in confined spaces on a vessel
MARF011	Manage firefighting and fire prevention activities on board a vessel
MARF013	Provide medical first aid on board a vessel
MARF015	Manage provision of medical care on board a vessel
MARF020	Coordinate search and rescue operations
MARF021	Manage safety and security of vessel crew and passengers
MARF022	Apply maritime resource management principles
MARG006	Manage a vessel and its crew
MARH009	Use an electronic chart display and information system to navigate safely
MARH010	Use bridge equipment to determine vessel position
MARH011	Forecast weather and oceanographic conditions to plan a safe passage
MARH012	Manage the navigation of a vessel 500 gross tonnage or more
MARJ005	Manage compliance with environmental management legislation
MARK006	Manoeuvre a vessel 500 gross tonnage or more

MARN006	Manage cargo operations
MARO002	Maintain a safe navigational watch
MARO003	Transmit and receive information by the global maritime distress and safety system
MARO004	Transmit and receive information by visual signalling

## Qualification Mapping Information

This qualification replaces and is equivalent to MAR60213 Advanced Diploma of Maritime Operations (Master Unlimited).

MAR60213 replaces TDM60407 Advanced Diploma of Transport & Distribution (Maritime Operations – Master Unlimited).

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARA011 Contribute to basic operations of ships in polar waters**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to contribute to basic operations of ships in polar waters.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/4 (1 and 2) and Code Section A-V/4 (1), Table A-V/4-1.

Legislative and regulatory requirements are applicable to this unit:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters or Ratings for basic operations of ships in polar waters and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## Competency Field

A - Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Contribute to safe operation of vessels in polar waters**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Ice properties and their characteristics and relevance to safe ship operations are correctly identified
- 1.2** Ice information and publications are used and interpreted correctly and applied appropriately
- 1.3** Visible and infrared satellite images and egg charts are used to identify ice conditions
- 1.4** Meteorological and oceanographic data is coordinated with ice data
- 1.5** Measurements and observations of weather and ice conditions are accurate and used appropriately when planning a passage
- 1.6** Ship characteristics are identified and their limitations under different ice conditions and impact of operating in a cold environment
- 1.7** Procedures for assessing risk are made before entering ice
- 1.8** Ship and crew are prepared for operations in ice and low air temperatures in accordance with workplace procedure and principles
- 1.9** Communication with personnel is clear, concise and accurate and information is understood and acted upon
- 1.10** Procedures for loading and unloading cargo and embarking and disembarking passengers in low

temperatures where appropriate, are correctly identified using Polar Code and Polar Water Operations Manual

- 1.11 Procedures for monitoring ballast water for icing, engine temperatures and anchor watch concerns in ice and transit near ice are correctly identified using Polar Code and Polar Waters Operations Manual
  - 1.12 Information from radar is interpreted and analysed in accordance with lookout procedures with special caution, regarding identification of dangerous ice features
  - 1.13 Information obtained from navigational charts, electronic charts and publications is relevant, assessed, interpreted and applied correctly
  - 1.14 Primary method of position fixing is frequent and appropriate for the prevailing conditions and routing through ice
  - 1.15 Performance checks and tests of navigation and communication systems comply with recommendations for operations in high latitude and low air temperature
- 2 **Monitor compliance with legislative requirements**
  - 2.1 Relevant sections of Polar Water Operations Manual are identified and applied to operations
  - 2.2 Communication is conducted in accordance with local, regional and international standard procedures
  - 2.3 Legislative requirements relevant to regulations, codes and practices are identified and applied correctly to operations
- 3 **Apply safe work practices when responding to emergencies**
  - 3.1 Hazardous situations are identified and appropriate actions are taken for hazardous situations for ship and individual crew members
  - 3.2 Actions taken are in accordance with Polar Water Operations Manual, accepted principles and procedures to ensure safety of operations and avoidance of pollution of the marine environment
  - 3.3 Personal protective equipment (PPE) is used correctly and safe working practices are observed at all times
  - 3.4 Actions taken are in accordance with emergency procedures and plans and are appropriate to the situation

		and nature of the emergency
	<b>3.5</b>	Legislative requirements relevant to regulations, codes and practices are identified and applied correctly to operations
	<b>3.6</b>	PPE is used correctly and defects and damages are detected and promptly reported
<b>4</b>	<b>Ensure compliance with pollution prevention and prevent environmental hazards</b>	
	<b>4.1</b>	Legislative requirements relevant to regulations, codes and practices are identified and applied correctly to operations
	<b>4.2</b>	Limitations on vessel discharges are identified and selected correctly in accordance with the Polar Code
	<b>4.3</b>	Limitations on vessel discharges and plans for storing are correctly applied in accordance with Polar Water Operations Manual and Waste Management Plan
	<b>4.4</b>	References that provide details of areas to be avoided are identified
	<b>4.5</b>	Factors that must be considered when managing waste stream during polar voyages are identified

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARA011 Contribute to basic operations of ships in polar waters**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying environmental factors and regulations in accordance with legislative and environmental requirements
- applying hazard identification and risk control measures
- applying relevant international regulations, codes, industry guidelines and industry standards relevant to operations in polar waters
- applying safe work practices and risk assessments for crew and shipboard safety
- communicating clearly and effectively
- correctly identifying and using safety data sheets (SDS)/material safety data sheets (MSDS) relevant to hazards
- following safe work practices, workplace procedures and emergency response procedures
- identifying and acting on hazardous situations
- selecting and using personal protective equipment (PPE) and devices appropriate to an emergency situation.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- fundamentals of operating and manoeuvring a vessel in ice, including:
  - engine loads and cooling problems
  - ballast tank monitoring
  - cargo operations in polar waters
  - safe speed in the presence of ice and icebergs
  - safety procedures during ice transit
- fundamentals of environmental factors, including:
  - areas where shipping is prohibited
  - areas where shipping should be avoided

- limitations of oil spill equipment
- sensitive sea areas regarding discharge
- ship plans for coping with increased volumes of waste, including:
  - garbage, bilge water and sewage
- lack of infrastructure
- fundamental knowledge of ice characteristics and areas where different types of ice can be expected in operational areas, including:
  - differential movement of icebergs and ice packs
  - effect of wind and current on ice
  - friction from snow covered ice
  - ice concentrations
  - ice blink
  - ice imagery
  - ice physics, terms, formation, growth, ageing and stage of melt
  - ice pressure and distribution
  - ice regimes in different regions, including:
    - ice types
    - first year
    - land ice
    - multiyear ice
    - sea ice
    - significant differences between the Arctic and Antarctic
  - implications of spray icing, including:
    - danger of icing up
    - options during icing up
    - precautions to avoid icing up
  - tides and currents in ice
  - water sky
- fundamental knowledge of vessel performance in ice and low air temperature, including:
  - engineering requirements for operating in ice
  - equipment and machinery limitation in ice condition and low air temperature
  - hull designs
  - ice strengthening requirements
  - limitations of ice-classes
  - low-temperature system performance
  - monitoring of ice pressure on hull
  - sea suction
  - superstructure insulation and special systems
  - vessel characteristics
  - vessel types

- water intake
- winterisation and preparedness of vessel, including engine and deck
- fundamental understanding of regulatory requirements, including:
  - Antarctic Treaty
  - Polar Code
  - accident reports for vessels in polar waters
  - International Maritime Organization (IMO) standards for operation in remote areas
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
- fundamental knowledge of crew preparation, working conditions and safety, including:
  - contingency planning
  - most common hull and equipment damages and how to avoid these
  - how to establish and implement safe working procedures for specific polar events:
    - ice covered surfaces
    - low temperatures
    - PPE
    - use of buddy system
    - working time limitations
  - human factors, including:
    - cold fatigue
    - crew welfare
    - medical first aid aspects
  - need for extra resources, including:
    - bunker
    - extra clothing
    - food
  - prevention and removal of ice, including the factors of accretion
  - dangers when crews are exposed to low temperatures
  - fatigue problems due to noise and vibrations
  - search and rescue (SAR) readiness and responsibilities, including:
    - sea area
    - SAR communication facility limitation
  - survival requirements, including:
    - group survival equipment
    - personal survival equipment
  - superstructure deck icing, including effect on trim and stability
- oil spill and pollution in ice, including regulatory and environmental consequences.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARAO12 Contribute to basic cargo operations on liquefied gas tankers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to recognise hazards associated with liquefied gas tankers (basic gas) and to apply appropriate hazard control measures to contribute to safe cargo operation.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters and Ratings for basic operations on liquefied gas tankers and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

- 1 Determine characteristics of tanker cargo and tankers to ensure safe transfer and transport of cargo**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Features of various types of liquefied gas tankers are outlined
- 1.2** Cargo operations of tankers are identified
- 1.3** Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations are outlined
- 1.4** Hazards associated with the transport of cargo are clarified according to emergency response documentation
- 1.5** Hazard controls associated with tanker cargo are employed according to organisational procedures
- 2 Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo**
  - 2.1** Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified
  - 2.2** SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel
  - 2.3** Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo

- |   |  |
|---|--|
| <b>3 Take precautions to prevent hazards</b>  | <b>3.1</b> Organisational policies and procedures to minimise hazards are identified   |
|   | <b>3.2</b> Type and severity of the hazard posed by cargo is recognised  |
|   | <b>3.3</b> Transfer and transport of cargo is monitored to prevent hazards   |
|   | <b>3.4</b> Gas monitoring equipment is regularly inspected and used according to organisational procedures   |
| <b>4 Recognise hazardous situation</b>  | <b>4.1</b> Source of hazard is identified according to organisational procedures   |
|   | <b>4.2</b> Risk is assessed considering severity and likelihood of consequences  |
|   | <b>4.3</b> Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for further action   |
|   | <b>4.4</b> Containment procedures are applied where appropriate  |
|   | <b>4.5</b> Appropriate safety procedures are followed and personal protective equipment (PPE) is used according to organisational procedures   |
|   | <b>4.6</b> Risk is eliminated, where possible, and if not practical, actions are taken to control risk   |
| <b>5 Take precautions to prevent pollution of the environment from release of liquefied gases</b> | <b>5.1</b> Procedures to prevent pollution are identified and observed at all times  |
|   | <b>5.2</b> Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures                                       |
|   | <b>5.3</b> All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud |
|   | <b>5.4</b> Shore-based response personnel are promptly notified when a vapour leak or cloud occurs   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA001 Contribute to safe cargo operations on liquefied gas tankers.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARA012 Contribute to basic cargo operations on liquefied gas tankers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assisting in implementing shipboard spill containment procedures
- communicating clearly and effectively
- contributing to cargo operations in accordance with principles and procedures
- identifying hazards, assessing risks and applying control measures in accordance with safety management systems (SMS)
- measuring for gas using monitoring instruments
- reading and interpreting safety data sheets (SDS)/material safety data sheets (MSDS), relevant cargo-related hazards to vessel and to personnel, and taking appropriate action according to organisational procedures
- recognising problems and hazards that can arise when managing safety on a liquefied gas tanker in accordance with SMS
- reporting relevant information to the responsible person.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- cargo handling equipment, including cargo compressors
- cargo types, characteristics and their properties
- chemical symbols
- effects of brittle fracture and prevention
- effects of pollution on human and marine life
- electrical safety
- emergency response procedures, including emergency organisation and alarms
- emergency shutdown (ESD) system
- fire hazards associated with cargo handling and transportation of liquefied gases in bulk
- firefighting agents and systems used to extinguish gas fires
- gas testing and monitoring instruments
- general arrangement and construction of liquefied gas tankers

- hazards and hazard control measures associated with tanker operations, including:
  - anti-static measures
  - atmospheric control
  - cargo inhibition
  - corrosion
  - cryogenic effects on the hull
  - electrical
  - electrostatic
  - enclosed space
  - environmental
  - explosion and flammability
  - extremely low temperatures
  - fire
  - gas testing
  - health hazards
  - hot and cold work
  - importance of cargo compatibility
  - inerting, drying and monitoring techniques
  - loss of containment
  - pollution
  - pressure
  - reactivity
  - repair and maintenance work
  - segregation
  - sources of ignition
  - toxicity
  - transport of cargo
  - vapour leaks and clouds
  - ventilation
- importance of cargo compatibility
- information on SDS/MSDS
- interpreting liquefied gas tanker layouts, tanker cargo features, characteristics and hazards
- loading, unloading and care in transit
- piping systems and valves
- precautions to be taken:
  - before and during repair and maintenance work
  - when entering enclosed spaces
- liquefied gas tanker cleaning, purging, gas-freeing and inerting
- liquefied gas tanker safety culture and safety management
- pressure and temperature, including vapour pressure/temperature relationship

- relevant firefighting operations and the use of firefighting installations
- reliquefaction systems and control of boil-off
- ship/shore safety checklist
- tank evacuation (rescue and escape) equipment
- types of electrostatic charge generation
- types of liquefied gas tankers
- using SDS/MSDS information when applying first aid
- using types of personal protective equipment (PPE), including:
  - breathing apparatus
  - resuscitators
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including gas monitoring instruments and oxygen indicators.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARA013 Contribute to basic cargo operations on oil and chemical tankers (basic oil and chemical)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to recognise hazards associated with oil and chemical tankers and apply appropriate hazard control measures to ensure safe cargo operation. It applies to Seafarers required to assist in the basic cargo operations on oil and chemical tankers (basic oil and chemical).

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

### **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/1-1 and Code Section A-V/1-1 (1 & 2), Table A-V/1-1-1.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters and Ratings for basic operations on oil and chemical tankers and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Recognise characteristics of tanker cargo and tankers to ensure the safe transfer and transport of cargo**

**1.1** Features of various types of oil and chemical tankers are outlined

**1.2** Cargo operations of tankers are identified

**1.3** Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is recognised

**1.4** Hazards associated with the transport of cargo are clarified according to emergency response documentation

**1.5** Hazard controls associated with tanker cargo are employed according to organisational procedures

**2 Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo**

**2.1** Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified

**2.2** SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel

- |  |            |   |
|--|------------|---|
|  | <b>2.3</b> | Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo                |
| <b>3 Take precautions to prevent hazards</b>   | <b>3.1</b> | Organisational policies and procedures to minimise hazards are identified   |
|  | <b>3.2</b> | Type and severity of hazard posed by cargo is recognised  |
|  | <b>3.3</b> | Transfer and transport of cargo is monitored to prevent hazards   |
|  | <b>3.4</b> | Monitoring equipment, where installed, is regularly inspected and used according to organisational procedures                                       |
| <b>4 Recognise hazardous situation</b>   | <b>4.1</b> | Source of hazard is identified according to organisational procedures   |
|  | <b>4.2</b> | Risk is assessed considering severity and likelihood of consequences  |
|  | <b>4.3</b> | Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for permission or further action     |
|  | <b>4.4</b> | Containment procedures are applied, where appropriate   |
|  | <b>4.5</b> | Appropriate safety procedures are followed and personal protective equipment (PPE) is used according to organisational procedures                   |
|  | <b>4.6</b> | Risk is eliminated where possible, and if not practical, actions are taken to control risk  |
|  | <b>4.7</b> | Appropriate firefighting equipment is identified to carry out firefighting operations   |
| <b>5 Take precautions to prevent pollution of the environment from the release of oil or chemicals</b> | <b>5.1</b> | Procedures to prevent pollution are identified and observed at all times  |
|  | <b>5.2</b> | Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures |

- 5.3 All relevant information is immediately reported to appropriate persons when a spill is detected or a malfunction has occurred that poses a risk of a spill
- 5.4 All required spill containment procedures are correctly implemented according to regulatory requirements and organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA002 Contribute to safe cargo operations on oil and chemical tankers.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA013 Contribute to basic cargo operations on oil and chemical tankers (basic oil and chemical)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assisting in implementing shipboard spill containment procedures
- applying cargo operations, including:
  - cargo handling equipment
  - loading, unloading and care in transit
  - piping systems and valves
  - tank cleaning, purging, gas-freeing and inerting
- communicating clearly and effectively
- correctly identifying safety data sheets (SDS)/material safety data sheets (MSDS), relevant cargo-related hazards to vessel and to personnel, and taking appropriate actions
- ensuring cargo operations are carried out according to accepted principles and procedures to ensure safety of operations
- identifying and acting on hazardous situations
- interpreting and applying knowledge of tanker layouts, tanker cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of tankers and gas carriers
- reading and interpreting SDS/MSDS
- recognising problems and hazards that can arise when managing safety on a tanker, taking appropriate remedial action and initiating appropriate solutions
- reporting relevant information to the responsible person.



## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken in the event of spillage
- alarms
- ballast voyage
- cargo and pumps
- cargo heating systems
- cargo measurement systems
- crude oil washing
- effects of oil and chemical pollution on human and marine life
- electrical safety precautions
- emergency procedures and emergency shutdown (ESD)
- features and characteristics of oil and chemical tankers
- features and characteristics of various types of tanker cargo
- firefighting agents used to extinguish oil and chemical fires
- firefighting systems on tankers, including:
  - firefighting agents
  - fixed dry chemical systems
  - fixed foam systems
  - portable foam systems
- fire hazards associated with cargo handling and transportation of hazardous and noxious liquids in bulk
- functions and processes for the calibration of various types of measuring instruments and devices used to test environments on tankers and gas carriers
- general arrangement and construction of tankers
- hazard control procedures on oil and chemical tankers
- hazards and control measures associated with tanker cargo operations
- hazards associated with:
  - carriage of bulk liquids and chemicals
  - tanker operations
- hazards to the environment
- inert gas systems
- information on SDS/MSDS
- loading and unloading
- measures to be taken in the event of spillage
- oil and chemical tanker fire response organisation and actions to be taken, including in the event of spillage
- physical properties of oil and chemicals, including:
  - chemical symbols
  - pressure and temperature, including vapour
  - pressure/temperature relationship

- types of electrostatic charge generation
- piping systems and valves
- precautions to be taken before and during repair and maintenance work
- precautions to be taken when entering into enclosed spaces
- principles of chemistry as they relate to tanker operations
- procedures for the safe use of personal protective equipment (PPE), including:
  - breathing apparatus
  - resuscitators
- procedures to prevent air and water pollution
- safety measures for hot and cold work
- ship to shore safety checklists
- shipboard pollution prevention plans, including:
  - shipboard procedures to prevent pollution and spill-containment procedures
  - Shipboard Oil Pollution Emergency Plan (SOPEP)
  - Shipboard Marine Pollution Emergency Plan (SMPEP) for noxious liquid substances (NLS)
- slops and slops disposal
- tanker cleaning, purging, gas-freeing and inerting
- tanker safety culture and safety management
- types of hazards and hazard controls, including:
  - anti-static measures
  - atmospheric control
  - cargo inhibition
  - corrosion
  - electrostatic
  - environmental
  - explosions and flammability
  - gas testing
  - health hazards
  - importance of cargo compatibility
  - inerting, drying and monitoring techniques
  - oxygen deficiency
  - reactivity
  - segregation
  - sources of ignition
  - toxicity
  - vapour leaks and clouds
  - ventilation
- tank evacuating (rescue and escape) equipment
- terminology relating to the structure capacities and operations of various types of tankers and gas carriers

- types of oil and chemical tankers
- use of SDS/MSDS to provide first aid
- work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including:
  - firefighting agents
  - fixed dry chemical systems
  - fixed foam systems
  - portable foam systems.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARAO14 Contribute to basic operations of a ship subject to IGF Code**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to contribute to safe operations of a ship subject to International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code).

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## **Licensing/Regulatory Information**

This unit is equivalent and delivers the objectives of the following STCW provisions:

- STCW Reg V/3 (4 and 5), Code Section A-V/3 (1), Table A-V/3-1.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters and Ratings for basic operations on ships subject to IGF Code and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Contribute to safe operation of ship

1.1 Communication with personnel is clear, concise and accurate and information is understood and acted upon

1.2 Cargo operations are planned, risk is managed and work carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment

#### 2 Take precautions to prevent hazardous situation

2.1 Hazards to ship and personnel are correctly identified using safety data sheets (SDS)/material safety data sheets (MSDS) and appropriate actions are taken in accordance with workplace procedures

2.2 Hazardous situations are identified and appropriate actions are taken in accordance with workplace procedures

#### 3 Apply work health and safety (WHS)/occupational health and safety (OHS) measures

3.1 Procedures designed to safeguard personnel and the ship are observed at all times

3.2 Appropriate safety procedures are followed and personal protective equipment (PPE) is used correctly

3.3 First aid requirements are identified and followed in

		accordance with SDS/MSDS, as required
<b>4</b>	<b>Carry out firefighting operations</b>	<p><b>4.1</b> Emergency procedures are followed in the event of an emergency</p> <p><b>4.2</b> Mustering signals are identified correctly and actions are taken in accordance with workplace procedures</p> <p><b>4.3</b> PPE and devices are selected and are appropriate to firefighting operations</p> <p><b>4.4</b> Timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions</p> <p><b>4.5</b> Fire is extinguished using appropriate procedures, techniques and firefighting agents</p>
<b>5</b>	<b>Respond to emergency</b>	<p><b>5.1</b> Type and urgency of emergency is identified correctly and in accordance with emergency procedures</p> <p><b>5.2</b> Actions taken are in accordance with emergency procedures and contingency plans</p>
<b>6</b>	<b>Take precautions to prevent environmental pollution</b>	<p><b>6.1</b> Procedures to prevent pollution are identified and observed at all times</p> <p><b>6.2</b> All required spillage, leakage and venting procedures are correctly implemented according to regulatory requirements and workplace procedures</p>

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.



## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA014 Contribute to basic operations of a ship subject to IGF Code**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying basic knowledge of hazard controls protection against cryogenic damages
- applying fuel storage system operations
- applying hazard identification and risk control measures
- applying physical properties of fuels
- applying relevant international regulations, codes, industry guidelines and industry standards relevant to the safe operations on ships subject to International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code)
- applying safety requirements and safety management systems
- correctly identifying and applying safety data sheets (SDS)/material safety data sheets (MSDS) to identify fuel characteristics on IGF ships
- following safe work practices, workplace procedures and emergency response procedures
- identifying and acting on hazardous situations
- identifying and using correct firefighting agents and methods to control and extinguish fires relevant to fuels onboard IGF ships
- identifying hazards that can arise when working with fuel systems and handling fuel
- identifying hazards and treating basic first aid incidents, as appropriate
- interpreting and applying knowledge of tanker layouts, tanker cargo features, characteristics and hazards to inform decision making
- selecting and using safety equipment and protective devices
- using gas-measuring instruments and equipment to test gas
- using personal protective equipment (PPE) and devices appropriate to an emergency situation.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- awareness of function of gas measuring instruments and gas-measuring instruments, including gas testing
- basic knowledge of emergency procedures, including emergency shutdown (ESD) procedures
- emergency response procedures, including:
  - leakage
  - spillage
  - venting
- firefighting operations, including:
  - fire organisation and actions to be taken in the event of a fire
  - firefighting methods and agents to control and extinguish fires in conjunction with the different fuels
  - firefighting system operations
  - special hazards associated with fuel systems and handling
- fundamental knowledge of fuel systems and fuel storage systems subject to IGF Code, including:
  - fuels addressed in the IGF Code
  - general arrangement of fuel storage systems
  - hazard zones and areas
  - monitoring, control and safety systems onboard IGF ship
  - standard fire safety plan
  - storage of fuels onboard IGF ships, including:
    - atmospheric
    - compressed storage of fuels
    - cryogenic
  - types of fuel systems
- fundamentals of fuels and fuel storage systems operations, including:
  - atmospheric, compressed and cryogenic storage
  - basic bunkering operations
  - basic bunkering systems
  - fuel leak monitoring and detection
  - piping systems and valves
  - protection against cryogenic accidents
  - relief systems and protection screens
- fundamental knowledge of measures to be taken in the event of fuel leakage, spillage and venting of fuels, including reporting relevant information to responsible persons
- fundamental knowledge of physical properties of fuels onboard IGF ships, including:
  - properties and characteristics
  - pressure and temperature

- vapour pressure/temperature relationship
- fuel storage systems and storage systems, including:
  - atmospheric, cryogenic and compressed fuel storage
  - fire safety plan
  - general arrangement of fuel storage systems
  - hazard zones and areas
  - monitoring, control and safety systems
  - using IGF Code to identify fuels and fuel systems relevant to the IGF ship
- hazards, including:
  - corrosion
  - electrostatic
  - environmental
  - explosion
  - extremely low temperatures
  - flammability
  - fuel batch differences
  - health hazards
  - ignition
  - pressure
  - reactivity
  - sources of ignition
  - toxicity
  - vapour clouds
  - vapour leaks
- hazard risk controls, including:
  - anti-static measures
  - atmospheric control
  - emptying, inerting, drying and monitoring techniques
  - gas testing
  - inhibition
  - measures to prevent:
    - explosion
    - fire
    - ignition
- safety requirements and safety management systems
- selection and use of specialised safety equipment and protective devices, including:
  - breathing apparatus
  - protection against cryogenic damages (LNG)
  - protective clothing
  - rescue and escape equipment

- resuscitators
- segregation
- ventilation
- safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety, including:
  - precautions to be taken before and during repair and maintenance work
  - precautions to be taken before entering hazardous spaces and zones
  - safety measures for hot and cold work
- selection of personal protective equipment (PPE) when responding to a spillage and leakage of fuels
- using SDS/MSDS to understand fuel characteristics on IGF ships and basic first aid treatments.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARAO15 Contribute to safe anchor handling and towing operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to undertake a range of offshore anchor handling and towing activities on board an Anchor Handling Tug Supply (AHTS) vessel within the limits of responsibility of an Integrated Rating and under the direction of the officer in charge or Master.

This unit applies to people working in the maritime industry in the capacity of:

- Integrated Rating working offshore, assigned to specific anchor handling and towing duties and responsibilities.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Integrated Ratings working offshore and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers. (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C - Equipment Operations



## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Recognise types of anchor handling and towing equipment, vessels and towed objects**

- 1.1** Required safety precautions, including fatigue management, are identified
- 1.2** Features of various AHTS are outlined
- 1.3** Types of anchor handling and towing operations are identified
- 1.4** Properties of towed objects are identified and their impact on safety, the environment and vessel operations is recognised
- 1.5** Properties of anchor handling and towing equipment and tools are identified and their impact on safety and vessel operations is recognised
- 1.6** Hazards associated with anchor handling and towing are identified
- 1.7** Hazard controls associated with anchor handling and towing are employed according to organisational procedures

#### **2 Prepare anchor handling and towing deck equipment, tools and machinery for use**

- 2.1** Appropriate personal protective equipment (PPE) and machinery are selected, used and stored according to work health and safety (WHS)/occupational health and safety (OHS) requirements
- 2.2** Routine pre-operational checks are carried out on anchor handling and towing deck equipment, tools and machinery according to manufacturer specifications, regulatory and organisational requirements
- 2.3** Deviations from normal operations are promptly identified and rectified

- |   |            |  |
|---|------------|--|
|   | <b>2.4</b> | Adjustments are made to achieve a safe and efficient operation   |
|   | <b>2.5</b> | Inability to start machinery is reported promptly and accurately to appropriate personnel  |
| <b>3 Operate anchor handling and towing deck tools and equipment</b>                                  | <b>3.1</b> | Deck equipment, tools and machinery are operated in a safe and controlled manner within defined operating limits when running to achieve optimum safety and efficiency |
|   | <b>3.2</b> | Deviations from normal operations are promptly identified  |
|   | <b>3.3</b> | Action is taken to rectify basic operational faults to maintain optimum safety and efficiency  |
|   | <b>3.4</b> | Appropriate action is taken in a malfunction or emergency  |
| <b>4 Check and complete anchor handling and towing deck equipment, tools and machinery operations</b> | <b>4.1</b> | Equipment and machinery shutdown procedures are carried out according to manufacturer specifications and organisational procedures                                     |
|   | <b>4.2</b> | Equipment and machinery damage, malfunctions or irregular performance are recorded and reported according to organisational procedures                                 |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA008 Contribute to safe anchor handling and towing operations

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **Assessment Requirements for MARA015 Contribute to safe anchor handling and towing operations**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- following manufacturer recommendations, regulations and vessel operating procedures
- identifying and taking appropriate action to rectify an operational fault
- implementing and working in a safe and controlled manner
- maintaining safe workloads within ships specifications
- selecting and using appropriate machinery and equipment
- undertaking pre-operational checks
- using anchor handling, towing and deck equipment
- using deck machinery
- using deck tools
- using operational techniques for specific location, operation and weather conditions
- using verbal and non-verbal means of communication in a clear and appropriate manner to effectively communicate with other crew members.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anchor handling and towing equipment, including:
  - capstan winches
  - towing pins
  - towing winches
  - tugger winches
  - wire stoppers/shark jaws
  - working winches
- anchor handling and towing tools, including:
  - anchors
  - buoys (surface and subsea)
  - capstan winches and wires
  - capstans
  - chains
  - connecting links (kenter, baldt, hinge and pear)
  - fibre rope
  - gob arrangements
  - grapnels
  - J hooks
  - oil rig cranes
  - shackles
  - swivels
  - towed barges
  - towed rigs
  - towing pins
  - tugger winches and wires
  - wire stoppers/shark jaws
  - wires (towing and work)
- legislation and guidance affecting anchor handling and towing operations
- operational faults, including:
  - breakage of wire
  - failure of deck tools and equipment
  - machinery breakdowns
- pre-operational checks, including:
  - deck equipment
  - equipment operational readiness
  - inspecting safety guards
  - pre-start and safety checks, including:

- emergency stops
  - oils, greases and lubricants
- safe and controlled manner, including:
  - maintaining safe workloads within ships specifications, including:
    - safe working load (SWL)
    - working load limit (WLL)
  - selecting and using appropriate machinery and equipment
  - using operational techniques for specific location, operation and weather conditions
- safe working procedures
- terminology and abbreviations used in the maritime industry specific to anchor handling and towing operations
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Practical assessment must occur onboard an Anchor Handling Tug Supply (AHTS) vessel using workplace operational situations, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARAO16 Contribute to safe cargo operations on offshore support vessels**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to undertake a range of offshore activities on board an offshore support vessel (OSV).

It includes deck preparation, transfer of deck cargoes, bulk cargo operations and operations with deck equipment within the limits of responsibility of an Integrated Rating and under the direction of the officer in charge or Master.

This unit applies to people working in the maritime industry assigned to specific activities and responsibilities in the capacity of:

- Integrated Rating working offshore.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Integrated Rating working offshore and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |   |
|---|---|
| <b>1 Recognise characteristics of OSV cargo and OSVs to ensure the safe transfer and transport of cargo</b>   | <b>1.1</b> Features of various offshore installation types, vessels rig types and operations are outlined<br><br><b>1.2</b> Cargo operations of OSVs are identified<br><br><b>1.3</b> Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is recognised<br><br><b>1.4</b> Hazards associated with the transport of cargo are clarified according to emergency response documentation<br><br><b>1.5</b> Hazard controls associated with OSV cargo are employed according to organisational procedures |
| <b>2 Comply with legislative and organisational requirements for safe transfer and transport of OSV cargo</b> | <b>2.1</b> Safety data sheets (SDS)/material safety data sheets (MSDS)/International Maritime Dangerous Goods (IMDG) Code relevant to cargo are accessed and safety management procedures are identified<br><br><b>2.2</b> SDS/MSDS/IMDG Code are interpreted to identify relevant cargo-related hazards to the vessel and to personnel<br><br><b>2.3</b> Legislative, organisational and company-specific requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo  |

- |          |  |   |
|----------|--|---|
|          | <b>2.4</b>   | Transfer of cargo is undertaken under direction and within the limits of responsibility of an Integrated Rating   |
| <b>3</b> | <b>Take precautions to prevent hazards</b>   |   |
|          | <b>3.1</b>   | Organisational policies and procedures to minimise hazards are identified   |
|          | <b>3.2</b>   | Type and severity of hazards posed by OSV cargo is recognised   |
|          | <b>3.3</b>   | Transfer and transport of cargo is monitored to prevent hazards   |
|          | <b>3.4</b>   | Monitoring equipment, where installed, is regularly inspected and used according to organisational procedures   |
| <b>4</b> | <b>Respond to hazardous situation</b>  |   |
|          | <b>4.1</b>   | Source of hazard is identified according to organisational procedures   |
|          | <b>4.2</b>   | Risk is assessed considering severity and likelihood of consequences  |
|          | <b>4.3</b>   | Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for permission or further action             |
|          | <b>4.4</b>   | Containment procedures are applied where appropriate  |
|          | <b>4.5</b>   | Appropriate safety procedures are followed and personal protective equipment (PPE) is used according to organisational procedures                           |
|          | <b>4.6</b>   | Risk is eliminated where possible   |
| <b>5</b> | <b>Take precautions to prevent pollution of the environment from the release of liquid or dry bulk cargo</b> |   |
|          | <b>5.1</b>   | Procedures to prevent pollution are identified and observed at all times  |
|          | <b>5.2</b>   | Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures         |
|          | <b>5.3</b>   | All relevant information is immediately reported to appropriate persons when a spill is detected or a malfunction has occurred that poses a risk of a spill |

- 5.4** All required spill containment procedures are correctly implemented according to regulatory requirements and organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARA007 Contribute to safe cargo operations on offshore support vessels

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA016 Contribute to safe cargo operations on offshore support vessels**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assisting in implementing shipboard cargo securing arrangements
- carrying out cargo operations safely and according to accepted policies and procedures, including:
  - loading and unloading dry bulk cargo
  - loading and unloading of liquid cargo
  - loading, unloading and care in transit of deck cargo
  - piping systems and deck valve arrangements
  - tubular cargo securing arrangements
- ensuring safe stowage or lashing of deck cargo
- identifying and developing awareness of hazardous situations
- identifying safety data sheets (SDS)/material safety data sheets (MSDS) and/or International Maritime Dangerous Goods (IMDG) Code, relevant cargo-related hazards to vessel and to personnel, and taking appropriate action for safe transfer and stowage of cargo
- interpreting and applying offshore support vessel (OSV) layouts, OSV cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of OSVs
- reading and interpreting SDS/MSDS and/or IMDG Code
- recognising hazards and other problems that can arise when managing safety on an OSV, taking appropriate remedial action and initiating appropriate solutions
- reporting relevant information to the responsible person
- using verbal and non-verbal means of communication in a clear and appropriate manner to effectively communicate with other crew members.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- actions and measures to be taken in the event of spillage
- cargo operation procedures, including loading and unloading cargo
- features and characteristics of various types of OSVs, including:
  - general arrangement and construction
  - types of offshore installations, rigs and platforms
  - types of OSVs
- general arrangement and construction of OSVs
- hazards including:
  - electrostatic hazards
  - environmental hazards, including the effects of oil and chemical pollution on human and marine life
  - explosion and flammability hazards
  - hazards associated with:
    - below deck cargo operations
    - OSV bulk and liquid
    - OSV deck cargo operations
  - health hazards
  - pressure hazards
  - sources of ignition
  - toxicity hazards
- hazard control procedures on OSVs
- hazard risk control measures, including:
  - atmospheric control
  - cargo securing arrangements, including ensuring safe stowage or lashing of deck cargo
  - cargo segregation
  - equipment colour coding
  - personal protective equipment (PPE)
- information on SDS/MSDS and/or IMDG Code
- OSV safety culture and safety management systems (SMS)
- piping systems, hoses and valves
- procedures for the safe use of PPE
- properties of cargo being transported, including:
  - deck cargo types and characteristics
  - hazards of noxious liquid substances (NLS) cargo
  - hazards of offshore cargo operations
  - hazards of oil cargoes
  - tubular cargo stability and securing

- shipboard procedures to reflect current International Convention for the Prevention of Pollution from Ships (MARPOL) regulations to prevent pollution
- terminology relating to the structure and operations of various types of OSVs
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.



## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur onboard an OSV workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- cargo, including:
  - containerised deck cargo
  - drilling brines
  - drilling muds
  - dry bulk cargo
  - heavy lifts and unusual lifts
  - NLS
  - oil
  - tubular deck cargo
- cargo securing equipment, including:
  - capstan winches and wires
  - cargo securing manual
  - cargo securing pins
  - chocks
  - dollies
  - tugger winches and wires
- range of relevant practical and written exercises, case studies and simulations that reflect typical conditions found in the workplace
- tools, equipment, machinery, materials and PPE currently used in industry

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARAO17 Maintain seaworthiness of the ship (ship stability)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to determine the stability and trim of a ship to ensure that stability conditions of ship comply with intact stability criteria under all conditions of loading, discharge and transfer of cargo.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Watchkeeper Deck.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

#### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

#### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain AMSA certification as a Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Calculate stability

#### 2 Manage weight distribution

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Ship stability data book is accessed and checked for endorsement
- 1.2 Sample worked data is interpreted to determine ship safety parameters
- 1.3 Transverse and longitudinal stability is accurately calculated using data extracted from the body of ship stability data book
- 1.4 Stability calculations are checked to ensure they correlate with data set out in ship stability book
- 1.5 Spurious or incorrect information is recognised and recalculated
- 1.6 Trim, draughts and list are adjusted, as required
- 1.7 Stability calculations are conducted at a time, frequency and scope appropriate to voyage
- 2.1 Stability calculations are used to plan weight distribution to ensure assigned load line conditions are not exceeded
- 2.2 Weight distribution is controlled to maintain ship within acceptable stability and stress limits for loading

- operation and at all stages of voyage
- 2.3** Appropriate action is taken when weight distribution is compromising ship safety
- 3 Maintain records of stability management**
- 3.1** Data and information related to stability management is accurately recorded
- 3.2** Data and information related to stability management is filed and stored according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA005 Maintain vessel stability.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## Assessment Requirements for MARA017 Maintain seaworthiness of the ship (ship stability)

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying appropriate actions to correct weight distribution, including:
  - amending the ship loading plan
  - ballast management
  - reduction of free surface
- applying stability, trim and stress tables, diagrams and stress calculating equipment
- carrying out calculations required when determining ship stability, list and trim
- managing ship stability in a range of conditions
- managing the loading and weight distribution of a ship to ensure assigned load line conditions are not exceeded
- reading and interpreting ship specifications and design drawings
- recognising problems affecting ship stability and trim
- undertaking stability calculations, including:
  - calculation of areas under the curve
  - changes in draft and trim due to differing water densities
  - correction for free surface effect
  - dead weight
  - displacement
  - draft and trim
  - effect of slack tanks
  - metacentric height
  - moment of static stability at small angles of heel
  - movement of the centre of gravity
  - tonnes per centimetre (TPC)
  - transverse and longitudinal stability
  - values for righting levers and construction of the curve of stability.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- buoyancy, including:
  - fundamental actions to be taken in the event of partial loss of intact buoyancy
- calculation of ships stability using the inclining experiment
- data and information related to stability management, including:
  - cargo stowage and loading plan
  - records of stability calculations
  - safety management system (SMS)
  - stability and trim booklet
- effects of angle of loll
- effects of beam and form coefficient on the stability of a ship
- effects of density of sea water on the draught and freeboard of a ship, including freshwater allowance and dock water allowance
- effects of free surface on the stability of a ship
- features of the load-line and draught marks of a ship and methods for performing related calculations
- fundamentals of watertight integrity
- principal stresses that act on the structure of a ship
- principal structural members of a ship and the proper names for various parts
- problems related to the control of trim, stability and stresses of ships and appropriate actions and solutions
- sections of the International Maritime Organization (IMO), International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and Australian Maritime Safety Authority (AMSA) Marine Orders related to intact stability criteria
- stability, trim and stress tables, diagrams and stress calculating equipment
- theory and calculations of ship stability and dynamics, including movement of weights
- use of computer programs in calculating stability.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARA018 Manage advanced chemical tanker cargo operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to manage advanced chemical tanker cargo operations.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## Licensing/Regulatory Information

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/1-1 (5 and 6) and Code Section A-V/1-1 (3), Table A-V/1-1-3.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters or Ratings for advanced operations on chemical tankers and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

A - Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Establish safe operating limits**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Communication with personnel is clear, concise and accurate and information is understood and acted upon
- 1.2** Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment
- 1.3** Potential non-compliance with cargo operation-related procedures are identified and rectified promptly
- 1.4** Cargo operations are carried out in a safe manner, taking into account chemical tanker designs, systems and equipment
- 1.5** Proper loading, stowage and unloading of cargo is undertaken to ensure that stability and stress conditions remain within safe limits at all times
- 1.6** Actions are taken and procedures followed and correctly applied, and the appropriate shipboard cargo-related equipment used
- 1.7** Calibration and use of monitoring and gas detection equipment are in compliance with operational practices and procedures
- 1.8** Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with workplace emergency procedures
- 1.9** Personnel are allocated duties and informed of procedures and standards of work to be followed in a

- manner appropriate to the individuals concerned and in accordance with safe operational practices
- |  |            |  |
|--|------------|--|
| <b>2 Recognise physical and chemical properties of chemical cargoes</b>                      | <b>2.1</b> | Information resources are used effectively to identify properties and characteristics of noxious liquid substances (NLS) and related gases and their impact on safety and environmental protection |
|  | <b>2.2</b> | Information resources are used effectively to identify properties and characteristics of NLS and related gases and their impact on vessel operation  |
| <b>3 Take precautions to prevent hazards</b>   | <b>3.1</b> | Cargo-related hazards to the vessel are identified, risk assessed, and control measures are implemented  |
|  | <b>3.2</b> | Cargo-related hazards to personnel are correctly identified and proper control measures are taken  |
| <b>4 Apply work health and safety (WHS)/occupational health and safety (OHS) precautions</b> | <b>4.1</b> | Procedures designed to safeguard personnel and the ship are observed at all times  |
|  | <b>4.2</b> | Safe working practices are observed, and appropriate safety and protective equipment is correctly used   |
|  | <b>4.3</b> | Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns   |
|  | <b>4.4</b> | Breathing apparatus is used correctly by personnel   |
|  | <b>4.5</b> | Entry into enclosed spaces is undertaken in accordance with workplace procedures   |
| <b>5 Respond to emergencies</b>  | <b>5.1</b> | Type and impact of the emergency is promptly identified, and the response actions conform with workplace emergency procedures and contingency plans  |
|  | <b>5.2</b> | Order of priority, the levels and timescales of making reports and informing personnel, are undertaken relevant to the nature of the emergency and accurately reflect the urgency of the problem   |
|  | <b>5.3</b> | Evacuation, emergency shutdown (ESD) and isolation procedures are undertaken appropriate to the nature of the emergency and are implemented promptly   |

	<b>5.4</b>	Medical emergency procedures are identified and required actions taken in a medical emergency conform to current recognised first aid practices and international guidelines
<b>6 Take precautions to prevent pollution of the environment</b>	<b>6.1</b>	Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the atmosphere
	<b>6.2</b>	Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the environment
<b>7 Monitor and control compliance with legislative requirements</b>	<b>7.1</b>	Cargo handling is in compliance with relevant IMO instruments
	<b>7.2</b>	Cargo handling procedures are in compliance with industrial standards and codes of safe working practices
	<b>7.3</b>	Workplace documentation is completed in accordance with workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARA018 Manage advanced chemical tanker cargo operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying pump theory, characteristics and types of cargo pumps
- applying relevant international regulations, codes, industry guidelines, industry standards and port regulations
- applying safe work practices and risk assessments for personal and shipboard safety
- applying safe work practices following a collision, grounding and spillage
- applying safe work practices when entering enclosed spaces, hot and cold work, conducting electrical work, before and during repair work and maintenance work
- applying safety management system (SMS) and requirements
- calibrating and using monitoring and gas-detection systems, instruments and equipment
- communicating effectively with personnel and reporting authorities
- conducting cargo operations within acceptable safety limits, including stress limits at all times
- evaluating tanker design, systems and equipment and cargo to inform decision making during cargo operations
- identifying and evaluating design, characteristics of chemical tanker systems and equipment to inform decision making during cargo operations
- managing and supervising personnel with cargo-related responsibilities
- monitoring enclosed space rescue, medical emergency, fire, system failure or failure of services essential to cargo, collision, grounding and spillage emergencies
- monitoring loading, unloading, care and handling of chemical cargo
- performing cargo measurements and calculations
- using all checklists when conducting cargo operations relevant to allocated job duties, certification and level of authority
- using basic chemistry, physics and correct definitions to identify and evaluate physical and chemical properties of cargo
- using loading and unloading plans
- using safety data sheets (SDS)/material safety data sheets (MSDS)
- using personal protective equipment (PPE) and devices.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alarms and trips, including:
  - high-level alarms
  - low-level alarms
- calibration of monitoring and gas-detection systems, instruments and equipment
- cargo area venting and accommodation ventilation
- cargo measurements and calculations
- chemical cargo operations, including:
  - ballasting and deballasting
  - cargo compatibility and segregation
  - cargo residue operations
  - gas-freeing
  - heating and cooling requirements, including consequences to adjacent cargo
  - high-viscosity cargo
  - inerting
  - inhibition and stabilisation requirements
  - loading and unloading plans
  - operational tank entry
  - ship-to-ship transfers
  - tank atmosphere control
  - tank cleaning operations
- compliance requirements, including:
  - codes of safe working practices
  - environmental procedures
  - industrial standards
  - industry guidelines
  - International Bulk Chemical (IBC) Code
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
  - permits to work
  - port regulations
  - International Convention for the Safety of Life at Sea (SOLAS)
- consequences, including dangers of non-compliance with relevant legislation and regulations
- development and application of cargo operation plans, procedures and checklists
- effect of bulk liquid cargoes on trim, stability and structural integrity
- emergency procedures, including:
  - cargo operations emergency shutdown (ESD)

- cargo reactivity
- collision
- ESD
- enclosed space rescue
- failure of services essential to cargo
- firefighting on chemical tankers
- grounding
- isolation
- jettisoning cargo
- medical
- ship emergency response plans
- spillage
- system failure and failure of services essential to cargo
- firefighting systems, including:
  - fire protection and extinguishing systems
  - fire-extinguishing agents, advantages and disadvantages
- hazards and control measures, including:
  - corrosivity
  - electrostatic hazards
  - explosion
  - flammability
  - health hazards
  - high-density cargo
  - inert gas composition
  - low boiling point cargoes
  - oxygen deficiency
  - polymerising cargo
  - reactivity
  - solidifying cargo
  - toxicity
- international regulations, codes, industry guidelines, industry standards and port regulations, including:
  - codes of safe working practice
  - environmental procedures
  - IBC Code
  - MARPOL
  - SOLAS
  - International Medical Guide for Ships
  - SDS/MSDS
  - Medical First Aid Guide (MFAG)

- medical first aid procedures
- permits to work
- workplace procedures
- loading and unloading plans
- loading, unloading, care and handling of cargo
- SDS/MSDS
- medical first aid procedures, including:
  - International Medical Guide for Ships
  - MFAG
- monitoring and safety systems, including the ESD system
- physical and chemical properties of cargo of noxious liquid substances (NLS), including:
  - chemical cargo categories, including:
    - corrosive
    - explosive
    - flammable
    - toxic
  - chemical groups and industrial usage
  - reactivity of cargo
- pollution prevention procedures, including:
  - controlled operational pollution at sea
  - pollution prevention requirements of ships construction and equipment
  - pollution prevention of the atmosphere and environment
- pressure systems, including:
  - tank and cargo pipeline pressure
  - temperature control systems and alarms
- pump theory and characteristics, including:
  - safe operation of cargo pumps
  - types of cargo pumps
- rationale, practical application and implications of ship design, systems and equipment, including:
  - impact on decision making in typical and emergency situations
  - location, positioning and segregation
  - operational advantages, disadvantages and limitations
- risk assessments
- safe operation of systems and equipment
- safe working practices, including precautions, risk assessment and personnel shipboard safety, including:
  - before and during repair and maintenance work
  - electrical safety
  - entering enclosed spaces



- hot and cold work
- selection and correct use of PPE, including personal monitors
- ship design, systems and equipment, including:
  - general arrangement and construction
  - pipeline and drainage systems
  - pumping arrangement and equipment
  - slop management
  - systems, including:
    - ballast systems
    - cargo area venting and accommodation ventilation
    - cargo heating and cooling systems
    - cargo-related electrical and electronic control systems
    - cargo tank environmental control systems
    - firefighting systems
    - gas detecting systems
    - gauging control systems and alarms
    - pipeline
    - pumping
    - tank and cargo pipeline pressure and temperature control systems and alarms
    - tank cleaning systems
    - tank, pipeline and fittings, material and coatings
    - vapour return/recovery systems
- tank construction and arrangement
- ship emergency response plans
- strategies for managing personnel and reporting bodies, including:
  - communicating urgency and nature of emergencies
  - confirming communication is clearly understood
  - delegating job tasks
  - level of authority
  - order of priority
  - timescales for reporting
- tank temperatures, impact of cargo on temperatures and typical settings
- tanker safety culture and implementation of SMS
- types, selection and correct use of different breathing apparatus
- using SDS/MSDS during operations and first aid
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE currently used in industry).

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARAO19 Manage advanced liquefied gas tanker cargo operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to manage advanced liquefied gas tanker cargo operations.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## Licensing/Regulatory Information

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/1-2 (3 and 4) and Code Section A-V/1-2 (2), Table A-V/1-2-2.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters or Ratings for advanced operations on liquefied gas tankers and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

A - Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Perform work safely and monitor all cargo operations**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Communication with personnel is clear, concise and accurate and information is understood and acted upon
- 1.2** Cargo operations are carried out in a safe manner, taking into account liquefied gas tanker designs, systems and equipment
- 1.3** Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment
- 1.4** Potential non-compliance with cargo operation-related procedures are identified and rectified promptly
- 1.5** Pumping operations are carried out in accordance with accepted principles and procedures relevant to the type of cargo
- 1.6** Proper loading, stowage and unloading of cargo is undertaken to ensure that stability and stress conditions remain within safe limits at all times
- 1.7** Actions taken and procedures are followed and correctly applied, and the appropriate shipboard cargo-related equipment used
- 1.8** Calibration and use of monitoring and gas detection equipment are in compliance with operational practices

		and procedures
	<b>1.9</b>	Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with workplace emergency procedures
	<b>1.10</b>	Personnel are allocated duties and informed of procedures and standards of work to be followed in a manner appropriate to the individuals concerned and in accordance with safe operational practices
<b>2</b>	<b>Recognise physical and chemical properties of liquefied gas cargoes</b>	
	<b>2.1</b>	Information resources are used effectively to identify properties and characteristics of liquefied gases and their impact on safety, the environment and vessel operation
	<b>2.2</b>	Information resources are used effectively to identify properties and characteristics of related gases and their impact on safety and vessel operation
<b>3</b>	<b>Take precautions to prevent hazards</b>	
	<b>3.1</b>	Cargo-related hazards to the vessel are identified, risk assessed, and control measures are implemented
	<b>3.2</b>	Cargo-related hazards to personnel are correctly identified and proper control measures are taken
	<b>3.3</b>	Gas-detection devices are used in accordance with manuals and workplace practices
<b>4</b>	<b>Apply work health and safety (WHS)/occupational health and safety (WHS) precautions</b>	
	<b>4.1</b>	Procedures designed to safeguard personnel and the ship are observed at all times
	<b>4.2</b>	Safe working practices are observed, and appropriate safety and protective equipment is correctly used
	<b>4.3</b>	Working practices are conducted in accordance with legislative requirements, codes of practice, permits to work and environmental concerns
	<b>4.4</b>	Breathing apparatus are used correctly by personnel
	<b>4.5</b>	Entry into enclosed spaces is undertaken in accordance with workplace procedures
<b>5</b>	<b>Respond to emergencies</b>	
	<b>5.1</b>	Type and impact of the emergency is promptly identified, and the response actions conform with workplace emergency procedures and contingency plans

- |          |   |   |
|----------|---|---|
|          | 5.2   | Order of priority, the levels and timescales of making reports and informing personnel are undertaken relevant to the nature of the emergency and accurately reflect the urgency of the problem |
|          | 5.3   | Evacuation, emergency shutdown (ESD) and isolation procedures are undertaken appropriate to the nature of the emergency and are implemented promptly  |
|          | 5.4   | Medical emergency procedures are identified and required actions taken in a medical emergency conform to current recognised first aid practices and international guidelines                    |
| <b>6</b> | <b>Take precautions to prevent pollution of the environment</b>     |   |
|          | 6.1   | Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the atmosphere   |
|          | 6.2   | Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the environment  |
| <b>7</b> | <b>Monitor and control compliance with legislative requirements</b> |   |
|          | 7.1   | Cargo handling is conducted in compliance with relevant IMO instruments   |
|          | 7.2   | Cargo handling is conducted in compliance with industrial standards and codes of safe working practices   |
|          | 7.3   | Workplace documentation is completed in accordance with workplace procedures  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARA019 Manage advanced liquefied gas tanker cargo operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying pump theory, characteristics and types of cargo pumps and their safe operation
- applying relevant international regulations, codes, industry guidelines, industry standards and port regulations concerning the safe loading, unloading, care and handling of cargo
- applying safe preparation, procedures and checklists during pre-docking preparation, post-docking and loading cargo operations, during sea passage, unloading and ship-to-ship transfer
- applying safe work practices and risk assessments for personal and shipboard safety
- applying safe work practices following a collision, grounding and spillage
- applying safety management system (SMS) and requirements
- calibrating and using monitoring and gas-detection systems, instruments and equipment
- communicating effectively with personnel and reporting authorities
- conducting cargo operations with acceptable safety limits, including stress limits at all times
- conducting risk assessments
- evaluating liquefied gas tanker design, systems, equipment and cargo to inform decision making during cargo operations
- evaluating the effect of bulk liquid cargo on trim, stability and structural integrity, including use of trim and stability manuals during cargo operations
- managing and supervising personnel with responsibility for cargo-related responsibilities
- monitoring enclosed space rescue, emergency cargo valve operations, medical emergency, envelopment of ship in toxic or flammable vapour, fire, system failure or failure of services essential to cargo, jettisoning of cargo, collision, grounding and spillage emergencies
- monitoring hazards and control measures to manage toxicity, flammability, explosion, reactivity, corrosivity, inert gas composition, electrostatic, polymerising cargo, oxygen deficiency and health hazards
- monitoring plans and procedures for loading, unloading, care and handling of cargo
- monitoring SMS and requirements
- performing cargo measurements and calculations relevant to cargo operations



- using all checklists, procedures and applying safe preparations for all cargo operations
- using and monitoring cargo handling equipment and instrumentation
- using fundamental chemistry, physics and correct and relevant definitions to ensure the safe carriage of liquefied gases in bulk on liquefied gas tanker ships
- using liquefied gas tanker design, systems and equipment to inform decision making during cargo operations
- using loading and unloading plans
- using safety data sheets (SDS)/material safety data sheets (MSDS), International Bulk Chemical (IBC) Code and International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)
- using personal protective equipment (PPE) and devices
- using SDS/MSDS during cargo operations and first aid incidents.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alarms and trips, including:
  - high-level alarms
  - low-level alarms
- calibration and use of monitoring and gas-detection systems, instruments and equipment
- cargo area venting and accommodation ventilation
- cargo measurements and calculations, including:
  - boil-off cargo calculations
  - gas phase
  - liquid phase
  - on board quantity (OBQ)
  - remain on board (ROB)
- cargo heating systems
- cargo-related electrical and electronic control systems, including automatic detection systems
- checklists, safe work procedures and safety preparations for all cargo operations, including:
  - pre-docking preparation, including:
    - gas-freeing
    - inerting
    - warm-up
  - post-docking and loading, including:
    - closed loop sampling
    - cooling down
    - deballasting

- gassing up
- inerting (oxygen and dew point reduction)
- loading
- sampling
- tank inspections
- sea passage, including:
  - boil-off
  - cooling down
  - inhibiting
  - pressure maintenance
- unloading, including:
  - ballasting
  - cleaning systems
  - stripping systems
  - systems to make the tank liquid-free
- ship-to-ship transfer
- compliance requirements, including:
  - environmental procedures
  - codes of safe working practices
  - industrial standards
  - industry guidelines
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
  - International Convention for the Safety of Life at Sea (SOLAS)
  - permits to work
  - port regulations
- consequences, including dangers of non-compliance with relevant legislation and regulations
- design, systems and equipment of liquefied gas tankers, including:
  - ballast system
  - boil-off systems
  - cargo emergency shutdown (ESD) systems
  - cargo containment systems
  - cargo containment systems, materials of construction and insulation
  - cofferdam heating systems
  - cargo handling equipment and instrumentation, including:
    - cargo pumps and pumping arrangements, including:
      - cargo pipelines and valves
      - cargo tank level-gauging systems
      - expansion devices
      - flame screens

- tank pressure monitoring and control systems
- temperature monitoring systems
- cargo temperature maintenance system
- custody transfer system
- gas-detecting systems
- general arrangement and construction
- reliquefaction systems
- development of cargo operation plans, procedures and checklists for cargo operations
- effect of bulk liquid cargo on trim, stability and structural integrity
- emergency procedures, including actions to be taken in event of:
  - cargo operations ESD
  - collision
  - emergency cargo valve operations
  - enclosed space rescue
  - envelopment of ship in toxic or flammable vapour
  - failure of services essential to cargo
  - firefighting
  - grounding
  - jettisoning of cargo
  - ship emergency response plans
  - spillage
  - system failure
- firefighting systems, including:
  - fire-extinguishing agents, advantages and disadvantages
  - fire protection and extinguishing systems
- fundamental chemistry, physics and relevant definitions related to the safe carriage of liquefied gases in bulk ships, including:
  - the chemical structure of gases
  - the properties and characteristics of liquefied gases (including CO<sub>2</sub>) and their vapours, including:
    - basic thermodynamic laws and diagrams
    - bubble point
    - compatibility, reactivity and positive segregation of gases
    - compression of gases
    - critical temperature of gases and pressure
    - dewpoint
    - diffusion and mixing of gases
    - effect of low temperature-brittle fracture
  - flashpoint, including:
    - auto-ignition temperature

- upper and lower explosive limits
- gauging systems
- hydrate formation
- liquid and vapour densities
- lubrication of compressors
- nature and properties of solutions
- polymerisation
- properties of materials
- properties of single liquids
- refrigeration of gases
- reliquefaction of gases
- saturated vapour pressure/reference temperature
- simple gas laws
- states of matter
- thermodynamic units
- hazards and control measures, including:
  - corrosivity
  - electrostatic hazards
  - explosion
  - flammability
  - health hazards
  - inert gas composition
  - oxygen deficiency
  - polymerising cargo
  - reactivity
  - toxicity
- international regulations, codes, industry guidelines, industry standards and port regulations concerning the safe loading, unloading, care and handling of cargo, including:
  - code of safe working practices
  - IBC Code
  - IGC Code
  - MARPOL
  - SOLAS
  - International Medical Guide for Ships
  - SDS/MSDS
  - Medical First Aid Guide (MFAG)
- loading, unloading, care and handling of cargo
- loading and unloading plans
- maintenance work, before and during repairs, including work affecting:
  - electrical and control systems

- piping
- pumping
- medical first aid procedures, including antidotes onboard liquefied gas tankers
- pollution prevention procedures, including:
  - controlled operational pollution at sea
  - pollution prevention requirements of ships construction and equipment
- pressure control systems, pressure surge and typical settings
- pump theory and characteristics, including:
  - safe pump operation
  - types of cargo pumps
- rationale, practical application and implications of ship design, systems and equipment, including:
  - impact on decision making in typical and emergency situations
  - location, positioning and segregation
  - operational advantages, disadvantages and limitations
- risk assessments
- safe working practices, risk assessment, personal shipboard safety procedures and precautions, including:
  - before and during repairs and maintenance work, including work affecting:
    - electrical and control systems
    - piping
    - pumping
  - cold burn
  - electrical safety
  - entering enclosed spaces, including:
    - compressor rooms
    - correct use of different types of breathing apparatus
  - frostbite
  - hot and cold work precautions
  - proper use of personal toxicity monitoring equipment
- safe operation of systems and equipment
- selection and correct use of PPE, including personal toxicity monitoring equipment
- system capabilities
- tank atmosphere control systems, including:
  - inert gas
  - nitrogen
  - storage, generation and distribution systems
- tank temperatures, impact of cargo on temperatures and typical settings
- tanker safety culture and implementation of SMS
- types of cargo tank construction

- types of liquefied gas tankers
- types, selection and correct use of breathing apparatus
- use of SDS/MSDS, IBC and IGC Codes and related documents
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARAO20 Manage advanced oil tanker cargo operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to manage advanced oil tanker cargo operations.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## Licensing/Regulatory Information

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/1-1 (3 and 4) and Code Section A-V/1-1 (2), Table A-V/1-1-2.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters or Ratings for advanced operations on oil tankers and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable

## Competency Field

A - Handling Cargo and Vessel Stability

## Unit Sector

Not applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Perform work safely and monitor all cargo operations**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Communication with personnel is clear, concise and accurate and information is understood and acted upon
- 1.2** Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment
- 1.3** Potential non-compliance with cargo operation-related procedures are identified and rectified promptly
- 1.4** Cargo operations are carried out in a safe manner, taking into account oil tanker designs, systems and equipment
- 1.5** Proper loading, stowage and unloading of cargo is undertaken to ensure that stability and stress conditions remain within safe limits at all times
- 1.6** Actions taken and procedures are followed and correctly applied, and the appropriate shipboard cargo related equipment used
- 1.7** Calibration and use of monitoring and gas detection equipment are in compliance with operational practices and procedures
- 1.8** Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with workplace emergency procedures
- 1.9** Personnel are allocated duties and informed of procedures and standards of work to be followed in a



- manner appropriate to the individuals concerned and in accordance with safe operational practices
- 2 Recognise physical and chemical properties of oil cargoes**
- 2.1** Information resources are used effectively to identify properties and characteristics of oil cargo and their impact on safety and environmental protection
- 2.2** Information resources are used effectively to identify properties and characteristics of related gases and their impact on safety and vessel operation
- 3 Take precautions to prevent hazards**
- 3.1** Cargo-related hazards to the vessel are identified, risk assessed, and control measures are implemented
- 3.2** Cargo-related hazards to personnel are correctly identified and proper control measures are taken
- 4 Apply work health and safety (WHS)/occupational health and safety (OHS) precautions**
- 4.1** Procedures designed to safeguard personnel and the ship are observed at all times
- 4.2** Safe working practices are observed, and appropriate safety and protective equipment is correctly used
- 4.3** Working practices are conducted in accordance with legislative requirements, codes of practice, permits to work and environmental concerns
- 4.4** Breathing apparatus is used correctly by personnel
- 4.5** Entry into enclosed spaces is undertaken in accordance with workplace procedures
- 5 Respond to emergencies**
- 5.1** Type and impact of the emergency is promptly identified, and the response actions conform with workplace emergency procedures and contingency plans
- 5.2** Order of priority, the levels and timescales of making reports and informing personnel are undertaken relevant to the nature of the emergency and accurately reflect the urgency of the problem
- 5.3** Evacuation, emergency shutdown (ESD) and isolation procedures are undertaken appropriate to the nature of the emergency and are implemented promptly
- 5.4** Medical emergency procedures are identified and required actions taken conform to current recognised

		first aid practices and international guidelines
<b>6</b>	<b>Take precautions to prevent pollution of the environment</b>	<p><b>6.1</b> Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the atmosphere</p> <p><b>6.2</b> Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the environment</p>
<b>7</b>	<b>Monitor and control compliance with legislative requirements</b>	<p><b>7.1</b> Cargo handling is conducted in compliance with relevant IMO instruments</p> <p><b>7.2</b> Cargo handling is conducted in compliance with industrial standards and codes of safe working practices</p> <p><b>7.3</b> Workplace documentation is completed in accordance with workplace procedures</p>

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA020 Manage advanced oil tanker cargo operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying pump theory, characteristics and types of cargo pumps and their safe operation
- applying relevant international regulations, codes, industry guidelines, industry standards and port regulations relevant to the safe loading, unloading, care and handling of cargo
- applying safe work practices and risk assessments for personal and shipboard safety
- applying safe work practices following a collision, grounding and spillage
- applying safety management system (SMS) and requirements
- calibrating and using monitoring and gas-detection systems, instruments and equipment
- communicating effectively with personnel and reporting authorities
- conducting cargo operations with acceptable safety limits, including stress limits at all times
- developing and applying cargo-related operation plans, procedures and checklists
- evaluating tanker design, systems, equipment and cargo to inform decision making during cargo operations
- evaluating the effect of cargo on trim, stability and structural integrity, including use of trim and stability manuals during cargo operations
- managing and supervising personnel with cargo-related responsibilities
- monitoring enclosed space rescue, medical emergency, fire, system failure or failure of services essential to cargo, collision, grounding and spillage emergencies
- performing cargo measurements and calculations relevant to cargo operations
- using loading and unloading plans
- using personal protective equipment (PPE) and devices
- using safety data sheet (SDS)/materials safety data sheets (MSDS) during cargo operations and first aid incidents.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alarms and trips, including:
  - high-level alarms
  - low-level alarms
  - tank pressure monitoring and alarm systems
- automatic detection systems
- calibration and use of monitoring and gas-detection systems, instruments and equipment
- cargo measurements and calculations
- cargo-related operations, including:
  - ballasting and deballasting
  - crude oil washing
  - gas-freeing
  - inerting
  - load on top
  - loading and unloading plans
  - ship-to-ship transfers
  - tank cleaning
- consequences, including dangers, of non-compliance with relevant legislation and regulations
- cargo operation plans, procedures and checklists
- effect of bulk liquid cargo on trim, stability and structural integrity
- emergency procedures, including actions to be taken in event of:
  - cargo operations emergency shutdown (ESD)
  - collision
  - enclosed space rescue
  - failure of services essential to cargo
  - firefighting
  - grounding
  - ship emergency response plan
  - spillage
  - system failure
- firefighting systems, including:
  - fire protection and extinguishing systems
  - fire-extinguishing agents, advantages and disadvantages
- gas freeing and inerting systems, including flue gas and independent generators
- hazards and control measures, including:
  - electrostatic hazards
  - explosion
  - flammability
  - health hazards
  - inert gas composition

- oxygen deficiency
- toxicity
- information contained in SDS/MSDS
- international regulations, codes, industry guidelines, industry standards and port regulations, including:
  - codes of safe working practices
  - environmental procedures
  - industrial standards
  - industry guidelines
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
  - International Convention for the Safety of Life at Sea (SOLAS)
  - International Medical Guide for Ships
  - International Safety Guide for Tankers and Terminals (ISGOTT)
  - International Safety Management (ISM) Code for oil tankers
  - SDS/MSDS
  - Medical First Aid Guide (MFAG)
  - medical first aid procedures
  - trim and stability manual
  - workplace procedures
- monitoring and safety systems, including ESD
- oil tanker design, systems and equipment, including:
  - cargo area venting and accommodation ventilation
  - cargo heating systems
  - cargo-related electrical and electronic control system
  - environmental protection equipment, including oil discharge monitoring equipment (ODME)
  - firefighting systems
  - gauging systems and alarms
  - general arrangement and construction
  - pumping arrangement and equipment
  - slop arrangements
  - tank arrangement, pipeline system and tank venting arrangement
  - tank cleaning, gas freeing and inerting systems
  - tank coating
  - vapour recovery systems
- physical and chemical properties of oil cargo
- pollution prevention, including:
  - controlled operational pollution at sea
  - procedures
  - requirements of ships construction and equipment

- pressure control systems, pressure surge and typical settings
- pump theory and characteristics, including types of pumps and their safe operation
- rationale, practical application and implications of ship design, systems and equipment, including:
  - impact on decision making in typical and emergency situations
  - location, positioning and segregation
  - operational advantages, disadvantages and limitations, and risk assessments
- risk assessment methodology and risk analysis for oil tankers
- safe operation of systems and equipment, including tanker safety culture and implementation of safety-management system
- safe working practices, risk assessment, personal shipboard safety procedures and precautions, including:
  - before and during repairs and maintenance work
  - electrical safety
  - entering enclosed spaces including correct use of different types of breathing apparatus
  - hot and cold work
- selection and correct use of PPE, including personal monitors
- tanker safety culture and implementation of SMS
- types, selection and correct use of different types of breathing apparatus
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals

- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARAO21 Manage advanced operations of a ship subject to IGF Code**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage operations onboard a ship that is subject to the International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code).

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/3 (7 and 8) and Code Section A-V/3 (2), Table A-V/3-2.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters or Ratings for advanced operations on ships subject to IGF Code and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.



## Pre-requisite Unit

Not applicable.

## Competency Field

A - Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Perform work safely and monitor all cargo operations**

- 1.1** Communication with personnel is clear, concise and accurate and information is understood and acted upon
- 1.2** Cargo operations are planned, risk is managed and work carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment
- 1.3** Pumping operations are carried out in accordance with acceptable principles, procedures and type of fuel
- 1.4** Ship operations are carried out safely and take into consideration ship design, systems and equipment

#### **2 Recognise physical and chemical properties of fuels**

- 2.1** Information resources are used effectively to identify properties and characteristics of oil cargo and their impact on safety and environmental protection
- 2.2** Information resources are used effectively to identify properties and characteristics of related gases and their impact on safety and vessel operation

#### **3 Operate fuel controls**

- 3.1** Plant, auxiliary machinery and equipment are operated in accordance with technical specifications
- 3.2** Plant, auxiliary machinery and equipment are operated in accordance with technical specifications and within

		safe operating limits at all time
<b>4</b>	<b>Plan and monitor safe bunkering, stowage and securing of fuel</b>	<p><b>4.1</b> Fuel quality and quantity are determined and take into account the current conditions and necessary corrective safe measures</p> <p><b>4.2</b> Operations are planned and carried out in accordance with fuel transfer manuals and procedures to ensure safety of operations and avoid spill damages and pollution of the environment</p> <p><b>4.3</b> Personnel are allocated duties and informed of procedures and standards of work to be followed in a manner appropriate to the individuals concerned and in accordance with safe operational practices</p>
<b>5</b>	<b>Take precautions to prevent pollution of the environment</b>	<p><b>5.1</b> Procedures to safeguard the environment are observed at all time</p> <p><b>5.2</b> Procedures to safeguard personnel are observed at all times</p>
<b>6</b>	<b>Monitor and control compliance with legislative requirements</b>	<p><b>6.1</b> Fuel handling is conducted in compliance with relevant IMO instruments, established industrial standards and codes of safe working practices</p> <p><b>6.2</b> Operations are planned and performed in accordance with approved procedures and legislative requirements</p>
<b>7</b>	<b>Take precautions to prevent hazards</b>	<p><b>7.1</b> Cargo-related hazards to the vessel are identified, risk assessed, and control measures are implemented</p> <p><b>7.2</b> Cargo-related hazards to personnel are correctly identified and proper control measures are taken</p> <p><b>7.3</b> Flammable and toxic gas detection devices are used in accordance with manuals and workplace practices</p>
<b>8</b>	<b>Apply work health and safety (WHS)/occupational health and safety (OHS) precautions</b>	<p><b>8.1</b> Appropriate safety and protective equipment are used correctly by personnel</p> <p><b>8.2</b> Procedures designed to safeguard personnel and the ship are observed at all times</p> <p><b>8.3</b> Working practices are followed in accordance with legislative requirements, codes of practice, permits to</p>

work and environmental concerns

- 8.4** Medical emergency procedures are identified and required actions taken conform to current recognised first aid practices and international guidelines

**9 Prevent and control fire**

- 9.1** Type and impact of the emergency is identified promptly, and response actions confirmed with emergency procedures
- 9.2** Evacuation, emergency shutdown (ESD) and isolation procedures are appropriate to the fuels addressed by the IGF Code

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA021 Manage advanced operations of a ship subject to IGF Code**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant international regulations, codes, industry guidelines, industry standards, and port regulations
- applying safe work practices and risk assessments for personal and shipboard safety
- calibrating and using monitoring and fuel detection systems, instruments and equipment
- communicating effectively with personnel and authorities
- conducting cargo operations with acceptable safety limits, including stress limits, at all times
- conducting risk assessments during cargo operations
- developing safety plans and safety instructions to manage risk
- evaluating ship design, arrangement and characteristics and cargo to inform decision making during cargo and fuel operations
- managing and supervising personnel with cargo-related responsibilities
- monitoring control measures to manage flammability, explosion, toxicity, reactivity, corrosivity, health hazards, inert gas composition, electrostatic hazards, pressurised gases and low temperatures
- operating controls of fuel related to propulsion plant, engineering systems, services and safety devices
- performing fuel system measurements and calculations
- using available data to ensure safe bunkering, storage and securing of fuels using operational plans, procedures and checklists to maintain safe operating limits
- using available data to ensure safe bunkering, storage and securing of fuels
- using fuel system theory and characteristics to inform decision making
- using fundamental chemistry, physics and correct and relevant definitions to ensure the safe bunkering and use of fuels onboard ships subject to International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code)
- using personal protective equipment (PPE) and devices
- using risk assessment method analysis to conduct risk assessments
- using safety data sheets (SDS)/material safety data sheets (MSDS) during IGF operations and first aid.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- checklists and safe procedures for taking fuel tanks in and out of service, including:
  - cooling down
  - emptying systems
  - heating of fuel
  - inerting
  - initial loading
  - pressure control
  - ship to shore
- calibration use and monitoring of fuel detection systems, instruments and equipment
- consequences, including dangers, of non-compliance with relevant legislation and regulations
- data relating to bunkering, storage and securing of fuels available onboard ship
- effects of pollution on personnel, the public and environment
- fuel system theory and characteristics and types of fuel system pumps and their safe operation, including:
  - heaters
  - high pressure
  - low pressure
  - pressure build-up units
  - vaporisers
- fuel system measurements and calculations, including:
  - fuel consumption calculations
  - maximum fill quantity
  - minimum remain on board (ROB)
  - on board quantity (OBQ)
- fundamental chemistry, physics and definitions relating to safe bunkering and use of fuels onboard ships subject to IGF Code, including:
  - chemical structure of different fuels used onboard ships subject to IGF Code
  - effect of low temperature, including brittle fracture for liquid cryogenic fuels
  - fundamental chemical structure, properties and characteristics of fuels subject to IGF Code, including:
    - boil-off and weathering of cryogenic fuels
    - combustion properties and heating values
    - compression and gas expansion
    - critical pressure and temperature of gases
    - dewpoint and bubble point
    - flashpoint, upper and lower flammable limits and auto-ignition temperature

- hydrate formation
- liquid and vapour densities
- methane number/knocking
- pollutant characteristics of fuels addressed in IGF Code
- saturated vapour pressure/reference temperature
- simple physical laws
- states of matter
- nature and properties of solutions
- properties of materials
- properties of single liquids and materials
- thermodynamic laws and diagrams
- thermodynamic units
- hazards and control measures, including:
  - corrosivity
  - electrostatic hazards
  - explosion
  - flammability
  - health hazards
  - inert gas composition
  - low temperature
  - pressurised gases
  - reactivity
  - toxicity
- hot work, enclosed spaces and tank entry including permitting procedures
- information contained in SDS/MSDS relevant to fuels subject to IGF Code
- international regulations, codes, industry guidelines, industry standards and port regulations, including:
  - codes of safe working practice
  - environmental procedures
  - IGF Code
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
  - International Convention for the Safety of Life at Sea (SOLAS)
  - International Medical Guide for Ships
  - SDS/MSDS
  - Medical First Aid Guide (MFAG)
  - medical first aid procedures
  - permits to work
  - workplace procedures
- measures to be taken in event of:
  - leakage

- spillage
- venting
- operating controls of fuel related to propulsion plant, engineering systems, services and safety devices, including:
  - marine engineering terms
  - operating principles of marine power plants
  - ships auxiliary machinery
- operating bunkering systems, including:
  - bunkering procedures
  - emergency procedures
  - prevention of rollover
  - ship to shore/ship to ship interface
- PPE and devices, including:
  - breathing apparatus
  - evacuating equipment
  - rescue and escape equipment
  - resuscitators
- prevention control and firefighting and extinguishing systems
- rationale, practical application and implications of ship design, systems and equipment, including:
  - impact on decision making in typical and emergency situations
  - location, positioning and segregation
  - operational advantages, disadvantages and limitations
- risk assessments
- risk assessment methodology and risk analysis for ships subject to IGF Code
- risks of non-compliance with relevant regulations and legislation
- safe operation of pumps
- safety and emergency procedures for operating machinery, fuel and control systems
- safe management of bunkering and other IGF-related operations concurrent with other onboard operations both in port and at sea
- safe working practices, procedures and precautions, including:
  - electrical safety
  - entering enclosed spaces, including correct use of different types of breathing apparatus
  - maintenance work before, during and after repairs
  - ship to shore safety checklists
- ship design, systems and equipment, including:
  - cryogenic fuel tanks temperature and pressure maintenance
  - fuel emergency shutdown (ESD) system
  - fuel handling equipment and instrumentation, including:

- expansion devices
- flame screens
- fuel pipelines
- fuel pumps and pumping arrangements
- fuel systems for different propulsion engines
- general arrangement and construction
- systems, including:
  - fuel tank level gauging systems
  - fuel storage systems, including materials of construction and insulation
  - fuel system atmosphere control systems (inert gas, nitrogen), including:
    - distribution
    - generation
    - storage
  - tank pressure monitoring and control systems
  - temperature monitoring systems
  - toxic and flammable gas-detecting systems
- SDS/MSDS for IGF operations and first aid
- selection and correct use of PPE, including personal monitors
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.



## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARA022 Manage loading, discharging and stowing of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage the loading, discharging and stowage of cargo to prevent damage or deterioration of cargo and to deliver it, as far as is possible, in as good a condition and order as it was when received onboard.

It includes planning the stow, planning load/unload with stevedores, preparing for loading, controlling loading/unloading of cargo, managing ballast management operations and monitoring care of cargo during voyage.

This unit applies to people working in the maritime industry in the capacity of:

- Master on commercial vessels less than 35 metres in length within the exclusive economic zone (EEZ)
- Master on vessels less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on vessels less than 80 metres in length within the EEZ.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 35 metres Near Coastal and Mate less than 80 metres Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

A – Handling Cargo and Vessel Stability

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Plan the stow

- 1.1 Loading manual is interpreted to determine operational loading conditions
- 1.2 Still water shear forces and bending moments in any load or ballast condition are identified and not exceeded
- 1.3 Load is planned to ensure stresses in vessel are minimised by evenly distributing cargo
- 1.4 Load is planned to avoid incompatible cargo stowage
- 1.5 Regulations relating to hazardous materials/dangerous goods are observed, where appropriate
- 1.6 Load is planned for unloading sequence
- 1.7 Vessel cargo carrying capacity is not exceeded for appropriate load line
- 1.8 Vessel trim is calculated to allow for optimum vessel performance at sea

#### 2 Plan load/unload with stevedores

- 2.1 Available port/vessel cargo handling gear and equipment are determined
- 2.2 Handling capacity of cargo handling gear and equipment are established
- 2.3 Pumping capacity of cargo pumps is verified
- 2.4 Availability and status of human resources are resolved
- 2.5 Cargo manifest is made available
- 2.6 Cargo stowage plan is completed and agreed with stevedores
- 2.7 Stability calculation is made and checked against vessel stability information manual
- 2.8 Notice of readiness to load/unload is provided

#### 3 Prepare for loading

- 3.1 Holds are checked to ensure they are clean, dry and free

- of odour
- 3.2** Safety arrangements in holds are verified to ensure they are operational
  - 3.3** Supplies of dunnage and mats are reviewed to ensure there are sufficient available
  - 3.4** Bilges are covered with tarpaulins/wrappers before loading
  - 3.5** Checks are made to ensure cargo is correctly identified, inspected and confirmed against documentation
  - 3.6** Preparations for loading are monitored according to stowage plan and organisational procedures
- 4 Control loading/unloading of cargo**
- 4.1** Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan
  - 4.2** Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations
  - 4.3** Loading/unloading is monitored to ensure loading rate is not exceeded in the case of bulk or liquid cargo
  - 4.4** Vessel stability is observed during loading/unloading operations
  - 4.5** Loading/unloading operations are checked against stowage plan
  - 4.6** Cargo is secured and lashed according to lashing plan
  - 4.7** All cargo handling documentation is completed according to organisational procedures and regulatory requirements
- 5 Manage ballast management operations**
- 5.1** Ballast discharge requirements of port authority are complied with
  - 5.2** Ballast management activities are monitored according to organisational procedures, ballast water management plan and port authority requirements
  - 5.3** Ballast management problems are identified and appropriate actions are taken to minimise risk to the environment

- 6 Monitor care of cargo during voyage**
- 6.1** Vessel plan for care of cargo during the voyage is implemented according to organisational and customer requirements, and relevant regulations
  - 6.2** Ventilation and humidity control systems are checked
  - 6.3** Action required to maintain the wellbeing of cargo during the voyage is initiated according to customer requirements and organisational procedures
  - 6.4** Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain safety of personnel, cargo and vessel
  - 6.5** Appropriate action is taken in the event of a cargo-related incident or emergency to rectify problem, secure cargo and maintain safety of vessel and personnel

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA003 Manage loading, discharging and stowing of cargo.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA022 Manage loading, discharging and stowing of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- developing effective cargo stowage plans, including:
  - cargo weight
  - correct description and stowage of hazardous and dangerous goods
  - description of cargo to be loaded
  - load/discharge port
  - segregation of non-compatible cargo
- monitoring use of cargo handling gear and equipment involved in loading, stowage, security and unloading of cargo
- using and applying instructions, regulations, procedures and information relevant to loading, stowage, security and unloading of cargo
- using stability manual and ensuring stability calculations are within appropriate parameters for proposed cargo operation.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken in the event of cargo-related incidents or emergencies, including:
  - cargo handling gear failure
  - cargo shift
  - leakage
  - spontaneous combustion
- ballast management issues and procedures, including:
  - ballast water management plan
  - confirming that the stowage plan conforms to stability requirements at all stages of loading and discharging
  - contaminated ballast
  - failure of ballast pumps

- cargo handling documentation requirements
- design of vessel hold
- effects on cargo handling of sea conditions, wind and weather
- effects of different types of cargo operations on vessel trim and stability
- effects upon stability during loading and discharging operations, including heeling moments from gear and loads
- emergency procedures for incidents involving dangerous and hazardous cargo, including:
  - enhanced survey regime
  - safety data sheets (SDS)/material safety data sheets (MSDS)
  - monitoring of cargo stowage areas for damage, defects and corrosion, including causes and prevention
  - safe working loads
- hazardous materials/dangerous goods, including:
  - any cargo described in the International Maritime Dangerous Goods (IMDG) Code as hazardous or dangerous
  - relevant documentation
- homogeneous loading
- main stresses set up by cargo, hogging, sagging and shearing
- methods of handling various types of cargo
- methods of handling and problems related to loading, stowage, security and unloading of cargo, including:
  - bulk cargo
  - containerised cargo
  - deck cargo
  - liquid cargo
  - refrigerated cargo
  - any other material, equipment or machinery that may be safely handled and stowed on the vessel
- operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- principles of cargo care for various types of cargo monitoring procedures and scheduling of inspections
- procedures for carrying out calculations involving weights, capacities, stowage factors and load densities
- regulations relating to hazardous materials/dangerous goods, including the IMDG Code
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) and cargo handling legislation, codes of practice, policies and procedures
- shipboard and terminal-based cargo handling equipment involved in loading, stowage, security and unloading of cargo, including:
  - cargo pumps
  - cranes

- derricks
- grabs
- hooks, wires and shackles
- slings
- standard stowage position numbering systems used on container vessels
- static and dynamic loads
- survey and inspection requirements for cargo handling equipment
- types of lashing and securing devices
- typical types and sizes of shipping containers
- use of cargo handling gear, including purchases and tackles
- usual methods of packing, loading and discharging, stowage and dunnage
- various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements; their hazards and problems, and appropriate preventative and remedial action and solutions
- ways of restricting vessel stress levels within permitted levels within permitted limits during loading/discharging cargo.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length
- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals, including:
  - IMDG Code
  - International Maritime Solid Bulk Cargoes Code (IMSBC)
  - stability books
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.



## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARA023 Manage trim, stability and stress of a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to control trim, stability and stress within safe limits at all times on a vessel 500 gross tonnage (GT) or more.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

A – Handling cargo and vessel stability

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Manage vessel trim under normal operating conditions**

- 1.1** Stability analysis and weight distribution planning are conducted at a time frequency and scope appropriate to the proposed nature of the voyage and vessel operation
- 1.2** Weight distribution is arranged to maintain vessel within acceptable stability limits for the anticipated operational situations likely to be experienced during the voyage
- 1.3** Calculations are made to determine the draught and centre of gravity (CG) of vessel after adding, removing or shifting weight
- 1.4** Factors affecting the stability and trim of vessel are identified and allowances are made in calculations
- 1.5** Trim, draughts and list of vessel are controlled, as required, to ensure they are suitable to progress all anticipated vessel operations

#### **2 Control vessel stability when compartment is flooded**

- 2.1** Damage to vessel and nature of flooding of compartments is assessed
- 2.2** Effect upon vessel stability of flooded and flooding compartments is evaluated
- 2.3** Suitable strategy for maintaining or restoring trim and stability is devised
- 2.4** Where stress limits of the vessel are exceeded as a consequence of damage and/or flooding, appropriate action is initiated to ensure safety of personnel, including abandoning the vessel, as required

#### **3 Manage stress conditions of the vessel**

- 3.1** Stress levels of the vessel are assessed according to manufacturer specifications
- 3.2** Stability of the vessel is monitored at a frequency and scope relevant to vessel operations, sufficient to enable stress and stability to be maintained within acceptable limits at all times

- |          |   |   |
|----------|---|---|
|          | <b>3.3</b>                                      | Appropriate action is taken where weight distribution has or could exceed acceptable safety limits              |
| <b>4</b> | <b>Maintain records of stability management</b> |   |
|          | <b>4.1</b>                                      | Data and information related to stability management is accurately recorded                                     |
|          | <b>4.2</b>                                      | Data and information related to stability management is filed and stored according to organisational procedures |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA009 Manage stability of a vessel 500 gross tonnage or more.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARA023 Manage trim, stability and stress of a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying International Maritime Organization (IMO) recommendations concerning vessel stability
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to appropriate level of detail in recordkeeping
- determining stability and trim requirements for docking or slipping the vessel
- determining the effect on trim and stability of vessel in the event of damage to and consequent flooding of a compartment, and countermeasures to be taken
- identifying vessels trim and stability factors
- interpreting and applying information on the fundamental principles of vessel construction and the theories and factors affecting trim and stability, and measures necessary to preserve trim and stability
- maintaining stability and stress conditions within safe limits at all times
- producing accurate and reliable documentation
- undertaking stability calculations, including:
  - calculating required load distribution to achieve desired trim
  - calculations for change of draught, trim and heel when entering different water densities and to bilging of compartments
  - centre of gravity (CG) of a vessel using an inclining experiment and effect of suspended weights
  - changes to draught, trim and heel due to adding or removing fuel, ballast or cargo
  - determining required correction for height of CG for free surface effect
  - determining values of righting lever and construction of righting lever curves
  - displacement, wetted surface, form coefficients, tonne per centimetre (TPC) immersion, application of Simpson's Rules to first and second moments of area, centroids and centres of pressure
  - effect on stability of dry docking and grounding
  - hydrostatic stability of a vessel
  - moment of statistical stability at small angles of heel

- permeability
- shear force and bending moment calculations
- transverse and longitudinal stability using hydrostatic data
- vessel CG, centre of buoyancy and metacentre
- using automatic data-based equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- causes and repercussions of a heeling vessel
- data and information related to stability management, including:
  - cargo handling equipment
  - instructions of relevant maritime authorities
  - manufacturer instructions and procedures
  - organisational cargo handling procedures
  - relevant Australian and international standards and regulatory requirements
  - relevant WHS/OHS legislation
  - vessel and shore safety checklists
  - vessel cargo securing manual
  - vessel log
  - vessel register of materials handling equipment
- effects of angle of loll, including centre of buoyancy, how a ship behaves at the angle of loll, inherent dangers, corrective action and the difference between a loll and a list
- effects of density of sea water on the draught and freeboard of a vessel
- effects of flooding on transverse stability and trim, including:
  - calculation of vessel after flooding
  - cargo vessels
  - passenger ships
- features of the load-line and draught marks of a vessel and procedures for carrying out related calculations
- fundamental theories and principles of ship construction and the theories and factors that impact on trim and stability, and measures necessary to preserve trim and stability
- IMO recommendations concerning vessel stability
- levelling arrangements for damaged side compartments
- nature of flooding, including:
  - flooding due to collision or grounding
  - ingress of sea water through hatch covers or ruptured pipes
- principle stresses that act on the structure of a vessel, including panting and pounding, shear force, bending moments and torsional stress
- principles of parametric rolling and control methods

- principles of synchronous rolling and methods for its control
- procedures for calculating the required load distribution to achieve the desired trim
- responsibilities under international conventions and codes, including:
  - IMO grain regulations and grain heeling moment information
  - minimum stability requirements required by Load Line Rules and Intact Stability Code
  - passenger ship stability after damage
  - use of weather criterion
- stability, including:
  - dynamical
  - intact, including grain
  - statical
- suitable strategies for stabilising vessels
- survey and dry dock requirements
- trim and list
- typical problems related to the control of trim and stability for vessels of 500 gross tonnage (GT) and more
- vessels trim and stability factors for:
  - dry docking
  - excessive trim
  - free surface of a liquid
  - grounding
  - handling of heavy weights
  - large swell conditions
  - shift of cargo
  - wind heel
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental

damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARA024 Manage vessel stability**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to manage the dynamic factors affecting the stability of a vessel less than 80 metres.

It includes calculating stability, controlling vessel stress and stability, and maintaining records of stability management.

This unit applies to people working in the maritime industry in the capacity of:

- Master on commercial vessels less than 35 metres in length within the exclusive economic zone (EEZ)
- Master on vessels less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on vessels less than 80 metres in length within the EEZ
- Chief Engineer on vessels with inboard engines less than 1500 kW within the EEZ
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 35 metres Near Coastal, Mate less than 80 metres and Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

A - Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |   |
|---|---|
| <b>1 Calculate stability</b>                      | <b>1.1</b> Vessel stability data book is made available and checked for endorsement<br><br><b>1.2</b> Data is interpreted to determine safety parameters for vessel<br><br><b>1.3</b> Stability is accurately calculated using data extracted from vessel stability data book<br><br><b>1.4</b> Stability calculations are checked to ensure they correlate with data set out in vessel stability book<br><br><b>1.5</b> Miscalculations or unsafe conditions are recognised and recalculated or checked<br><br><b>1.6</b> Calculated stability data is recorded using appropriate units and correct number of significant figures          |
| <b>2 Control vessel stress and stability</b>      | <b>2.1</b> Information from vessel stability information is used to determine loading limits and displacement from draft<br><br><b>2.2</b> Vessel weight distribution is managed to maintain stability condition within safe limits at all times and regulatory requirements are complied with under all conditions of loading<br><br><b>2.3</b> Relevant stability information is correctly communicated to others, as required<br><br><b>2.4</b> Stability conditions of vessel are managed in adverse weather conditions<br><br><b>2.5</b> Emergencies that may jeopardise vessel stability are recognised and appropriate actions taken |
| <b>3 Maintain records of stability management</b> | <b>3.1</b> Data and information related to stability management is accurately recorded  |

- 3.2** Data and information related to stability management is filed and stored according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARA004 Manage vessel stability.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARA024 Manage vessel stability

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- attending to appropriate level of detail in recordkeeping
- carrying out basic calculations associated with maintaining vessel stability which must include:
  - dock water and freshwater allowance
  - draft
  - final height of the centre of gravity (CG) above the keel of a vessel
  - trim
  - final position of the longitudinal centre of gravity (LCG)
  - free surface effect and vertical distance between keel and CG adjusted for free surface effect (CGf)
  - metacentric height (GM) and GM adjusted for free surface effect (GMf)
  - righting moments
- checking calculations to ensure correlation against stability book data
- managing loading and weight distribution of vessel to ensure assigned load line conditions are not exceeded.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bilging and permeability
- centroids and CG
- change of draught and trim (MCT)
- conditions of stable, neutral and unstable equilibrium and effects of disturbing vessel from upright
- construction features and stress characteristics for vessels
- density and specific gravity
- dock water and freshwater allowance
- effects of free surface of liquids
- emergencies, including:

- adverse weather and water conditions
- any other emergency identified by risk assessment that may affect stability
- cargo shift
- damaged hull
- flooding of cargo spaces
- factors that affect the rolling period of vessel
- forces and moments
- information contained in stability data books
- loading and discharging weights
- loading limits, including:
  - not exceeding allowable passenger carrying capacity and distribution
  - not exceeding cargo carrying capacity of the vessel
  - the effect of fuel, freshwater and ballast on cargo carrying capacity
- maintenance of stability during firefighting operations
- principal stresses that act on the structure of a vessel
- principles of vessel stability
- problems affecting vessel stability
- procedures for carrying out basic calculations associated with vessel stability
- relationship between light displacement, loaded displacement and deadweight tonnage
- stability curves
- stability of vessel in a range of conditions
- stability terms and definitions
- steps involved in bringing an unstable vessel to a stable condition
- stress calculations
- tonnes per centimetre (TPC) immersion
- transverse and longitudinal dynamics
- trim and stress tables
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), vessel stability books, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## **Links**

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARA025 Monitor, loading, unloading, securing and stowage of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage the loading, stowage, securing and care of cargo during the voyage and the unloading of cargo, according to the cargo plan, organisational procedures and vessel stowage limitations.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain AMSA certification as a Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Develop cargo plan

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Cargo plan is developed to determine required cargo operations
- 1.2 Characteristics of cargo being transported are identified and the type, severity and impact of the hazard posed by cargo on safety, the environment, vessel operations and personnel are established
- 1.3 Cargo plan is evaluated to ensure regulations relating to hazardous materials/dangerous goods are observed
- 1.4 Cargo plan is assessed to ensure incompatible cargo stowage is avoided
- 1.5 Cargo plan is checked to ensure unloading sequence is effective

#### 2 Prepare for loading

- 2.1 Holds are checked to ensure they are clean, dry and free of odour
- 2.2 Safety arrangements are verified to ensure they are operational
- 2.3 Supplies of cargo protection and securing material are reviewed to ensure there are sufficient available
- 2.4 Bilge suction are protected before loading



- 2.5** Checks are made to ensure cargo is correctly identified, inspected and confirmed against documentation
    - 2.6** Preparations for loading are monitored according to stowage plan and organisational procedures
    - 2.7** Ballast discharge plan is identified and confirmed and appropriate actions to support this plan are undertaken
  - 3 Supervise loading/unloading of cargo**
    - 3.1** Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan
    - 3.2** Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations
    - 3.3** Loading/unloading is monitored to ensure loading rate is not exceeded
    - 3.4** Vessel stability is observed during loading/unloading operations
    - 3.5** Loading/unloading operations are checked against cargo plan
    - 3.6** Cargo is secured according to cargo plan
    - 3.7** Cargo handling documentation is completed according to organisational procedures and regulatory requirements
    - 3.8** Transfer of cargo is monitored to prevent hazards
    - 3.9** Gas monitoring equipment is regularly inspected and used according to organisational procedures, as required
  - 4 Monitor care of cargo during voyage**
    - 4.1** Plan for care of cargo during voyage is implemented according to organisational and customer requirements, and relevant regulations
    - 4.2** Ventilation and humidity control systems are checked
    - 4.3** Actions required to maintain the safety and security of cargo during the voyage are initiated according to customer requirements and organisational procedures
    - 4.4** Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain the

- safety of personnel, cargo and vessel
- 4.5** Safety procedures are followed, and appropriate action is taken when defects or damage to cargo are detected
- 5 Take precautions to prevent pollution of the environment**
- 5.1** Procedures to prevent pollution are identified and observed at all times
- 5.2** Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
- 5.3** All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud
- 5.4** Shore-based response personnel are promptly notified when a vapour leak or cloud occurs

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARA010 Manage loading, unloading and stowage of cargo

## Links

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA025 Monitor, loading, unloading, securing and stowage of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying actions required to maintain the wellbeing of cargo
- applying international regulations, codes and standards concerning the safe handling, stowage, securing and transport of bulk cargo and dangerous, hazardous and harmful cargo
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- carrying out cargo operations according to cargo plan or other documents and established safety rule/regulations, equipment operating instructions and shipboard stowage limitations, including identifying incompatible cargo stowage
- establishing and maintaining effective communications during loading, stowage, transportation and unloading
- identifying defects or damage to cargo and initiating timely action in response to defects or damage
- identifying relevant cargo handling documentation
- interpreting and applying knowledge of bulk ship, including bulk grain, chemical and oil tanker, and liquefied gas tanker layouts, cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of vessel
- monitoring and anticipating problems and risks associated with loading, unloading, stowage and care of cargo
- monitoring use of equipment in loading, unloading, stowage and care of cargo
- reading and interpreting safety data sheets (SDS)/material safety data sheets (MSDS), relevant cargo-related hazards to vessel and to personnel, and taking appropriate action according to organisational procedures
- reading, interpreting and applying instructions, regulations, procedures and information associated with loading, unloading, stowage and care of cargo
- recognising problems and hazards that can arise when managing safety on a liquefied gas tanker, taking appropriate remedial action and initiating appropriate solutions.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- ballast management issues and procedures
- bulk ships, including bulk grain, chemical and oil tanker layouts, liquefied gas tanker layouts, cargo features and characteristics
- cargo calculations
- cargo care, including:
  - inspection and preparation of holds
  - refrigerated cargo
  - segregation and separation of cargo
  - ventilation and control
- cargo handling documentation
- cargo handling equipment and safety
- cargo lifting equipment and safe working loads
- cargo plans, including:
  - cargo weight
  - correct description and stowage of hazardous and dangerous goods
  - description of cargo to be loaded
  - load/discharge port
  - segregation of non-compatible cargo
  - stowage of refrigerated containers
- cargo hazards, including obstructing view from navigating bridge or overside at the bow defects or damage to cargo, including:
  - damage caused by cargo movement
  - deterioration of perishable cargo
  - water ingress
- effect of cargo, including heavy lifts and deck cargo on the seaworthiness, draught, trim and stability of the vessel
- effects of a concentrated load which can be spread over a wider area by the use of dunnage and deck shoring taking into consideration the position of girders, transverses and longitudinals under the tank top
- effects of different types of cargo operations on vessel trim and stability
- effects on cargo handling of sea conditions, wind and weather
- effects on stability and draught during loading and discharging operations, including heeling moments from gear and loads
- fundamental understanding of:
  - cargo operations for oil, chemical and liquefied gas tankers, including cargo preparation and carriage
  - physical properties of oil, chemical and liquefied gases
  - types of oil, chemical and liquefied gas tankers, general arrangement and construction
- hazardous materials/dangerous goods classification, signage, stowage and segregation requirements under the International Maritime Dangerous Goods (IMDG) Code and relevant Marine Orders

- hazards and control measures associated with bulk ships, including bulk grain, chemical and oil tanker cargo loading, and liquefied gas tanker cargo loading, stowage and unloading
- incompatible cargo stowage, including:
  - cargo liable to taint
  - hazardous material/dangerous goods
- inspection and preparation of holds
- methods of caring for various types of cargo, including:
  - blocking
  - chocking
  - lashing
  - shoring
  - tombing
- methods of stowage and securing of:
  - heavy lifts
  - heavy loads
  - vehicles and trailers
- oil tanker piping and pumping arrangements, including:
  - cargo piping systems
  - cargo pumping systems
  - cargo pumps
  - tanker arrangement
- operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- precautions before entering enclosed and contaminated spaces
- precautions to prevent pollution of the environment from the release of oil, chemicals and liquefied gases
- procedures for carrying out calculations involving weights, capacities and stowage factors
- relevant firefighting operations and the use of firefighting equipment
- relevant sections of maritime regulations, codes and conventions related to chemical and oil tankers, and liquefied gas tankers
- relevant WHS/OHS and cargo handling legislation, codes of practice, policies and procedures
- safe handling, stowage and securing of cargo, including dangerous goods, hazardous material and harmful cargo, and their effect on the safety of life and the vessel
- standard stowage position numbering systems used on container vessels
- typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- typical types and sizes of shipping containers
- usual methods of container packing, loading and discharging, stowage and dunnaging
- various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements, hazards and problems; and appropriate preventative and remedial action and solutions
- ways of restricting vessel stress levels within permitted levels within permitted limits during

loading/discharging cargo.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB033 Assist with routine maintenance of a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to carry out routine maintenance on a vessel less than 80 metres.

It includes selecting and setting up equipment and materials for cleaning, cleaning work area, following instructions to carry out routine maintenance of vessel machinery, preparing and painting surfaces, and maintaining and storing tools, equipment and chemicals

This unit applies to people working in the maritime industry in the capacity of:

- assistant to the Master or Engineer of a vessel working under their direct supervision
- worker on deck or in the engine room of a vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- worker in the engine room only for a vessel with propulsion power less than 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B – Equipment Checking and Maintenance

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

**1 Select and set up equipment and materials for cleaning**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Equipment is selected according to type of cleaning to be undertaken
- 1.2** Equipment is checked to ensure it is clean and serviceable
- 1.3** Suitable dry and wet cleaning agents and chemicals are selected and prepared according to manufacturer instructions and work health and safety (WHS)/occupational health and safety (OHS) requirements
- 1.4** Suitable personal protective equipment (PPE) is selected and used, where necessary

**2 Clean work area**

- 2.1** Work area to be cleaned is prepared and hazards are identified
- 2.2** Work area is barricaded or warning signs are provided, as appropriate, to reduce risk to self and other crew members
- 2.3** Correct cleaning agents are selected and applied according to manufacturer instructions and WHS/OHS requirements
- 2.4** Equipment is used correctly and safely

**3 Follow instructions to carry out routine maintenance of vessel machinery**

- 3.1** Suitable PPE is selected and used according to WHS/OHS requirements
- 3.2** Greasing, lubrication and other routine servicing of vessel machinery and equipment is carried out according to supervisor and manufacturer instructions
- 3.3** Routine adjustments and repairs are made to vessel machinery and equipment according to supervisor and manufacturer instructions



- |  |            |   |
|--|------------|---|
|  | <b>3.4</b> | Faulty vessel machinery and equipment is identified and reported according to workplace procedures  |
| <b>4 Prepare and paint surfaces</b>                        | <b>4.1</b> | Suitable PPE is selected and used according to WHS/OHS requirements   |
|  | <b>4.2</b> | Surfaces are prepared using correct equipment   |
|  | <b>4.3</b> | Rust remover, rust converter and undercoats are applied according to manufacturer specifications  |
|  | <b>4.4</b> | Paints are mixed in correct proportions according to manufacturer specifications  |
|  | <b>4.5</b> | Finishing coat is applied using brush, roller or spray gun  |
| <b>5 Maintain and store tools, equipment and chemicals</b> | <b>5.1</b> | Equipment and tools are cleaned, returned to operating order and stored according to supervisor and manufacturer instructions   |
|  | <b>5.2</b> | Environmental procedures are followed and waste from cleaning and maintenance tasks is collected, treated and disposed of or recycled according to workplace procedures |
|  | <b>5.3</b> | Work area is cleaned and maintained according to workplace requirements   |
|  | <b>5.4</b> | Malfunctions, faults, wear or damage to tools are reported according to workplace procedures  |
|  | <b>5.5</b> | Chemicals are stored according to supervisor and manufacturer instructions  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB001 Assist with routine maintenance of a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB033 Assist with routine maintenance of a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing maintenance records
- complying with manufacturer requirements, work health and safety (WHS)/occupational health and safety (OHS) requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
- identifying faulty equipment
- implementing safe and environmentally responsible work practices
- making routine adjustments and repairs under supervision, including:
  - checking cooling system, fuel, grease and oil, and battery levels
  - inspecting fan belts, leads, lines, connections, air filters, hydraulics and lighting
  - greasing and oiling
- selecting and using correct tools and equipment for cleaning or maintenance tasks, including:
  - cleaning supplies
  - grease guns
  - handheld power tools
  - hand tools.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- component parts, operation and routine maintenance requirements of vessel machinery
- environmental and waste management procedures, including:
  - preventative measures with regard to damage to the environment caused by servicing, maintenance and cleaning activities
  - safely using and disposing of cleaning and maintenance debris, including oil containers, fuel, chemical residues and paint
- equipment cleaning and preservation techniques
- maintenance hazards and problems

- paint types and applications
- principles and procedures of machinery lubrication as they relate to vessel machinery
- procedures for using hand tools for routine maintenance operations
- relevant WHS/OHS and pollution control legislation
- rust treatment
- techniques for maintenance of surfaces, including timber, fibre glass, steel and aluminium
- workplace cleaning and maintenance procedures.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery and materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB034 Carry out basic welding, brazing, cutting and machining operations on a coastal vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to carry out basic welding, brazing, cutting and machining tasks.

It includes carrying out basic welding, brazing, cutting and machining tasks and following safety and hazard control procedures.

This unit applies to persons working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B - Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Carry out basic welding tasks</b> | <b>1.1</b> Requirements for welding tasks are correctly interpreted from work instructions  |
|  | <b>1.2</b> Parts are prepared for welding according to established practice   |
|  | <b>1.3</b> Parts are welded according to established practice and work requirements   |
|  | <b>1.4</b> Weld defects are identified and appropriate actions taken according to established practice and standard operating procedures (SOPs) |
|  | <b>1.5</b> Flame gouging methods are used to remove plate and weld material according to established practice and standard operating procedures |
|  | <b>1.6</b> Finished work is checked against work instructions for accuracy and quality  |
| <b>2 Carry out basic brazing tasks</b> | <b>2.1</b> Requirements for brazing tasks are correctly interpreted from work instructions  |
|  | <b>2.2</b> Parts are prepared for brazing according to established practice and work requirements   |
|  | <b>2.3</b> Brazing equipment is prepared for brazing operations according to established procedures   |
|  | <b>2.4</b> Parts are brazed using established procedures  |
|  | <b>2.5</b> Finished work is checked against work instructions for accuracy and quality  |
| <b>3 Carry out basic cutting tasks</b> | <b>3.1</b> Instructions are reviewed, and required size and shape of cut work is correctly identified and interpreted                           |
|  | <b>3.2</b> Work is correctly marked out in preparation for cutting  |

- according to established practice and SOPs
- 3.3 Thermal cutting plant and equipment is set up according to established procedures
  - 3.4 Steel plate and/or rolled sections are cut to shape and size according to established practice and SOPs
  - 3.5 Finished work is checked against work instructions for accuracy and quality according to SOPs
- 4 Carry out basic machining tasks**
- 4.1 Requirements for basic machining tasks are correctly interpreted from work instructions according to SOPs
  - 4.2 Work is correctly marked out in preparation for basic machining according to established practice and SOPs
  - 4.3 Machine is set up according to established procedures
  - 4.4 Machining is carried out according to established procedures
  - 4.5 Finished work is checked against work instructions for accuracy and quality according to SOPs
- 5 Follow safety and hazard control procedures**
- 5.1 Required safety precautions and regulations are followed when carrying out basic welding
  - 5.2 Operational hazards are identified and action is taken to eliminate or, where elimination is not possible, to minimise, risk to personnel

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB008 Carry out basic welding, brazing, cutting and machining operations on a coastal vessel.

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## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB034 Carry out basic welding, brazing, cutting and machining operations on a coastal vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out basic welding, brazing, cutting and machining tasks while underway, in port and moored or at anchor
- cleaning, sharpening or adjusting tools according to standard operating procedures (SOPs)
- dressing and truing a grinding wheel
- following required work schedule according to company requirements
- identifying a glazed, loaded or untrue grinding wheel condition and taking appropriate action
- interpreting and applying instructions and SOPs relevant to basic welding, brazing, cutting and machining operations required on a coastal vessel
- interpreting work specifications and drawings
- marking out work to specifications, and measuring and checking the quality of finished work
- performing basic calculations required to carry out basic welding, brazing, cutting and machining operations
- recognising routine problems that may occur when performing basic welding, brazing, cutting and machining operations on a vessel and taking appropriate action
- selecting and safely using welding, brazing, cutting and machining tools and equipment according to operating procedures
- storing welding, brazing, cutting and machining tools and equipment after use according to standard procedures
- taking action promptly to report operational incidents and problems according to regulations and shipboard procedures
- using effective verbal and other communication skills required when carrying out basic welding, brazing, cutting and machining operations on a vessel
- working safely and collaboratively with others when carrying out basic welding, brazing, cutting and machining operations on a vessel.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable sections of relevant maritime regulations

- applicable legislation, regulations and codes of practice, including:
  - National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
  - relevant Australian engineering standards
  - relevant state and territory marine regulations
  - relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) and pollution control legislation and policies
- basic operations within area of own responsibility, including:
  - basic butt welds
  - basic fillet welds
  - basic machining operation
  - basic pad welds
  - manual metal arc welding
  - oxygen acetylene welding
- characteristics and identifying features of common engineering drill bits
- documentation and records, including:
  - maintenance records
  - manufacturer instructions for tools and equipment
  - relevant safety data sheets (SDS)/material safety data sheets (MSDS)
  - safety management system (SMS) plans, procedures, checklists and instructions
  - work instructions
  - vessel and company procedures
- environmental protection measures when carrying out basic engineering tasks
- hazards and related safety precautions when carrying out basic welding, brazing, cutting and machining tasks
- operational hazards, including:
  - moving and rotating machinery
  - moving heavy loads using unsafe procedures
  - non-compliance with safe working procedures
  - poor housekeeping procedures
  - power tools
  - sharp tools and implements
  - unsecured machinery, components or equipment
  - using equipment beyond safe working limits
  - using welding equipment near explosive/flammable liquids and gases
- operating procedures for basic welding, brazing, cutting and machining tasks required of a Marine Engine Driver Grade 1
- procedures for:
  - identifying a glazed, loaded or untrue grinding wheel condition
  - dressing and/or truing a grinding wheel
- procedures for marking out work to specifications and measuring and checking the quality of

finished work, including the correct use of:

- adjustable gauge
- callipers
- centre punch hammers
- dividers
- rules and tapes
- scribes
- squares
- trammels
- vernier callipers and micrometer
- SMS and procedures
- techniques for identifying defective welds within limits of responsibility
- types, names and identifying features of drilling machines used on coastal maritime vessels
- typical work specifications and drawings used on a coastal vessel.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or workshop ashore
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB035 Contribute to routine engine maintenance on a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to contribute to servicing engines and engine components on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Engine or Integrated Rating who assists under the direction of the officer in charge of the engineering watch in performing a range of engine maintenance activities on a range of vessels
- Navigational Watch - Deck/Engine.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine, Integrated Rating or Navigational Watch - Deck/Engine and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan engine maintenance tasks**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Planned maintenance system is accessed to establish engine maintenance requirements for vessel

**1.2** Maintenance tasks are proposed and prioritised in conjunction with others involved in or affected by the maintenance work

**1.3** Resource requirements are identified and accessed to ensure efficient completion of tasks

**1.4** Maintenance tasks are recorded in the maintenance schedule according to workplace procedures

#### **2 Prepare for engine service**

**2.1** Nature and scope of work requirements are confirmed according to workplace procedures

**2.2** Service procedures, workshop manuals and manufacturer specifications are accessed and interpreted

**2.3** Tools, equipment and materials required for servicing are identified and prepared

**2.4** Engine and components are visually inspected for external signs of defects according to maintenance documentation

**2.5** Electrical components are identified and electrical equipment used safely

**2.6** Engine is started, ran up to operating temperature and checked for leaks, abnormal noises and pressures

**2.7** Test results are compared with manufacturer/component supplier specifications to determine compliance or non-compliance

**2.8** Results are documented with supporting information and recommendations are made about serviceability and

repair

### **3 Service engines and engine components**

- 3.1** Work health and safety (WHS)/occupational health and safety (OHS) requirements are identified and observed
- 3.2** Service operations are performed according to workplace procedures and manufacturer/component supplier specifications
- 3.3** Fluid level checks and replenishments are carried out according to manufacturer/component supplier specifications
- 3.4** Appropriate lubricants are applied to engine
- 3.5** Equipment/components requiring replacement are changed according to manufacturer/component supplier specifications
- 3.6** Adjustments are made according to manufacturer/component supplier specifications

### **4 Complete work**

- 4.1** Engine is inspected to ensure protective guards, cowlings and safety features are in place
- 4.2** Engine is cleaned according to workplace procedures
- 4.3** Materials to be reused are collected and stored according to manufacturer specifications and workplace procedures
- 4.4** Tools and equipment are cleaned, maintained and stored according to manufacturer specifications and workplace procedures
- 4.5** Waste and scrap are removed according to legislative requirements and workplace procedures
- 4.6** Unserviceable equipment is tagged and faults are identified and reported according to workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB016 Contribute to routine engine maintenance on a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARB035 Contribute to routine engine maintenance on a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- appropriately using and selecting personal protective equipment (PPE)
- assisting in maintaining and servicing marine systems/components, including:
  - batteries
  - cooling systems/components
  - engine mounting systems/components
  - exhaust systems/components
  - fuel systems/components
  - intake systems/components
  - lubrication systems/components
- communicating with other personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- confirming maintenance to be undertaken and identifying resource requirements with the officer in charge of the engineering watch
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant WHS/OHS skills and knowledge
- identifying hazards and safety issues and reporting these to the engineering officer of the watch
- identifying tools, equipment and materials required to undertake maintenance tasks
- using electrical equipment safely and applying:
  - correct emergency procedures
  - different voltages in use onboard vessel
  - isolation procedures
  - precautions to prevent electric shock
  - safety precautions before commencing work

- using painting, lubrication and cleaning materials and equipment safely.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- causes of electric shock and precautions to be observed to prevent shock
- electrical principles covering voltage, current, resistance, power, magnetic and inductance
- engine room cleaning procedures and relevant cleaning agents
- engine room hazards and safety, including:
  - electrical safety
  - gas testing
  - head of water/fluid
  - heat stress
  - high pressures
  - hot fluids
  - mechanical safety
  - noise
  - pollution
  - steam
  - toxic gases
  - ventilation
  - vibration
- engine room machinery and equipment, including:
  - air compressors
  - air start systems
  - bilge system, bilge pumps, bilge pick-ups, bilge valves and bilge piping
  - engine protection devices (crankcase mist detectors)
  - hydraulic systems, power packs, rams and motors, and directional control valves (DCVs)
  - oily water separators
  - osmosis plant
  - pumps – positive displacement, centrifugal and axial flow
  - purifiers and clarifiers
  - refrigeration and air conditioning plant
  - sewage treatment plant
  - slow speed, medium speed and high-speed diesels
  - steering systems
  - valves – globe and full flow, screw down non-return, screw lift, butterfly, ball, relief, non-return and gate

- water making (both freshwater generators and reverse)
- maintenance and servicing tasks, including:
  - economiser cleaning
  - engine room rounds (daily/weekly/monthly maintenance checks)
  - greasing and oiling of machinery
- inspection and maintenance of:
  - hatches, watertight doors and deadlights
  - hoists and lifting equipment
- manufacturer safety guidelines and shipboard instructions
- mechanical principles covering the concepts of mechanical, hydraulic and pneumatic systems
- purpose of isolation procedures and application of lock out tags
- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- rights and responsibilities of individuals about lock out and tagging of plant and equipment
- routine inspection of hand and power tools, measuring instruments and machinery tools
- routine maintenance and repair procedures
- safe disposal of waste materials
- scavenge space cleaning
- soot blowing
- surface preparation and painting
- surface preparation techniques, including:
  - abrasive blast cleaning
  - hand and power tool cleaning
- types, functions and limitations of marine equipment/components, including:
  - cooling systems/components
  - engine mounting systems/components
  - engines
  - exhaust systems/components
  - fuel systems/components
  - intake systems/components
  - lubrication systems/components.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the

time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB036 Implement vessel planned maintenance system

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to establish, organise and implement preventative and reactive maintenance programs to optimise vessel operational performance.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating.

## Licensing/Regulatory Information

There are no legislative and regulatory requirements applicable to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Develop maintenance plan**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Vessel and equipment specifications, service requirements and workplace procedures are checked for recommended maintenance intervals and processes according to the safety management system (SMS)

- 1.2 Special requirements for maintenance are separated from routine maintenance tasks
  - 1.3 Maintenance plan and a related work schedule are developed
  - 1.4 Procedures for safety checks of equipment are developed and documented according to workplace procedures
  - 1.5 Recordkeeping system is developed for maintenance work completed and equipment replaced according to workplace procedures
- 2 **Establish maintenance systems**
  - 2.1 Resource requirements are identified and supplied
  - 2.2 Roles and responsibilities of crew are clarified and built into position descriptions and work instructions
  - 2.3 Mentoring and training is provided to support the maintenance strategy
  - 2.4 Maintenance procedures and schedules are prepared to minimise negative impacts on vessel operations, costs, waste and the environment
  - 2.5 Potential risks are analysed and management strategies are recommended
  - 2.6 Contingency plans are prepared
  - 2.7 Maintenance schedules and procedures are effectively communicated to crew
- 3 **Implement maintenance plan**
  - 3.1 Consumables and equipment are coordinated to meet maintenance work schedule
  - 3.2 Maintenance work schedule is completed according to maintenance plan
  - 3.3 Technical assistance is provided to crew in completing maintenance activities, as required
  - 3.4 Appropriate readings, measurements and recordings are made and compared to equipment and other relevant specifications
  - 3.5 Areas of vessel and equipment requiring further testing are identified and appropriate procedures for testing are

implemented

- 3.6** Appropriate adjustments are made to maintenance plan based on experience and required documentation is completed
  - 3.7** Maintenance records are completed and forwarded to appropriate personnel
  - 3.8** Areas where changes to equipment operation or routine maintenance are required to maintain optimum work output and equipment life, are noted
- 4 Monitor and review maintenance management system**
  - 4.1** Continuous improvement strategies are developed
  - 4.2** Performance criteria for maintenance goals are determined and data collection strategies are established
  - 4.3** Performance information and outcomes are analysed and implications are reported to appropriate personnel

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB018 Implement vessel planned maintenance system.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB036 Implement vessel planned maintenance system**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- determining and recommending the need for capital expenditure to replace plant and equipment
- developing effective planning documents
- developing maintenance strategies, including establishing criteria for determining maintenance priorities, and planning and scheduling routine equipment and overhead maintenance to meet quality system requirements
- discussing maintenance costs with relevant personnel to ensure costs meet budget requirements
- ensuring currency of relevant legislative and regulatory knowledge
- establishing and monitoring performance targets for maintenance teams within performance planning and appraisal processes
- evaluating and recommending alternative maintenance policies and strategies, including changes in work roles and responsive/preventative models for maintenance
- identifying and applying relevant WHS/OHS, regulatory and workplace requirements
- managing maintenance costs
- monitoring system performance
- using appropriate information technology and software when preparing reports and plans
- using recordkeeping procedures to document maintenance costs, problems, priorities, solutions, schedules and completions.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- cleaning materials, and methods of storage and handling of such materials



- computer applications and software suitable for developing a range of reports, plans and schedules
- cost elements in maintenance system costing and budgeting
- costs resulting from poor maintenance and the benefits of a preventative maintenance system
- health hazards associated with maintenance procedures
- impacts of poor maintenance on vessel, and on occupational and environmental safety
- maintenance goals, including:
  - changes in attitudes
  - costs
  - frequency of breakdowns
  - length of time out of action
  - time of repairs
- maintenance issues related to vessel
- maintenance strategy, including:
  - cleaning
  - electrical
  - emergency lighting
  - evacuation
  - housekeeping
  - painting
  - pests
  - plumbing
- plant and equipment falling under scope of maintenance program
- potential risks, including:
  - dealing with hazardous material
  - hot work
  - working at heights
  - working in confined spaces
  - working overside
- relevant legislation, regulations and industrial agreements
- routine maintenance tasks, including:
  - back-ups
  - checks of cooling system, fuel, grease and oil, and battery levels
  - confirmation of operational effectiveness
  - dismantling and assembling
  - identification and replacement of worn parts
  - inspections of fan belts, leads, lines, connections, air filters, hydraulics and lighting
  - minor adjustments
  - testing
- special requirements for maintenance, including:

- damage repair
- hatch cover watertight arrangements
- main engine or auxiliary machinery breakdowns
- replacing defective cargo-lifting equipment
- types of lubrication, and lubricant storage and handling
- use and care of personal safety equipment.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB037 Maintain and repair bridge navigation equipment and ship communication systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to maintain and repair bridge navigation equipment and ship external communication systems.

It includes reviewing, maintaining and managing bridge navigation and communication equipment systems.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

Bridge navigation equipment includes:

- automatic identification system (AIS)
- echosounder systems
- electronic chart display and information system (ECDIS)
- global navigation satellite systems (GNSS)
- inertial navigation system
- marine autopilots
- navigation lights and search lights
- radar
- ship compass equipment
- ship horn and sound signal system
- speed logs
- voyage data recorders
- wind trackers.

## **Licensing/Regulatory Information:**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention

on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Electrotechnology

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1. Review ship bridge navigation equipment and communication systems**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Bridge navigation equipment and ship communication systems are interpreted from ships technical drawings and/or specifications
- 1.2** Bridge navigation equipment and communication systems are identified, visually inspected and tested in accordance with shipboard procedures
- 1.3** Hazards are identified, risks assessed and control measures implemented
- 1.4** Measuring and calibrating instruments are used in accordance with manufacturer specifications
- 1.5** Operations are carried out in accordance with operational manuals, rules and procedures to ensure safety of operations

**2. Maintain bridge navigation equipment**

- 2.1** Bridge navigation equipment is visually inspected and tested in accordance with maintenance specification and plan
- 2.2** Bridge navigation equipment and associated plant and safety systems are isolated and electrical hazards identified in accordance with safe working practices
- 2.3** Bridge navigation equipment malfunctions detected during equipment maintenance are documented in service records and effect on associated plant and safety systems specified accurately
- 2.4** Bridge navigation equipment faults are rectified by competent person in accordance with shipboard procedures and legislative requirements
- 2.5** Bridge navigation equipment is dismantled and re-assembled in accordance with manufacturer safety guidelines and shipboard instructions
- 2.6** Bridge navigation equipment rectification plans are justified in service/maintenance records
- 2.7** Maintenance work is checked to verify that it conforms with technical specifications
- 2.8** Bridge navigation equipment restoration actions are taken in a timely manner by the method most suitable and appropriate to the ship prevailing circumstances and conditions

**3. Maintain ship communication systems**

- 3.1** Ship communication system is visually inspected and tested in accordance with maintenance specification and plan
- 3.2** Working in flammable areas hazards are identified, risks assessed and control measures implemented in accordance with shipboard procedures
- 3.3** Communication systems restoration actions are undertaken by the method most suitable and appropriate to the ship prevailing circumstances and conditions
- 3.4** Faults are rectified in accordance with shipboard procedures and legislative requirements
- 3.5** Clear and concise communication is used when testing internal communication systems

- 4. Clean up and complete documentation**
- 4.1** Work area is cleared and cleaned
  - 4.2** Work area is made safe and all equipment and plant returned to service in accordance with shipboard procedures and legislative requirements
  - 4.3** Materials are disposed of or recycled in accordance with legislative and workplace requirements
  - 4.4** Tools and equipment are cleaned, checked and stored in accordance with workplace procedures
  - 4.5** Maintenance reports are completed in accordance with procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB037 Maintain and repair bridge navigation equipment and ship communication systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- carrying out fault finding and procedural maintenance on hardware and software of the following bridge navigation equipment, on at least two separate occasions:
  - automatic identification system (AIS)
  - echosounder systems
  - electronic chart display and information system (ECDIS)
  - global navigation satellite systems (GNSS)
  - inertial navigation system
  - marine autopilots
  - navigation lights and search lights
  - ship compass equipment
  - ship horn and sound signal system
  - speed logs
  - voyage data recorders
  - wind trackers
- detecting machinery malfunction, location of faults and actions to prevent damage
- dismantling and identifying component parts of the following typical ship's bridge navigation equipment on at least one occasion:
  - radar
  - ship gyrocompass
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- bridge navigation equipment, including:
  - construction, operation, maintenance and fault finding of:
    - AIS
    - echosounder systems
    - ECDIS
    - GNSS
    - inertial navigation system
    - marine autopilots
    - navigation lights and search lights
    - radar
    - ship compass equipment
    - ship horn and sound signal system
    - speed logs
    - voyage data recorders
    - wind trackers
- electrical and electronic systems operating in flammable areas
- principles and maintenance procedures of:
  - bridge navigation equipment
  - internal and external communication systems
- relevant industry standards and manufacturer specifications
- safety precautions and procedures, including electrical risk mitigation control measures
- WHS/OHS requirements, including safe working practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or



may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- radar and ship gyrocompass equipment
- tools, bridge navigation equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB038 Maintain and repair marine electrical and electronic equipment**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to maintain and repair marine electrical and electronic equipment on a vessel. This includes carrying out routine maintenance of marine generators, switchboards, electric motors, motor starters, direct current (DC) electrical systems and electrical distribution systems; and identifying faults in automated control systems.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Maintain marine generators**

- 1.1** Safety requirements associated with working on marine electrical generation systems are complied with
- 1.2** Marine generators are inspected using appropriate manuals and drawings according to regulatory, organisational and manufacturer requirements
- 1.3** Routine maintenance and testing of marine generators is performed according to regulatory, organisational and manufacturer requirements
- 1.4** Alternators are synchronised according to organisational and manufacturer requirements
- 1.5** Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements

#### **2 Maintain marine switchboards**

- 2.1** Safety requirements associated with handling circuit breakers are complied with
- 2.2** Routine maintenance is performed on main circuit breaker according to with regulatory, organisational and manufacturer requirements
- 2.3** Faults in circuit breakers are detected and corrected according to regulatory, organisational and manufacturer requirements
- 2.4** Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements

#### **3 Maintain marine electrical motors**

- 3.1** Safety requirements associated with working on marine electrical motors are complied with
- 3.2** Equipment required for maintenance of electrical motors

- is selected and checked for serviceability
- 3.3** Routine maintenance procedures are applied on marine electrical motors according to regulatory, organisational and manufacturer requirements
- 4 Test marine electrical motor starters**
- 4.1** Safety requirements associated with working on marine electrical motor starters are complied with
- 4.2** Faults in electrical motor starters are detected and rectified according to regulatory, organisational and manufacturer requirements
- 4.3** Starting and running current load testing is performed on electrical motors according to regulatory, organisational and manufacturer requirements
- 4.4** Procedures for finding start and finish of electrical motor windings are applied according to regulatory, organisational and manufacturer requirements
- 4.5** Testing, repairs and maintenance records are maintained according to regulatory, organisational and manufacturer requirements
- 5 Maintain marine electrical distribution systems**
- 5.1** Safety requirements associated with working on marine electrical distribution systems are complied with
- 5.2** Causes and potential dangers associated with earth faults in multiple earthed neutral (MEN) and floating neutral systems are identified
- 5.3** Earth faults are detected and repaired using correct equipment according to regulatory, organisational and manufacturer requirements
- 5.4** Hazards associated with working on fluorescent lamp circuits are identified
- 5.5** Fluorescent lamp circuit is constructed using appropriate manuals and drawings according to regulatory, organisational and manufacturer requirements
- 5.6** Components, function and operation of watertight and flame proof fittings are identified
- 5.7** Reasons for earthing high voltage (HV) systems via a resistor are outlined

- 5.8 Routine maintenance, inspection and testing of marine electrical distribution systems is performed according to regulatory, organisational and manufacturer requirements
      - 5.9 Temporary repairs to insulation are performed according to regulatory, organisational and manufacturer requirements
      - 5.10 Limitation of temporary repairs to insulation in terms of survey requirements are identified
- 6 Maintain DC electrical systems**
  - 6.1 Safety requirements associated with working on marine DC electrical systems are complied with
  - 6.2 Operation of a rectifier is identified
  - 6.3 Single-phase full wave rectifier fitted with filters is built and operated
  - 6.4 Routine battery maintenance is carried out according to organisational and manufacturer requirements
  - 6.5 Correct procedures for checking specific gravity of electrolyte in lead acid and alkaline batteries are applied according to manufacturer requirements
  - 6.6 Methods for supplying back-up power for remote/automatic control equipment are identified
  - 6.7 Procedure for testing back-up power is identified and applied
- 7 Identify faults in automated control systems**
  - 7.1 Pneumatic, hydraulic, electronic/electrical control systems are compared and contrasted
  - 7.2 Function and operation of main components of automated control systems are outlined
  - 7.3 Faults in automated control systems are detected and rectified using standard fault-finding procedures
  - 7.4 Testing procedures for identifying function and performance of automatic control systems in vessel operating systems are identified and applied
- 8 Operate electrical testing and measuring**
  - 8.1 Insulation tester is operated safely according to manufacturer procedures

## equipment

- |          |                                       |  |
|----------|---------------------------------------|--|
|          | <b>8.2</b>                            | Continuity testing on electrical circuits is performed according to organisational and manufacturer procedures |
|          | <b>8.3</b>                            | Clamp meter is operated safely according to manufacturer procedures  |
|          | <b>8.4</b>                            | Multimeter is operated safely according to manufacturer procedures   |
| <b>9</b> | <b>Test automatic control devices</b> |  |
|          | <b>9.1</b>                            | Operational functions are performed on a monitor   |
|          | <b>9.2</b>                            | Different types and operation of control valves are identified   |
|          | <b>9.3</b>                            | Control system control functions are applied using different control devices                                   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB013 Maintain and repair marine electrical and electronic equipment.

## Links

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB038 Maintain and repair marine electrical and electronic equipment**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant procedures
- communicating procedures associated with maintaining and repairing marine electrical and electronic equipment verbally and in writing
- conducting risk assessment on task to be performed
- extracting information from basic electrical and electronic diagrams required to build electrical and electronic circuits
- identifying and interpreting numerical and graphical information in vessel electrical diagrams and specifications
- identifying and suggesting ways of rectifying faults and malfunctions in marine electrical and electronic systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine electrical and electronic systems
- initiating timely action in response to defects or damage
- reading and interpreting written information related to operating and maintaining marine electrical and electronic systems, including specifications, drawings, technical manuals, and electrical and electronic circuit diagrams
- using testing equipment to gather information on function and performance of marine electrical and electronic systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alternating current (AC)/direct current (DC) voltage
- batteries
- circuit breakers and interlocks fitted to circuit breakers
- circuits
- current protection relays, including:
  - operate on fault and request

- operate on fault and request and demand
- operate on fault and request and under voltage
- earthing
- electrical measuring and testing instruments
- electrical symbols, basic electrical and electronic diagrams and circuits
- faults in circuit breakers, including:
  - alignment of contactors
  - condition of:
    - closing and opening mechanisms
    - insulation barriers
  - wear and tear on linkages
- faults in electrical motor starters, including:
  - earthing
  - open circuit
- faults in automated control systems
- fault protection equipment, including:
  - differential protection device
  - fuses
  - over current devices
  - over voltage devices
  - reverse power devices
  - thermal overload devices
  - thermistor protection devices
  - under voltage devices
- function and performance testing of system monitoring devices, including:
  - alarm printer
  - data logger
- current codes, standards, regulations and industry practices
- main components of automated control systems, including:
  - actuator
  - control valve
  - controller
  - positioner
  - regulator
  - relay
  - sensor
  - servomotor
  - transducer
- marine generator testing, including:
  - testing an alternator



- nature and causes of typical start-up and shutdown malfunctions of main and auxiliary electrical and associated systems and available methods for their detection and rectification
- operation of:
  - boiler, purifier and generator shutdown systems
  - main engine shutdown protective devices
  - protective devices found onboard vessels
- operational characteristics and performance specifications for different types of electrical and electronic systems found on vessels
- principles and procedures of electrical maintenance
- purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- relevant procedures such as those relating to:
  - adjusting, testing and maintaining fault protection devices on switchboards
  - carrying out start-up and shutdown of electrical machinery and associated systems to ensure compliance with company and survey requirements and regulations
  - changing alarm-setting values in monitoring systems
  - confirming the accuracy of measuring monitoring
  - detecting electrical malfunctions and preventing damage
  - electrical safety and isolation
  - fault finding
  - marine maintenance, including difference between breakdown repair, planned maintenance and condition monitoring, purpose of maintenance recording and reporting procedures
  - routine maintenance on marine electrical motors (cleaning, inspection, deterioration of insulation, removal of dust and oil, and renewal of bearings)
  - safety and emergency
  - testing function and performance of protection devices as part of vessel statutory survey
- risks and safety procedures associated with working in high voltage (HV) environments
- safety, environmental and hazard control precautions and procedures relevant to start-up and shutdown of marine electrical machinery and associated systems
- safety requirements associated with working on marine electrical systems, including:
  - dangers associated with the spaces in the vicinity of busbars
  - potential dangers associated with instrument voltage/current transformer circuits
  - protection normally provided on doors of switchboard cubicles
- types of electrical and electronic equipment and components
- vessel operating systems
- vessel safety management systems (SMS)
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- working safely with electricity, including:
  - appropriate method of removing an electric shock victim from a live electrical situation
  - common causes of electrical accidents
  - effects of electric shock on the human body

- electrical safe working practices
- need for ensuring safe isolation of an electrical supply
- precautions that can minimise chance of electric shock.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB039 Maintain and repair shipboard machinery and equipment

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to maintain and repair shipboard machinery and equipment on a vessel. This includes maintaining marine pumps, valves, air compressors, heat exchangers, diesel engines, turbochargers, marine lubricating systems and deck machinery as well as conducting inspections of marine boilers and marine refrigeration units.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.
- This unit is one of the requirements to obtain AMSA certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Follow safe work practices**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (WHS/OHS) procedures relevant to maintaining shipboard machinery and equipment are complied with
- 1.2** Safety hazards are identified and reported according to safety and vessel procedures
- 1.3** Tools, equipment and testing devices needed to carry out maintenance activities are checked for correct operation and safety prior to use according to safety and vessel procedures
- 1.4** Isolation precautions are implemented prior to commencing maintenance activities according to safety and vessel procedures

#### **2 Maintain marine pumps**

- 2.1** Maintenance requirements for pump are determined according to safety, manufacturer and vessel procedures and documentation
- 2.2** Appropriate procedures, materials, tools and equipment for maintaining pump are selected according to safety, manufacturer and vessel procedures
- 2.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 2.4** Pump is disassembled, inspected and serviced according to safety, manufacturer and vessel procedures
- 2.5** Pump is reassembled and tested according to safety,

manufacturer and vessel procedures

- 2.6** Performance of pump is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

### **3 Maintain valves**

- 3.1** Maintenance requirements for valves are determined according to safety, manufacturer and vessel procedures and documentation
- 3.2** Appropriate procedures, materials, tools and equipment for maintaining valves are selected according to safety, manufacturer and vessel procedures
- 3.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 3.4** Valves are removed for maintenance according to safety, manufacturer and vessel procedures and documentation
- 3.5** Valves are disassembled and valve maintenance is performed according to safety, manufacturer and vessel procedures and documentation
- 3.6** Valves are reassembled and tested according to safety, manufacturer and vessel procedures and documentation

### **4 Maintain air compressors**

- 4.1** Maintenance requirements for air compressor are determined according to safety, manufacturer and vessel procedures and documentation
- 4.2** Appropriate procedures, materials, tools and equipment for maintaining air compressor are selected according to safety, manufacturer and vessel procedures
- 4.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 4.4** Air compressor is disassembled and inspected according to safety, manufacturer and vessel procedures
- 4.5** Air compressor is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 4.6** Performance of air compressor is confirmed against recommended performance specifications according to

- safety, manufacturer and vessel procedures
- 5 Maintain heat exchangers**
- 5.1** Maintenance requirements for heat exchanger are determined according to safety, manufacturer and vessel procedures and documentation
- 5.2** Appropriate procedures, materials, tools and equipment for maintaining heat exchanger are selected according to safety, manufacturer and vessel procedures
- 5.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 5.4** Heat exchanger is disassembled and inspected according to safety, manufacturer and vessel procedures
- 5.5** Heat exchanger is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 5.6** Performance of heat exchanger is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 6 Maintain diesel engines**
- 6.1** Maintenance requirements for diesel engine are determined according to safety, manufacturer and vessel procedures and documentation
- 6.2** Appropriate procedures, materials, tools, measuring instruments and equipment for maintaining diesel engine are selected according to safety, manufacturer and vessel procedures
- 6.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 6.4** Diesel engine components are disassembled and inspected for wear and deterioration according to safety, manufacturer and vessel procedures
- 6.5** Routine maintenance on diesel engines is performed according to manufacturer and vessel procedures
- 6.6** Diesel engine components are refurbished, as required, according to manufacturer and vessel procedures
- 6.7** Specialised tools and measuring instruments are used to maintain and refurbish diesel engines/components

- according to safety, manufacturer and vessel procedures
- 6.8** Diesel engine is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 6.9** Performance of diesel engine is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 7 Maintain turbochargers**
- 7.1** Maintenance requirements for turbocharger are determined according to safety, manufacturer and vessel procedures and documentation
- 7.2** Appropriate procedures, materials, tools and equipment for maintaining turbocharger are selected according to safety, manufacturer and vessel procedures
- 7.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 7.4** All components of turbocharger are disassembled and inspected for wear and deterioration according to safety, manufacturer and vessel procedures
- 7.5** Turbocharger is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 7.6** Performance of turbocharger is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 8 Inspect marine boilers**
- 8.1** Inspection requirements for marine boiler are determined according to safety, manufacturer and vessel procedures and documentation
- 8.2** Appropriate procedures for inspecting marine boiler are selected according to safety, manufacturer and vessel procedures
- 8.3** Relevant information is extracted from drawings and technical specifications required to perform inspection activities
- 8.4** Marine boiler is inspected for repair or general maintenance according to safety, manufacturer and vessel procedures
- 8.5** Performance of marine boiler is confirmed against recommended performance specifications according to

- safety, manufacturer and vessel procedures
- 9 Inspect marine refrigeration units**
- 9.1** Inspection requirements for marine refrigeration unit are determined according to safety, manufacturer and vessel procedures and documentation
- 9.2** Appropriate procedures for inspecting marine refrigeration unit are selected according to safety, manufacturer and vessel procedures
- 9.3** Relevant information is extracted from drawings and technical specifications required to perform inspection activities
- 9.4** Marine refrigeration unit is inspected for repair or general maintenance according to safety, manufacturer and vessel procedures
- 9.5** Performance of marine refrigeration unit is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 10 Maintain marine lubricating systems**
- 10.1** Inspection and maintenance requirements for lubricating systems are determined according to safety, manufacturer and vessel procedures and documentation
- 10.2** Relevant information is extracted from drawings and technical specifications required to perform inspection and maintenance activities
- 10.3** Purifier maintenance procedures are applied according to safety, manufacturer and vessel procedures
- 10.4** Components of lubricating system are inspected according to safety, manufacturer and vessel procedures
- 11 Maintain and repair deck machinery**
- 11.1** Maintenance and/or repair requirements for deck machinery are determined according to safety, manufacturer and vessel procedures and documentation
- 11.2** Appropriate procedures, materials, tools and equipment for maintaining and/or repairing deck machinery are selected according to safety, manufacturer and vessel procedures
- 11.3** Relevant information is extracted from drawings and technical specifications required to perform maintenance activities



- 11.4** Deck machinery maintenance and/or repair procedures are implemented according to safety, manufacturer and vessel procedures
- 11.5** Deck machinery is tested and adjusted according to safety, manufacturer and vessel procedures
- 11.6** Performance of deck machinery is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit is equivalent to MARB014 Maintain and repair shipboard machinery and equipment.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB039 Maintain and repair shipboard machinery and equipment**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- explaining principles of shipboard machinery and equipment and imparting knowledge and ideas verbally and in writing
- initiating timely action in response to defects or damage
- performing calculations and interpreting graphical information used in maintaining shipboard machinery and equipment
- reading and interpreting written information related to the operation, performance and maintenance of shipboard machinery and equipment, including machinery specifications and operational manuals
- scheduling maintenance of shipboard machinery and equipment
- using testing equipment and explaining test and performance results relevant to shipboard machinery and equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of diesel engine operation, including:
  - causes of crankcase and air-line explosions, and scavenge and uptake fires
  - common faults and appropriate action to be taken with cooling of diesel engines
  - crankshafts
  - cylinder liners and heads
  - different methods of cooling marine diesel engines, including common requirements of cooling
  - exhaust valves
  - materials used to construct diesel engine major parts
  - means of pressure charging diesel engines, including common service faults, appropriate actions to rectify these faults, and emergency operation and isolation procedures
  - operating principles and adjustments of diesel engine fuel injection equipment, including common service faults, symptoms and causes of diesel fuel injection problems, and

- appropriate actions to be taken
- typical diesel engine lubrication systems, including:
- typical starting air and manoeuvring systems of diesel engines, including all components normally found therein
- basic principles of electrotechnology, marine electrical practice and marine automation and control relevant to detection, fault finding and repair of faults in electrical and electronic equipment, including:
  - alternating current (AC) and direct current (DC) theory and plant and equipment
  - basic cabling, distribution and lighting systems
  - basic control and switchgear
  - basic electrical circuit theory
  - basic theory of electromagnetism and electrostatics
  - electrolytic action and cells
  - instruments, calibration and testing
- basic principles of mechanics as they relate to forces, pressures, stress and strains in shipboard dynamic machinery
- basic principles of operating and maintaining:
  - fluid power control systems
  - machinery lubrication systems
  - marine boilers and materials used to construct boiler major parts
  - refrigeration systems:
    - furnace
    - steam and water drum
    - superheaters
    - water tubes
- basic thermodynamics, including:
  - advantages of multi-staging and inter-cooling
  - air/fuel ratio and significance of excess air on combustion
  - basic steam plant cycles and function of each component
  - basic thermodynamic properties of common working fluids
  - clearance volume, its effect on volumetric efficiency and methods of calculating volumetric efficiency
  - combustion process and calorific value of fuels
  - elementary principles of steam plants
  - meaning of gauge and absolute pressure
  - methods of heat transfer and related problems
  - operating cycle of single stage reciprocating air conditioners, including methods for the mass of air delivered
  - principles of heat transfer by conduction, convection and radiation and their application to marine systems
  - International System of Units (SI) and common thermodynamic terms and principles

- temperature and temperature scales
- deck machinery, including:
  - cranes
  - lifeboat davits and gear
  - mooring winch
  - winch
  - windlass
- diesel engine routine maintenance, including:
  - air intake system:
    - inspecting and changing air filters
    - inspecting turbocharger to make sure there is no fouling of compressor blades from crankcase gases
  - cooling system:
    - coolant sampling for trending analysis
    - draining, flushing and refilling system when required
    - fluid level checks
  - emissions systems:
    - inspecting crankcase ventilation systems, selective catalytic reduction (SCR) systems and diesel particulate filters (if so equipped)
  - exhaust system:
    - inspecting for leaks, corrosion and wet stacking
  - fuel system:
    - changing fuel filters and fuel injectors
    - checking water separators
  - lubrication:
    - changing oil and oil filters
    - checking levels
    - taking oil samples for trending analysis to optimise oil change intervals and to detect engine wear
  - mechanical systems:
    - generally inspecting for leaks, wear or deterioration
    - inspecting resilient engine mounts and torsional couplings
  - operating systems:
    - downloading data from digital engine management system to note and review alarm conditions
  - valves and heads:
    - inspecting and recording cylinder head wear for trending analysis
    - inspecting, adjusting and recording valve train wear for trending analysis
- inspection and disassembling, including:
  - air compressors:

- coolers and cooling passages
- lubricating systems
- piston and rings
- suction and delivery valves and seats
- diesel engine components:
  - bearings
  - cooling system
  - crankshaft alignment
  - liners
  - lubrication system
  - pistons
  - rings
  - valves
- heat exchangers:
  - corrosion
  - erosion
  - fouling
  - leakage
  - provision for tube expansion
- inspection requirements for:
  - marine refrigeration:
    - compressors
    - condensers
    - evaporators
    - expansion valves
    - oil separators
  - marine boiler:
    - fire side
    - water side
- lubricating system components, including:
  - settling tank
  - system bearings
  - system filters
- maintenance and repair hazards and problems, and appropriate preventative and remedial action and solutions during maintaining and repairing shipboard plant and equipment
- maritime communication techniques needed during maintenance and repair operations
- materials used to construct the following gas turbine major parts:
  - compressors
  - gas generators
  - rotors

- turbine casing
- materials used to construct the following steam turbine major parts:
  - blades
  - nozzles
  - reduction gears
  - rotors
  - turbine casings
- national and international regulations, International Maritime Organization (IMO) conventions and codes, including Australian Maritime Safety Authority (AMSA) Marine Orders applicable to managing shipboard plant and equipment maintenance and repair operations
- nature and causes of typical shipboard plant and equipment malfunctions and available methods for their detection and repair, including established fault-finding techniques
- operating principles and performance specifications for different types of shipboard plant and equipment usually found on a vessel of unlimited propulsion power
- operating principles of unmanned machinery spaces (UMS) and automated monitoring and control of machinery
- planned maintenance systems and procedures for condition monitoring of plant and equipment, including responsibilities and requirements covered by various forms of vessel survey
- plant and equipment typically found onboard a vessel of unlimited propulsion power
- procedures for:
  - carrying out shipboard plant and equipment fault finding and repair as part of routine maintenance procedures to ensure compliance with company and survey requirements, and established safety rules and regulations
  - completing temporary and permanent repair and/or replacement procedures for plant and equipment on board vessels at sea, alongside and in dry dock
  - reading and interpreting plant and equipment performance readings and instrumentation
- pumps, including:
  - axial
  - centrifugal
  - gear
  - reciprocating
  - screw
- purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- refurbished diesel engine components, including:
  - air start valves
  - cylinder heads
  - exhaust valves
  - fuel injectors
  - relief valves
- safety procedures for:

- handling heavy plant, equipment and component parts during maintenance and repair of shipboard plant and equipment
- using hand and power tools and maintenance equipment
- safety, environmental and hazard control precautions and procedures relevant to shipboard plant and equipment inspection and maintenance operations
- servicing, including:
  - dismantling rod and gears, seals, bearings and relief valve
  - gland packing
  - identifying wear and deterioration
  - measuring wear in cylinders, neck rings and rods
  - protecting finished surfaces
  - replacing and adjusting seals
  - removing studs: intact and broken
- turbocharger components, including:
  - air casing
  - air filters
  - bearings
  - diffuser
  - gas inlet grid
  - impeller
  - inducer
  - nozzle ring
  - rotor
  - volute
- types of vessel maintenance and repair records to be maintained to meet requirements of company, survey and regulatory authorities
- typical vessel and plant and equipment specifications, equipment drawings, operational manuals, and electrical and control circuit diagrams
- valves, including:
  - ball
  - butterfly
  - check
  - diaphragm
  - gate
  - globe:
  - screw down non return
  - screw lift
- valve maintenance, including:
  - examining seats, valves, spindles and glands
  - gland packing

- lapping valves and seats
- machining valves and seats
- removal
- repacking
- selection
- work health and safety (WHS)/occupational health and safety (WHS/OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARB040 Maintain control and safety systems of hotel equipment

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to maintain and repair control and safety systems of ship hotel equipment.

It includes knowledge of construction and function of various hotel equipment useful for its maintenance and repair:

- alarm and safety systems, including fire detection and control systems, hospital call system and cold rooms trap alarm
- elevators
- galley equipment
- hotel lighting systems
- laundry equipment.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Electrotechnology

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1. Maintain control and safety systems of hotel equipment

#### 2. Rectify control and safety systems of hotel equipment

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |            |   |
|------------|---|
| <b>1.1</b> | Hotel equipment control and safety systems are identified, visually inspected and tested in accordance with shipboard procedures  |
| <b>1.2</b> | Ship hotel equipment technical drawings are obtained and interpreted  |
| <b>1.3</b> | Measuring and calibrating instruments are used in accordance with manufacturer specifications   |
| <b>1.4</b> | Hotel equipment malfunctions detected during equipment maintenance are documented in service records and effect on associated plant and safety systems specified accurately |
| <b>1.5</b> | Equipment rectification plans are justified in service/maintenance records  |
| <b>2.1</b> | Hotel equipment and associated plant and safety systems are isolated and electrical hazards identified in accordance with safe electrical working practices                 |
| <b>2.2</b> | Working in flammable areas hazards are identified, risks assessed and control measures implemented in   |

accordance with shipboard procedures

- 2.3** Hotel equipment along with associated plant and safety system faults are rectified by competent person in accordance with shipboard procedures and legislative requirements
  - 2.4** Plant, equipment, control and safety systems are dismantled and re-assembled in accordance with manufacturer safety guidelines and shipboard instructions
  - 2.5** Hotel equipment control and safety systems restoration actions are undertaken by the method most suitable and appropriate to the prevailing circumstances and conditions
  - 2.6** Work area is made safe and all equipment and plant returned to service in accordance with shipboard procedures and legislative requirements
  - 2.7** Work area is cleared and cleaned
- 3. Complete documentation**
- 3.1** Work area is made safe in accordance with safe working practices
  - 3.2** Hotel equipment maintenance records are completed in accordance with shipboard procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB040 Maintain control and safety systems of hotel equipment**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices
- carrying out safe maintenance and repair procedures
- detecting machinery malfunction, location of faults and actions to prevent damage.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- electrical systems, including:
  - layout systems
  - measuring and testing instruments
- electrical and electronic systems operating in flammable areas
- hotel equipment technical drawings, including elevator technical specifications
- relevant industry standards and legislative requirements
- safety precautions and procedures, including electrical risk mitigation control measures
- shipboard hotel equipment, including equipment fitted to:
  - alarm and safety systems including fire detection and control systems, hospital call system and cold rooms trap alarm
  - cabins
  - communal spaces
  - elevators
  - galley equipment
  - hotel lighting systems
  - laundry equipment
  - provision stores
- symbols, electrical diagrams/circuits
- WHS/OHS requirements including safe electrical working practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of ship workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- tools, hotel equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARB041 Manage refuelling

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to manage refuelling and fuel transfer operations.

This includes planning refuelling or fuel transfer operations, preparing vessel for refuelling or fuel transfer operations, completing refuelling operations and managing an emergency.

This unit of competency applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- an assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres long with propulsion power less than 3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### Pre-requisite Unit

Not applicable.

### Competency Field

B - Equipment Checking and Maintenance

### Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Plan refuelling or fuel transfer operations

- 1.1 Fuel tanks are dipped to establish current level of fuel
- 1.2 Fuel is ordered according to organisational procedures
- 1.3 Amount and positioning of fuel onboard vessel is calculated with reference to tank tables
- 1.4 Impact of refuelling on safety and operation of vessel is determined and appropriate strategies are implemented
- 1.5 Local port authorities are informed of vessel location for bunkering operations and duration of bunkering

#### 2 Prepare vessel for refuelling or fuel transfer operations

- 2.1 Vessel is positioned and secured for refuelling
- 2.2 All personal protective equipment (PPE) is accessed and used
- 2.3 Bunkering equipment is correctly deployed according to organisational procedures
- 2.4 Safety zone for refuelling process is established and maintained for full duration of operation
- 2.5 Procedures for refuelling are established with bunker operator and completed lists are checked according to organisation and safety management system (SMS) requirements
- 2.6 Bunker hose is securely connected to vessel fuel manifold
- 2.7 Tank valves are opened, as necessary, and refuelling operations are performed safely according to SMS and regulatory requirements
- 2.8 Tanks are dipped to ensure correct amount of fuel has been received
- 2.9 Fuel samples are taken to check quality of fuel received



- and appropriate action is taken if fuel sample is not to specification
- |   |  |
|---|--|
| <b>3 Complete refuelling operations</b> | <b>3.1</b> Shutdown procedures are conducted according to organisational procedures  |
|   | <b>3.2</b> Malfunctions, faults, irregular performance or damage to refuelling equipment are recorded and repairs are organised according to organisational procedures |
|   | <b>3.3</b> Refuelling equipment is maintained and secured according to organisational procedures   |
|   | <b>3.4</b> Refuelling records are completed according to organisational procedures and regulatory requirements   |
| <b>4 Manage an emergency</b>            | <b>4.1</b> Appropriate response is made to an emergency situation according to organisational procedures   |
|   | <b>4.2</b> Safety zone is closed off and isolated according to organisational procedures   |
|   | <b>4.3</b> All persons in the safety zone are correctly notified and their activities are managed to ensure safety according to organisational procedures              |
|   | <b>4.4</b> Appropriate authorities are notified and actions are taken as directed according to emergency procedures and regulatory requirements                        |
|   | <b>4.5</b> Documentation of emergency is completed according to organisational procedures and relevant maritime authority  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB009 Manage refuelling.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB041 Manage refuelling

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing refuelling records, including:
  - bunker receipt
  - logbook entry
  - oil record book
- implementing procedures for refuelling, including:
  - emergency disconnection procedures
  - flow rates
  - system of communication with supplier in relation to starting and shutdown procedures
- implementing shutdown procedures, including:
  - blowing through of bunker hoses
  - disconnecting bunker hose
  - isolating fuel valves
  - stowing equipment
- measuring tank levels
- recognising faulty equipment and taking appropriate action
- recognising problems and hazards during refuelling and fuel transfer operations, and taking appropriate action
- selecting and using relevant equipment required for refuelling and fuel transfer operations
- taking appropriate action in an accidental spillage, fire or safety incident during refuelling and fuel transfer operations.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- environmental protection measures to be applied during refuelling or transfer operations
- functions and responsibilities of crew during refuelling or transfer operations
- hazards and safety precautions to be observed during refuelling or transfer operations
- impact of refuelling on safety and operation of vessel, including:

- hot work
- increase in the potential for fire
- loading and discharging operations
- stability, including the free surface effect
- toxic fumes
- work being conducted by others
- emergency situations whilst refuelling
- refuelling and fuel transfer procedures applying to commercial vessels, including:
  - bunding
  - bunker flag
  - fire-extinguishers
  - measuring tank levels
  - no smoking signs
  - radios
  - sample containers
  - scupper plugs
  - sounding tape
  - spill kit
  - tank tables
  - tank tables and fuel line diagrams
- requirements for reporting incidents
- safety zones, including:
  - area where no smoking or hot work is permitted
  - systems that can contain a spill
- work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation and policies.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or

may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or appropriate engine, propulsion plant and auxiliary systems ashore
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- relevant personal protective equipment (PPE)
- relevant equipment required for bunkering
- tools, equipment, machinery and materials currently used in industry.

## **Links**

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB042 Manage reported defects, damage, repairs and maintenance of a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to implement a planned maintenance system to ensure effective maintenance of a vessel, including assessing reported defects, damages and repairs of a vessel to ensure its seaworthiness.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B – Equipment Checking and Maintenance

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Define maintenance targets**

- 1.1** Compliance documentation relevant to maintaining the vessel is interpreted
- 1.2** Vessel planned maintenance system is interpreted to establish maintenance activities and priorities, according to regulatory and organisational requirements
- 1.3** Current maintenance practices are reviewed to evaluate efficiency, reliability and comparative cost-effectiveness
- 1.4** Maintenance targets are set to ensure compliance and cost-effectiveness

#### **2 Optimise maintenance management**

- 2.1** Objectives of maintenance are clearly defined and appropriate maintenance mechanisms are determined
- 2.2** Preventative maintenance activities are forecast, scheduled and matched to resources to ensure work is completed on time and within budget
- 2.3** Optimal cost balance between preventative and corrective maintenance activities is determined
- 2.4** Priority system for preventative and corrective maintenance is developed based on critical analysis to maximise quality outcomes
- 2.5** Maintenance plan is negotiated and agreed in consultation with relevant stakeholders
- 2.6** Monitoring and reporting arrangements for maintenance activities are established and documented according to organisational procedures
- 2.7** Risk management plan to identify, assess and control risks is incorporated into maintenance plan according to regulatory and organisational requirements

#### **3 Organise support processes**

- 3.1** Resource requirements are determined and organised according to the maintenance plan
- 3.2** Targets and milestones are identified and linked to the achievement of outcomes according to the maintenance

plan

- 3.3** Documentation and checklists associated with the implementation of the maintenance plan are prepared in established formats and distributed to relevant people
  - 3.4** Information related to the implementation of the maintenance plan is distributed according to organisational procedures
  - 3.5** Contingency arrangements for the implementation of the maintenance plan are identified
- 4 Monitor implementation of maintenance plan**
  - 4.1** Progress is systematically monitored and variations to implementation of the maintenance plan are verified as required with relevant people
  - 4.2** Expenditure and resource usage are monitored and controlled to ensure objectives are achieved within specified parameters
  - 4.3** Coaching and mentoring assistance is provided to crew members as required to overcome difficulties in implementing the plan
  - 4.4** Systems, records and reporting procedures are maintained according to regulatory and organisational requirements
- 5 Evaluate implementation of maintenance plan**
  - 5.1** Regular reports on progress and outcomes are provided orally or in writing to relevant stakeholders to ensure completion of activities is in line with maintenance plan
  - 5.2** Systematic review processes and established evaluation methods are used to evaluate implementation processes and outcomes
  - 5.3** Evaluation results are prepared in required format and presented to relevant people within agreed timeframes
  - 5.4** Recommendations for improving implementation processes are presented to relevant people according to organisational procedures
  - 5.5** Relevant documentation is completed and processed according to regulatory and organisational requirements



## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB020 Manage repairs and maintenance of a vessel 500 gross tonnage or more.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB042 Manage reported defects, damage, repairs and maintenance of a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- analysing current work practices
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to detail when completing documentation
- documenting information, including completing compliance documentation
- ensuring currency of relevant legislative and regulatory knowledge
- estimating resource and time requirements
- identifying potential barriers to implementing maintenance plan, analysing risks and establishing contingencies
- making decisions
- operating vessel planned maintenance system
- preparing a detailed vessel maintenance plan that incorporates strategies addressing risk management, resource needs, monitoring and reporting arrangements, and quality assurance controls
- preparing appropriate reports on the outcomes of inspection and maintenance activities to ensure the seaworthiness of a vessel
- preparing docking requirements, including repair lists and survey requirements
- providing high quality reports
- sequencing maintenance activities logically, planning and documenting strategies to implement maintenance plans, setting goals and meeting time constraints
- monitoring one or more of the following preventative maintenance activities:
  - applying lubricants to moving parts
  - hull cleaning and painting
  - identifying deterioration of vessel structure and fittings, including cargo spaces, freshwater and ballast tanks
  - inspecting and repairing or replacing cargo handling equipment, including wires, blocks, shackles, chains and hooks
  - prescribed tank inspections
  - restoring weathered, rusted surfaces and corrosion

- routine maintenance inspections.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria include knowledge of:

- beam theory and stress calculations
- compliance documentation, including as a minimum:
  - cargo gear and equipment register
  - maintenance schedules and records according to the planned maintenance system
  - port state/territory control inspection records
  - statutory survey certificates
  - statutory survey periodic inspection records
  - vessel general arrangement plans, docking plan and manuals relevant to maintenance requirements
- construction of double bottoms, ship's hull, bulkheads, fore and aft ends, construction of tankers, bulk carriers and container vessels and their limitations
- construction, materials, layout and subdivision requirements of a typical vessel, including the freeboard and bulkhead deck, watertight compartments, weather tight compartments, including doors, the bulkhead of the vessel and the collision bulkhead
- contingency plans for maintenance and repairs
- corrosion control measures, including surface preparation, painting and antifouling
- fire protection on ships
- limitations on strength of the vital constructional parts of a standard bulk carrier and interpretation of given figures for bending moments and shear forces
- maintenance plans - corrective and preventative
- methods to avoid the detrimental effects on bulk carriers of corrosion, fatigue and inadequate cargo handling
- preservatives and finishes used in marine maintenance, and the related procedures and precautions to be taken for preparation, application and storage
- principal features of the structure of a vessel
- properties and application of materials used in vessel construction
- relevant national and international legislation related to maintaining vessels
- stresses imposed on vessels at sea
- vessel and machinery specifications, vessel design machinery design drawings, operational manuals, specifications, and electrical and control circuit diagrams.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory

requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARB043 Manage stores for planned maintenance system

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release.

### Application

This unit involves the skills and knowledge required to plan and control inventory levels of materials required for vessel maintenance.

This unit applies to people working in the maritime industry in the capacity of a:

- Chief Integrated Rating.

### Licensing/Regulatory Information

There are no legislative and regulatory requirements applicable to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

B – Equipment Checking and Maintenance

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### **1 Identify materials requirements**

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1.1 Drawings and specifications for vessel and equipment are read and interpreted to determine materials requirements**

- 1.2** Sources of product supply are identified and recorded
  - 1.3** Normal quantity supply and matching storage facilities and equipment are identified
  - 1.4** Safety data sheets (SDS)/material safety data sheets (MSDS) or other supplier information are read, relevant engineering controls or personal protective equipment (PPE) are identified, and additional resources required for handling and storing materials are documented
  - 1.5** Procedures to deal with fire or explosion risk, spills or injury are identified and recorded
- 2 Plan inventory levels**
  - 2.1** Estimates are calculated according to specification requirements and workplace procedures
  - 2.2** Cost reports are prepared
  - 2.3** Estimates that meet initial requirements are documented
  - 2.4** Estimates are authorised for implementation by appropriate personnel
- 3 Monitor receipt and dispatch of goods**
  - 3.1** Workplace procedures are implemented in the receipt, dispatch and secure storage of materials
  - 3.2** Materials are inspected for quality and quantity on receipt
  - 3.3** Variation to quantity and quality of delivered materials is acted on according to workplace procedures
  - 3.4** Safe handling and storage of materials is supervised according to workplace procedures
  - 3.5** Information is formatted and entered into inventory system according to workplace procedures and system requirements
- 4 Manage stock control**
  - 4.1** Workplace procedures are implemented for stock control and inventories
  - 4.2** Procedures are established and implemented to monitor and control stock levels
  - 4.3** Stock levels are monitored and maintained at required levels

- 4.4** Stock reorder cycles are maintained and adjusted, as required
- 4.5** Stocktaking procedures are established and implemented
- 4.6** Contingency plans for stock delivery times are established and implemented
- 4.7** Accurate reports on stock inventories are prepared
- 4.8** Stock discrepancies are identified and recorded

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB019 Manage stores for planned maintenance system.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB043 Manage stores for planned maintenance system

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anticipating interruptions to supply
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- calculating correct inventory requirements taking into account lead times, re-order triggers, impacts of turnover and supply margins
- calculating cost of materials and other resources to meet inventory requirements
- costing and documenting requirements
- forecasting accurate inventory demand
- identifying appropriate materials and consumables to match maintenance standards
- identifying commercially viable sources of consumables and materials
- identifying the impact of decisions in terms of commercial, environmental and safety risks
- planning and organising activities to avoid any backtracking, workflow interruptions or wastage
- planning for inventory required to meet special events or contingencies
- researching information related to inventory, including relevant technical, regulatory, environmental and safety requirements
- using appropriate information technology and software when preparing inventory.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- authorised maintenance processes and plans, and related materials and consumables
- commercial supply systems, including standard documentation support processes
- computer applications and software suitable for managing an inventory
- cost-benefit analysis or equivalent techniques
- inventory and operations management approaches, including:



- cyclical counts
- minimisation of out-of-date stock
- monitoring stock levels
- quality control
- stocktaking
- inventory control systems used on a vessel
- materials, process characteristics and special requirements, including:
  - appropriate oils and grease
  - cleaning material
  - machinery spare parts
  - mooring ropes and wires
  - paint
  - shackles and other lifting equipment
  - tools - hand and power
- systems and equipment for inventory recording and control
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB044 Operate and maintain ship power systems exceeding 1,000 volts

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package

## Application

This unit involves the skills and knowledge required to operate and maintain ship high voltage (HV) power systems exceeding 1,000 volts (V).

It includes reviewing and managing electrical propulsions of the ship, electrical motors and control systems as part of the ship power system. It also includes HV technology and required documentation.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited)
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

A person competent in this unit will hold either an Unrestricted Electrical Licence issued in an Australian state or territory, a Marine Engineering Certificate of Competency issued under Marine Order 72 or be undertaking an Australian Maritime Safety Authority (AMSA) approved course of study under Marine Order 72, and be able to operate and maintain ship power systems exceeding 1,000 V in accordance to relevant industry standards and regulations.

This unit is subject to the following requirements:

- Legislation, regulations, relevant industry standards and codes of practice for electrical work, including specific work health and safety (WHS)/occupational health and safety (OHS) legislation and regulatory requirements.
- This unit is one of the requirements to obtain AMSA certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited), Engineer Class 2 (STCW Second Engineer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together

with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

- Electrical licence requirements – unrestricted electrical work or relevant industry experience approved by maritime regulator.
- Legislation, regulations, relevant industry standards and codes of practice for ship power systems exceeding 1,000 V.

There may be variations in these requirements across jurisdictions.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Electrotechnology

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1. Review ship power systems operations

#### 2. Manage ship power systems

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Ship power systems are identified and analysed from electrical drawings and specifications

**1.2** Hazards are identified, risks assessed and control measures implemented

**2.1** Operations are carried out in accordance with operational manuals, rules and procedures to ensure safety of operations

**2.2** Electrical permit system to work on HV systems are identified and applied

**2.3** HV isolation and verification are carried out in accordance with procedures

- 2.4 Ship power systems are visually inspected and tested in accordance with maintenance specification and electrical operation plan
  - 2.5 Maintenance work is checked to verify that it conforms with technical specifications
  - 2.6 Electrical system is verified prior to re-energising system
  - 2.7 HV system is re-energised in accordance with procedures
- 3. **Clean up and complete documentation**
  - 3.1 Work area is cleared and cleaned
  - 3.2 Work area is made safe in accordance with safe electrical working practices
  - 3.3 Materials are disposed of or recycled in accordance with legislative and workplace requirements
  - 3.4 Tools and equipment are cleaned, checked and stored in accordance with procedures
  - 3.5 Maintenance reports are completed in accordance with procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB044 Operate and maintain ship power systems exceeding 1,000 volts**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying safe operations and maintenance of high voltage (HV) systems procedures, including:
  - de-energising
  - earthing down
  - isolating and switching procedures
  - testing HV electrical systems
- identifying and interpreting complex numerical and graphical information in electrical diagrams
- identifying and suggesting ways of rectifying electrical hazards and emergency situations on a ship
- reading and interpreting written information related to electrical circuitry and components on a ship
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- electrical propulsions of the ships, electrical motors and control systems
- electrical:
  - layout systems
  - measuring and testing instruments
  - shipboard equipment
  - symbols, electrical diagrams/circuits

- HV electrical permit system, including:
  - earthing down
  - isolation and verification methods
  - HV switching
- HV technology
- relevant industry standards
- safety precautions and procedures, including electrical risk mitigation control measures
- special technical types of HV systems and the danger resulting from operational voltage of more than 1,000 volts (V)
- WHS/OHS requirements, including safe electrical working practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of ship workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system, workplace procedures and operational manuals
- HV electrical system
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARB045 Perform routine maintenance and repairs on a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to perform routine remedial, preventative and survey deck maintenance and repairs. It includes basic deck maintenance, cleaning tasks, marine painting, and servicing deck machinery and systems on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Deck/Engine or Integrated Rating engaged in a range of maintenance activities required on a range of vessels, under the direction of the officer in charge of the Deck Watch
- Navigational Watch - Deck/Engine.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Deck/Engine, Integrated Rating or Navigational Watch - Deck/Engine and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Plan and prepare for work**

- 1.1** Maintenance and repair activities are identified from work orders and are clarified with the officer in charge of the deck watch
- 1.2** Relevant plans, drawings and texts are interpreted to determine job specifications requirements in accordance with workplace procedures
- 1.3** Resources required to complete tasks are identified, obtained and inspected for compliance in accordance with workplace procedures
- 1.4** Appropriate fall arrest and restraint devices are selected and used according to work health and safety (WHS)/occupational health and safety (OHS) requirements when working at heights or overside
- 1.5** Tasks are sequenced and prioritised in accordance with workplace procedures
- 1.6** Coordination requirements are resolved with the officer in charge of the deck watch, work planning committee and others involved or affected by the work
- 1.7** Potential hazards are identified and prevention and/or control measures are selected according to work plan in accordance with workplace procedures

#### **2 Perform basic deck maintenance**

- 2.1** Suitable personal protective equipment (PPE) is selected and used according to WHS/OHS requirements
- 2.2** Deck surfaces are checked according to planned maintenance system
- 2.3** Deterioration or corrosion of deck surfaces is identified and appropriate maintenance action is carried out according to manufacturer instructions and workplace

procedures

- 2.4** Minor faults and imperfections in paint surfaces are repaired according to manufacturer instructions and workplace procedures
  - 2.5** Weathered surfaces are restored using cleaners and liquid abrasives according to manufacturer instructions and workplace procedures
  - 2.6** Tools and equipment are used correctly and safely in accordance with workplace procedures
  - 2.7** Maintenance materials are obtained, prepared and applied according to manufacturer instructions and workplace procedures
- 3 Carry out cleaning tasks**
  - 3.1** Suitable PPE is selected and used according to WHS/OHS requirements
  - 3.2** Area to be cleaned is prepared and hazards are identified
  - 3.3** Work area is isolated or warning signs are provided, as required, to reduce risk to other crew members in accordance with workplace procedures
  - 3.4** Correct chemicals and cleaning agents are selected and applied according to manufacturer instructions, safety data sheets (SDS)/material safety data sheets (MSDS) and WHS/OHS requirements and in accordance with workplace procedures
  - 3.5** Equipment is used correctly and safely in accordance with workplace procedures
  - 3.6** Cleaning tasks are completed according to manufacturer instructions and workplace procedures
- 4 Prepare and paint surfaces**
  - 4.1** Suitable PPE is selected and used according to WHS/OHS requirements in accordance with workplace procedures
  - 4.2** Surfaces are prepared using correct equipment in accordance with workplace procedures
  - 4.3** Rust remover, rust converter and undercoats are applied according to manufacturer instructions and workplace procedures
  - 4.4** Paints are mixed in correct proportions according to

- manufacturer instructions and workplace procedures
- 4.5** Paint is applied using appropriate application equipment in accordance with workplace procedures
- 5 Carry out routine maintenance of deck fittings, equipment and systems**
- 5.1** Fittings and equipment are inspected and inspection results are compared with manufacturer specifications in accordance with workplace procedures
- 5.2** Maintenance tasks are carried out to specification in accordance with workplace procedures
- 5.3** Mechanical equipment and system components are checked with appropriate instruments in accordance with workplace procedures
- 5.4** Faulty items or components are identified, reported and appropriate maintenance procedure is selected in accordance with workplace procedures
- 5.5** Unserviceable equipment is tagged in accordance with workplace procedures
- 6 Repair/replace faulty fittings and equipment**
- 6.1** Fittings and equipment are safely isolated according to regulations and WHS/OHS requirements
- 6.2** Faulty fittings or equipment are removed using appropriate tools and equipment in accordance with workplace procedures
- 6.3** Consumable items are selected or serviceable items are repaired according to manufacturer specifications
- 6.4** Adjustments are made to fittings or equipment to comply with specifications in accordance with workplace procedures
- 6.5** Operational checks are carried out to ensure compliance with manufacturer specifications and in accordance with workplace procedures
- 6.6** Maintenance report is completed in accordance with workplace procedures
- 7 Clean up**
- 7.1** Work area is cleared and cleaned in accordance with workplace procedures
- 7.2** Materials are disposed of or recycled according to regulatory requirements and workplace procedures

- 7.3** Tools and equipment are checked, maintained and stored in accordance with workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARB017 Perform routine maintenance and repairs on a vessel.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB045 Perform routine maintenance and repairs on a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying corrosion control and preventive measures/maintenance
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying safe and environmentally responsible work practices when performing routine remedial, preventative and survey deck maintenance on a vessel
- applying surface preparation techniques
- communicating with other personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- completing required records when performing routine remedial, preventative and survey deck maintenance on a vessel
- following required work and maintenance schedules according to workplace requirements
- reading and interpreting instructions for performing routine remedial, preventative and survey deck maintenance on a vessel
- reading and interpreting manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- recognising routine problems when performing routine remedial, preventative and survey deck maintenance on a vessel
- selecting and using relevant tools, equipment and materials
- selecting, using and maintaining suitable lifting gear
- undertaking regular testing with repairs
- using fall arrest and restraint devices, as required.
- using paint, lubrication and cleaning materials and equipment correctly.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- application, use, type and maintenance of lifting gear used on a vessel
- appropriate selection and use of personal protective equipment (PPE)
- component parts, operation and routine maintenance requirements of vessel machinery
- corrosion control and preventive measures/maintenance, paint systems and surface preparation techniques
- job safety analyses (JSA)/safe work method statements (SWMS), including safety and toolbox meetings
- maintenance and repair activities, including:
  - fire and bilge pumps - greasing and oiling
  - lifebuoys and lifejackets, regular inspection and maintenance of lifeboats, life rafts and equipment, including:
    - expired food
    - general cleaning and painting
    - replacing lashings
    - wires
- maintenance records for a vessel
- manufacturer safety guidelines and shipboard instruction
- nature and causes of corrosion of marine surfaces and structures, and available methods of control, including prevention
- paint types suitable for interior and exterior application on a vessel
- planned maintenance systems
- principal parts of a vessel and basic design methods
- principles and procedures of machinery lubrication as they relate to vessel machinery
- procedures for:
  - checking deck areas, machinery and fittings of a vessel as part of the planned routine maintenance on a vessel
  - inspecting ropes and wires for damage
  - repairing damaged areas (splicing) and replacing where necessary:
    - cargo wires
    - lashings
    - lifeboat falls
    - mooring lines
  - using hand tools for routine maintenance operations
- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- safe disposal of waste materials according to the International Convention for the Prevention of Pollution from Ships (MARPOL)

- safety management system (SMS) as it relates to planned vessel maintenance systems
- storage requirements for equipment, paints, chemicals and cleaning agents used in planned maintenance operations
- suitable equipment cleaning and preservation techniques used onboard a vessel
- surface preparation techniques, including:
  - abrasive blast cleaning
  - hand and power tool cleaning
- type, characteristics and functions of:
  - equipment/tools used in cleaning and maintenance
  - vessel machinery and equipment
- use of various vessel construction material and regulations governing structure of vessels.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARB046 Plan and supervise routine maintenance on a vessel up to 80 metres

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to implement a maintenance program for a vessel less than 80 metres.

This unit applies to people working in the maritime industry in the capacity of:

- Master of commercial vessels less than 35 metres in length within the exclusive economic zone (EEZ)
- Master of vessels less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on vessels less than 80 metres in length within the EEZ.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 35 metres Near Coastal and Mate less than 80 metres Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential Performance criteria describe the performance needed to

outcomes.

demonstrate achievement of the element.

**1 Develop maintenance program**

- 1.1** Planned maintenance system is accessed to establish maintenance requirements for vessel
- 1.2** Maintenance program for vessel is developed to meet requirements of planned maintenance system
- 1.3** Maintenance schedules and budgets are identified
- 1.4** Suggestions that support effective implementation of maintenance program are offered according to organisational procedures
- 1.5** Strategies to minimise impact of maintenance activities on vessel operations are identified

**2 Implement maintenance program**

- 2.1** Routine maintenance activities are proposed and prioritised in conjunction with others involved in or affected by maintenance work
- 2.2** Routine maintenance activities are allocated within scheduled timeframes and budgets according to organisational procedures
- 2.3** Vessel operations are maintained, where possible, without interruption
- 2.4** Safety of crew is maintained at all times according to relevant legislation and organisational procedures
- 2.5** Requests for assistance from crew to complete maintenance activities are responded to promptly

**3 Identify failed or unsafe machinery and equipment**

- 3.1** Faulty machinery and equipment are identified and clear and noticeable warning signs are erected according to organisational procedures
- 3.2** Failed or unsafe machinery and equipment are assessed according to organisational procedures
- 3.3** Repairs are allocated to appropriate crew members according to organisational procedures
- 3.4** Unsafe machinery and equipment which cannot be repaired are promptly tagged and isolated according to organisational procedures
- 3.5** Unsafe machinery and equipment are promptly reported according to organisational procedures

- 3.6** Reports on all repair work undertaken are completed according to organisational procedures
- 4 Monitor supplies**
  - 4.1** Supply and stock levels are maintained to ensure ongoing availability
  - 4.2** Management of supplies is undertaken according to organisational procedures
  - 4.3** Supply and stock levels are reconciled and any discrepancies are rectified or reported
  - 4.4** Supply records are maintained according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB010 Plan and supervise routine maintenance on a vessel up to 80 metres.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB046 Plan and supervise routine maintenance on a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- actioning planned maintenance system, including:
  - liaising with internal and external suppliers, authorities and agencies
  - preparing reports on outcomes of inspection and maintenance activities
  - taking appropriate precautions to prevent pollution of the marine environment
  - using and interpreting vessel, equipment and machinery specifications, drawings, operational manuals and diagrams
- developing a maintenance program having regard to:
  - owner's requirements
  - periodic survey requirements
  - programmed maintenance requirements of hull and machinery
  - relevant safety data sheets (SDS)/material safety data sheets (MSDS)
  - routine maintenance as contained in manufacturer instruction manuals and drawings
  - safety and environmental policy and requirements
- initiating timely action in response to defects or damage.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- elements of ship structure crucial to the safety of the ship
- fundamental principles of vessel construction
- maintenance records that must be maintained on vessel to meet organisational and regulatory requirements
- managing maintenance of the vessel
- means for control of corrosion of marine surfaces and structures
- monitoring, selection and use of supplies involved in maintenance of vessel
- planned maintenance system, including:
  - continuous improvement and review procedures

- document control procedures
- provision of safe practices in vessel operation and a safe working environment
- reference to applicable codes, guidelines and standards
- systems for recording completed maintenance schedules, including identification of defective equipment and rectification of defects
- principal structural components
- procedures for initiation and coordination of repair and/or replacement procedures onboard vessel
- relevant laws and regulations, including work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation
- routine maintenance activities
- slipping and docking procedures suitable for various types of hull forms
- typical problems related to maintenance of vessels and appropriate actions and solutions.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length
- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARB047 Undertake maintenance of 240 to 440 voltage alternating current electrical systems**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to establish, organise and implement a preventative and reactive maintenance program and capabilities on 240 to 440 volt (V) alternating current (AC) electrical systems on a vessel.

It includes verifying maintenance requirements, establishing maintenance systems, organising maintenance activities, supervising maintenance tasks, performing planned maintenance activities, performing breakdown maintenance and monitoring, and adjusting and reporting on implementation of maintenance plan.

This unit of competency applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- an assistant under the direct supervision of the Chief Engineer
- a worker in the engine room of a vessel less than 80 metres long with propulsion power less than 3000 kW.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

Note: Relevant state/territory qualification requirements apply to persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V AC or above, or 120 V direct current (DC) or above.

### **Pre-requisite Unit**

Not applicable.

## Competency Field

B - Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Verify maintenance requirements**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Regulatory and organisational requirements for electrical system maintenance program are identified and followed
- 1.2** Specifications, diagrams and organisational procedures for electrical systems are checked for recommended maintenance
- 1.3** Special requirements for electrical system maintenance are separated from adjustment and day-to-day maintenance schedules
- 1.4** Maintenance system goals for electrical systems are outlined
- 1.5** Maintenance plan and related work schedule for electrical systems are developed according to regulatory requirements and safety management system (SMS)
- 2 Establish maintenance systems**
  - 2.1** Maintenance costs are identified and quantified
  - 2.2** Interruptions, processes and procedures are documented
  - 2.3** Internal and external maintenance providers are specified
  - 2.4** Maintenance plan is prepared to minimise negative impacts on production, costs, waste and the environment
  - 2.5** Approvals for maintenance plan are negotiated and confirmed

- |   |            |  |
|---|------------|--|
|   | <b>2.6</b> | Recordkeeping systems are developed and maintained   |
| <b>3 Organise maintenance activities</b>        | <b>3.1</b> | Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shutdown      |
|   | <b>3.2</b> | Agreement from Master is obtained for timing of maintenance tasks to optimise maintenance process and minimise operational disruptions |
|   | <b>3.3</b> | Detailed work plans are developed in line with schedules, availability of expertise and scheduling of resource availability            |
|   | <b>3.4</b> | Team members with required competencies are allocated to maintenance activities  |
|   | <b>3.5</b> | Consumables and equipment are secured to meet work plan requirements   |
|   | <b>3.6</b> | Externally sourced equipment, consumables and expertise are located and procured   |
|   | <b>3.7</b> | Contingency plans are prepared   |
|   | <b>3.8</b> | Maintenance schedules and procedures are effectively communicated to team  |
| <b>4 Supervise maintenance tasks</b>            | <b>4.1</b> | Job specifications and maintenance tasks are communicated effectively to team members  |
|   | <b>4.2</b> | Maintenance and repair tasks are monitored to ensure they satisfy system specifications  |
|   | <b>4.3</b> | Work health and safety (WHS)/occupational health and safety (OHS)) requirements are monitored and observed at all times                |
|   | <b>4.4</b> | Emergency equipment is made available and working order of equipment is ensured  |
|   | <b>4.5</b> | Contingencies are managed to ensure quality of work is maintained and work is completed within agreed timeframe                        |
| <b>5 Perform planned maintenance activities</b> | <b>5.1</b> | WHS/OHS risk control measures and procedures for carrying out work are followed  |
|   | <b>5.2</b> | Maintenance schedule and process compliance requirements are confirmed and work is appropriately                                       |



sequenced according to job specification

- 5.3** Appropriate person/s is consulted to ensure work is coordinated effectively with others
- 5.4** Resources needed to conduct maintenance are obtained according to organisational procedures and are checked against job requirements
- 5.5** Tools, equipment and testing devices needed to conduct maintenance are obtained according to organisational procedures and checked for correct operation and safety
- 5.6** Live and operating system is tested or measured strictly according to WHS/OHS requirements and within established safety procedures
- 5.7** Electrical equipment is checked as being isolated, where necessary, strictly according to WHS/OHS requirements and within established safety procedures
- 5.8** Electrical equipment to be maintained is inspected and evaluated for compliance with system specifications
- 5.9** Non-compliant electrical equipment components are rectified or repaired according to system specifications

## **6 Perform breakdown maintenance**

- 6.1** Nature of breakdown is confirmed with appropriate personnel
- 6.2** Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques
- 6.3** Restrictions are applied to operations, as necessary, and agreed to with the Master
- 6.4** Electrical equipment is checked as being isolated, where necessary, strictly according to WHS/OHS requirements and within established safety procedures
- 6.5** Repair work is carried out according to system specifications
- 6.6** Master is notified of completion of repair work and details are documented

## **7 Monitor, adjust and report on implementation of maintenance plan**

- 7.1** Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements

- 7.2** Electrical systems are monitored to ensure achievement of planned outcomes
- 7.3** Costs are monitored and controlled
- 7.4** Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes
- 7.5** Reports are completed according to maintenance plan requirements and organisational procedures
- 7.6** Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of SMS
- 7.7** Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARB011 Undertake maintenance of 240 to 440 voltage alternating current electrical systems.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB047 Undertake maintenance of 240 to 440 voltage alternating current electrical systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying safety requirements throughout work sequence, including the use of personal protective equipment (PPE)
- completing all work to specification
- completing records, including:
  - incident reports
  - maintenance logs
  - reports required under planned maintenance system
- developing effective planning documents
- ensuring correct requirements and details of maintenance of electrical systems and equipment
- implementing safe and environmentally responsible work practices in testing and maintenance activities
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating alternating current (AC) systems and conducting operator preventive maintenance according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- operating electrical systems and equipment according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation providing high quality reports
- performing maintenance tasks, including:
  - battery maintenance
  - testing:
    - alarm systems
    - emergency alternator
    - power and lighting systems
- recognising electrical system faults and, where necessary, taking steps to make them immediately safe and initiate repair
- selecting and using appropriate processes, tools and equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- AC systems not exceeding 440 volts (V) AC
- batteries, including types, care and maintenance, and hazards
- care of electrical systems and equipment in general including fault recognition
- charging systems, including:
  - alarms/indicators
  - regulators
- connecting batteries
- electric systems, including above 240 V AC and up to 440 V AC
- fault identification, location and safety implications
- operation and maintenance of starter motors, alternators and associated equipment
- personal safety
- protective devices on switchboards
- shore power connection
- special requirements for electrical system breakdown/s, including:
  - isolation procedures
  - stopping alternator/s
  - stopping main engine/s
  - switching to emergency power
- use of fuses and circuit breakers, including selection of correct capacity.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW

or appropriate engine and auxiliary system ashore

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry
- electrical systems, including:
  - AC alternator (above 240 V AC and up to 440 V AC)
  - batteries
  - electrical motor starting circuits
  - emergency electrical supply
  - power and lighting
  - shore supply
  - switchboards.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARB048 Undertake maintenance of machinery, machinery systems and structural components**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to establish, organise and implement a preventative and reactive maintenance program and capabilities for machinery, machinery systems and structural components to optimise vessel operational performance.

It includes verifying maintenance requirements; establishing maintenance systems; organising maintenance activities; supervising maintenance tasks; performing planned and breakdown maintenance activities; monitoring, adjusting and reporting on implementation of the maintenance plan; and carrying out damage control procedures.

This unit of competency applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- an assistant under the direct supervision of the Chief Engineer
- a worker in the engine room of a vessel less than 80 metres long with propulsion power less than 3000 kW.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

Note: Relevant state/territory training and qualification requirements must be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment, especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

### **Pre-requisite Unit**

Not applicable.

## Competency Field

B - Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Verify maintenance requirements**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Maintenance program regulatory and organisational requirements for machinery, machinery systems and structural components are identified and followed

**1.2** Technical specifications, service requirements and organisational procedures for machinery, machinery systems and structural components are checked for recommended maintenance requirements

**1.3** Special requirements for maintenance of machinery, machinery systems and structural components are separated from normal lubrication, adjustment and day-to-day maintenance schedules

**1.4** Maintenance system goals for machinery, machinery systems and structural components are outlined

**1.5** Maintenance plan and related work schedule for machinery, machinery systems and structural components are developed

#### **2 Establish maintenance systems**

**2.1** Maintenance costs are identified and quantified

**2.2** Processes, procedures and delays are documented

**2.3** Internal and external maintenance providers are specified

**2.4** Maintenance plan is prepared to minimise ship operation costs, waste and harm to the environment

- |  |            |   |
|--|------------|---|
|  | <b>2.5</b> | Approvals for maintenance plan are negotiated and confirmed   |
|  | <b>2.6</b> | Recordkeeping systems are developed and maintained  |
| <b>3 Organise maintenance activities</b> | <b>3.1</b> | Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shutdown                       |
|  | <b>3.2</b> | Agreement with the Master is obtained for timing of maintenance tasks to optimise maintenance process and minimise operational disruptions              |
|  | <b>3.3</b> | Detailed work plans are developed in line with schedules, availability of expertise, scheduling of resource availability and environmental requirements |
|  | <b>3.4</b> | Team members with required competencies are allocated to maintenance activities   |
|  | <b>3.5</b> | Consumables and equipment are secured to meet work plan requirements  |
|  | <b>3.6</b> | Externally sourced equipment, consumables and expertise are located and procured  |
|  | <b>3.7</b> | Contingency plans are prepared  |
|  | <b>3.8</b> | Maintenance schedules and procedures are effectively communicated to the team   |
| <b>4 Supervise maintenance tasks</b>     | <b>4.1</b> | Job specifications and maintenance tasks are communicated effectively to team members   |
|  | <b>4.2</b> | Maintenance and repair tasks are monitored to ensure they satisfy technical specifications  |
|  | <b>4.3</b> | Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times                                  |
|  | <b>4.4</b> | Emergency equipment is made available and working order of equipment is ensured   |
|  | <b>4.5</b> | Contingencies are managed to ensure quality of work is maintained and work is completed within agreed timeframe   |
| <b>5 Perform planned</b>                 | <b>5.1</b> | WHS/OHS risk control measures and procedures for  |



<b>maintenance activities</b>	carrying out work are followed
	<b>5.2</b> Preventative maintenance is carried out in compliance with technical specifications
	<b>5.3</b> Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes
	<b>5.4</b> Ongoing quality checks of maintenance work are undertaken according to technical specifications
	<b>5.5</b> Work is carried out efficiently without waste of materials and damage to equipment, machinery or other services
	<b>5.6</b> Worksite is made safe according to organisational safety procedures
	<b>5.7</b> Maintenance work is checked to verify that it conforms with technical specifications
<b>6 Perform breakdown maintenance</b>	<b>6.1</b> Nature of breakdown is ascertained and reported to appropriate personnel or authorities
	<b>6.2</b> Maintenance records of machinery, machinery systems and structural components related to reported breakdown are reviewed for possible causes
	<b>6.3</b> Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques
	<b>6.4</b> Restrictions are applied to operations, where necessary, and agreed to with the Master
	<b>6.5</b> Extent of repair work is ascertained from available evidence
	<b>6.6</b> Limits of repair work that can be carried out are established
	<b>6.7</b> Machinery and equipment are isolated
	<b>6.8</b> Repair work is carried out according to technical specifications
	<b>6.9</b> Master is notified of completed repair work and details are documented
<b>7 Monitor, adjust and</b>	<b>7.1</b> Execution of maintenance tasks is monitored to ensure

<b>report on implementing the maintenance plan</b>	they are completed according to maintenance plan and statutory survey requirements
	<b>7.2</b> Machinery, machinery systems and structural components are monitored to ensure achievement of planned outcomes
	<b>7.3</b> Costs are monitored and controlled
	<b>7.4</b> Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes
	<b>7.5</b> Reports are completed according to maintenance plan requirements and organisational procedures
	<b>7.6</b> Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of safety management system (SMS)
	<b>7.7</b> Machinery, machinery systems and structural components are maintained in a clean and safe operational condition
<b>8 Carry out damage control procedures</b>	<b>8.1</b> Damage to vessel hull and watertight integrity is ascertained and monitored according to established procedures and safety regulations
	<b>8.2</b> Appropriate damage control measures are implemented to maintain watertight integrity and to control flooding of vessel according to vessel emergency and safety management plans

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB012 Undertake maintenance of machinery, machinery systems and structural components.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB048 Undertake maintenance of machinery, machinery systems and structural components**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing maintenance records
- developing effective planning documents
- implementing safe and environmentally responsible work practices
- interpreting and applying documentation and instructions, including:
  - lubricating oil and cooling water reports
  - manufacturer instructions, including:
    - safety data sheets (SDS)/material safety data sheets (MSDS)
    - work health and safety (WHS)/occupational health and safety (OHS) requirements
- managing legislative compliance and compliance records
- recognising and rectifying operating faults in accordance with manufacturer specifications and fault-finding procedures
- overhauling and maintaining pumps, bilge and seawater systems
- performing maintenance tasks, including:
  - changing filters and oil
  - cleaning coolers and strainers
  - lubrication and topping up oils
- planning and organising application of control techniques for hull damage
- planning and preparing for maintenance, including isolating equipment
- recognising damage to hull of small vessel and taking appropriate action according to operating instructions
- repairing pipe work
- scheduled survey inspections
- selecting and using correct tools and equipment for maintenance task
- servicing valves.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- appropriate mathematical procedures for estimating and measuring, including calculating time to complete tasks
- breakdowns, including:
  - cooling water system failure
  - engine failure
  - exhaust systems
  - fuel system failure
  - gearbox failure
  - loss of control systems
  - lubricating systems failure
  - power plant failure
  - propeller and shafting arrangements systems
  - pumping systems failure
  - refrigeration plant and its operation
  - steering gear failure
- causes of vibrations and undue wear in power transmission system
- construction, layout and subdivision requirements of a typical vessel, including freeboard and bulkhead deck, watertight compartments, weather tight compartments and bulkheads of vessel
- costs of material, consumables and labour
- dangers associated with back flooding and methods to prevent back flooding
- environmental risks and hazards; safe disposal of waste material; safe use and storage of flammable/explosive liquids, gases, solids and other materials normally carried on board, including spare fuel, lubricants, liquified petroleum gas (LPG) cooking gas and flares
- function of lubricating oil and grease
- inspections to be undertaken on vessel hull during slipping or dry docking
- maintenance procedures and methodologies for:
  - batteries
  - cooling water systems, including treatment
  - fuel systems, including contamination
  - heat exchangers
  - hull maintenance, including use of sacrificial anodes
  - hydraulic systems
  - lubricating oil systems, including contamination
  - power transmission systems
  - oily water separator
  - steering systems
  - starter motors, alternators and associated equipment
- material and stress characteristics in constructing a vessel
- methods of corrosion and how to prevent corrosion

- organisational requirements, policies and procedures for organising maintenance programs
- principal features and structure of a vessel
- procedures for recording and reporting workplace information
- special requirements for maintenance, including:
  - asbestos awareness
  - awareness of confined and restricted space operations
  - dry docking
  - handling refrigerant gas within regulatory requirements
- types of tools and equipment, and procedures for their safe use and maintenance
- valve types and construction.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than and equal to 375 kW or appropriate engine, propulsion plant and auxiliary system ashore
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry, including:
  - hydraulic systems
  - pumps and pumping systems
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARB049 Use internal communication systems, operate computers and computer networks on ships**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package

### **Application**

This unit involves the skills and knowledge required to use internal communication systems, operate computers and computer networks on the ship.

It includes reviewing internal communication systems and computer networks, installing and maintaining the networks and systems on board a ship.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Pre-requisite Unit**

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Electrotechnology

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Review ship information technology devices**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Current network requirements are determined from ship requirements and specifications
- 1.2** Ensure network is compatible with current shipboard work practices
- 1.3** Shipboard information technology devices are checked and handled in accordance with manufacturer specifications
- 1.4** Network data processing is evaluated in accordance with ship requirements and network capability

#### **2. Manage maintenance of the computer network and internal communication systems**

- 2.1** Computer network hardware and software control and security records are maintained in accordance with procedures
- 2.2** Network and internal communication faults are responded to and rectified in accordance with ship requirements
- 2.3** Major problems are reported in accordance with procedures
- 2.4** Software is filed and stored in accordance with procedures
- 2.5** Measured and testing devices are used to verify correct operation of network and systems

#### **3. Maintain computer**

- 3.1** Information technology equipment is obtained and installed in accordance with ship requirements and



<b>networks on the ship</b>	manufacturer specifications
	<b>3.2</b> Proportional-integral-derivative (PID) controller, personal computer (PC)-based control systems and programmable logic controller (PLC) are adjusted in accordance manufacturer specifications
	<b>3.3</b> New and updated software is installed in accordance with network requirements
	<b>3.4</b> User network access is established effectively and efficiently
	<b>3.5</b> Bridge and engine room information technology devices are maintained in accordance with industrial standards and manufacturer specifications
<b>4. Transmit and receive messages</b>	<b>4.1</b> Transmission of messages are consistently undertaken in accordance with required internal communication protocols
	<b>4.2</b> Reception of internal messages are acknowledged and actioned in accordance with internal communication protocols
	<b>4.3</b> Clear and concise communication is used when using internal communication systems
<b>5. Complete records</b>	<b>5.1</b> User and security records are maintained in accordance with shipboard confidentiality requirements
	<b>5.2</b> Documentation and drawings are updated and processed in accordance with ship requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB049 Use internal communication systems, operate computers and computer networks on ships**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least four separate occasions and include:

- adjusting proportional-integral-derivative (PID) controller systems
- applying fault-finding methods to rectify faults in the following systems:
  - computer network systems
  - internal communication
- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and electronic safe work practices
- checking and handling shipboard information technology devices in accordance with manufacturer specifications
- operating internal communication systems onboard a ship in accordance with required protocols.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bridge-based, engine-room-based and commercial computer use, including:
  - construction and function of integrated navigation systems
  - purpose, construction and operation of ship fuel consumption optimising systems
  - purpose, structure and function of computer systems for critical equipment condition monitoring
  - purpose, structure and function of electronic alarm recorder
  - purpose, structure and function of programmable logic controller (PLC) or PLC-based power management systems
  - purpose, structure and function of PLC or PLC-based refrigeration systems
  - purpose, structure and function of PLC or PLC-based systems for fuel storage, transport and preparation

- purpose, structure and function of voyage data recorder (VDR) system
- purpose, structure and functions of dynamic positioning system
- construction and use of computer networks on a ship, including:
  - internet and ethernet protocols
  - medium access methods, including master-slave, master-slave with cyclical polling, token ring, token ring with master-slave polling, carrier-sense multiple access/collision detection (CSMA/CD), carrier-sense multiple access/collision avoidance (CSMA/CA)
  - Profibus decentralised peripherals (DP) network, characterises nodes, structures, objects of configuration, programming of data exchange
- software licensing rights and responsibilities
- fault-finding methods and techniques
- features of computer networking
- hardware and software of digital enhanced cordless telecommunications (DECT) cordless phone system used on ships with advanced private automatic branch exchange (PABX)
- hardware, software and functions of pager system
- internal communication systems, including:
  - alarm systems
  - public address (PA) systems
  - talkback and intercom system
  - telephones:
    - automatic telephone system
    - sound powered telephone system
- main features of data processing
- metering and measuring equipment suitable for internal communication and computer networks systems
- operation of internal communication systems on board a ship
- personal computer (PC)-based control systems
- PID controller
- relevant industry standards and legislative requirements
- shipboard information technology, including:
  - computer networks
  - computers
  - electronic device capable of receiving information
- typical sound powered telephone network on ship
- typical talkback network on ship and its components for various environmental conditions
- WHS/OHS requirements, including electronic safe work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory

requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- computer network with PID and PLC controllers
- tools, technology equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARC045 Contribute to the operation of engine equipment and associated propulsion plant**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to contribute to the operation, monitoring and evaluation of engine performance and associated propulsion plant on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Engine
- Integrated Rating

who assist under the direction of the officer in charge of the engineering watch, with the operation of engine equipment and associated propulsion plant, as required, on a range of vessels.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine or Integrated Rating and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Pre-requisite Unit**

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan and prepare work**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Safety issues are identified, and safe operational practices are applied to minimise risk and to control hazards
  - 1.2** Work requirements of engine and plant are identified from the officer in charge of the engineering watch and relevant documentation
  - 1.3** Localised engine and plant inspections are carried out according to manufacturer specifications and workplace procedures
  - 1.4** Engine and plant operational prerequisites are established according to manufacturer specifications and workplace procedures
  - 1.5** Sequence of recommissioning of plant is determined to suit existing circumstances according to manufacturer specifications and workplace procedures
- 
- 2.1** Engines and plant are operated according to manufacturer specifications and workplace procedures
  - 2.2** Performance of engines and plant is monitored to detect deviations from normal operating conditions
  - 2.3** Faulty and worn engine equipment and components are identified and reported to the officer in charge of the engineering watch
  - 2.4** Action is taken when an engine fails or emergencies occur to secure the engine or machinery and to maintain

#### **2 Operate engines and associated propulsion plant**

- the safety of vessel and persons involved according to workplace procedures
- |   |  |
|---|--|
| <b>3 Test engines and associated propulsion plant</b>           | <b>3.1</b> Tests are performed according to manufacturer specifications and workplace procedures   |
|   | <b>3.2</b> Engines and associated propulsion equipment are observed for correct operational response   |
|   | <b>3.3</b> Corrective actions are taken to rectify abnormalities according to manufacturer specifications and workplace procedures   |
| <b>4 Analyse engines and associated propulsion plant faults</b> | <b>4.1</b> Causes of abnormal operating conditions are identified by analysing technical and operational information in a logical and sequential manner                                      |
|   | <b>4.2</b> Corrective actions are taken to rectify abnormalities according to manufacturer specifications and workplace procedures   |
|   | <b>4.3</b> Plant integrity is maintained according to manufacturer specifications and workplace procedures   |
| <b>5 Complete documentation</b>                                 | <b>5.1</b> Correct records are logged relating to the operation and performance of engines and associated propulsion equipment according to regulatory requirements and workplace procedures |
|   | <b>5.2</b> Documentation is updated and engine and plant problems, abnormalities and status are reported according to regulatory requirements and workplace procedures                       |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.



## Unit Mapping Information

This unit replaces and is equivalent to MARC027 Contribute to the operation of engine equipment and associated propulsion plant.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC045 Contribute to the operation of engine equipment and associated propulsion plant**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices, including:
  - awareness of hazards involved in engines, propulsion plant and auxiliary equipment operation
  - pollution control practices
  - safe entry into pump room, fuel tanks and other confined spaces on a vessel
- attending to appropriate level of detail in recordkeeping
- avoiding polluting the environment
- identifying problems that occur during the operation of engines on vessels
- interpreting and following procedures for the operation, monitoring and evaluation of the performance of engines on vessels
- operating bilge and ballast systems, under the supervision of the officer in charge of the engineering watch, according to manufacturer instructions and workplace procedures
- producing reliable documentation
- reading and interpreting:
  - equipment performance readings and instrumentation
  - lock out and tagging procedures
  - safety data sheets (SDS)/material safety data sheets (MSDS)
- recognising and reporting electrical hazards and unsafe equipment
- selecting and using tools required for operating, monitoring and evaluating the performance of engines on vessels
- testing machinery, under the supervision of the officer in charge of the engineering watch, according to manufacturer instructions and workplace procedures.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- accessing and understanding typical SDS/MSDS, vessel and machinery specifications, machine drawings, operation manuals, electrical and control circuit diagrams
- appropriate use and selection of personal protective equipment (PPE)
- causes of electric shock and precautions to be observed to prevent shock
- emergencies, including:
  - crankcase and gearbox explosions
  - gearbox failure
  - scavenge and uptake fires
  - starting air line
- hazards and problems that can occur during the operation and performance of engines, propulsion plant and auxiliary machinery and appropriate preventative and remedial actions and solutions
- methods of providing air for combustion in the vessel engine room
- national and international regulations, International Maritime Organization (IMO) conventions and codes, and class rules applicable to the operation and performance evaluation of engines, propulsion plant and auxiliary machinery on vessels
- nature and causes of typical malfunctions and/or poor performance of engines, propulsion plant and auxiliary machinery, and the available methods for their detection and rectification
- principles and functions of machinery space monitoring and alarm systems principles and operational characteristics of:
  - auxiliary boilers and associated equipment
  - controllable pitch propellers (CPP)
  - direct drive propulsion systems
  - internal combustion engines
  - jet propulsion
  - marine gas engines
  - reduction boxes
  - steam turbines, gearing and associated equipment as they apply to auxiliary systems
  - thrusters (Z pellers, azimuth, tunnel)
  - Voith Schneider Units
- principles of:
  - detection, identification and repair of faults
  - engine cooling and lubrication
  - fuel systems, including heavy fuel oil (HFO) and diesel
  - marine control systems
  - operation of hydraulic and electronic governors and overspeed trips
- procedures for:
  - carrying out performance evaluation of engines, propulsion plant and auxiliary machinery
  - testing and treating auxiliary boiler water, machinery cooling water and lubricating oil
- preventative strategies for scavenge and uptake fires, and starting air lines, crankcase and

gearbox explosions

- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- rights and responsibilities of individuals regarding lock out and tagging of plant and equipment
- safe function, operation and maintenance of bilge and ballast systems
- safe operation of equipment, including valves and pumps
- safe use and operation of electrical equipment, including safety precautions before commencing work or repair, isolation procedures, emergency procedures and different voltages on board
- safety, environmental and hazard control precautions and procedures relevant to the operation and performance of engines, propulsion plant and auxiliary machinery
- shafting systems, oil fill stern tube, pedestal bearings and thrust bearings
- the use of safe isolation systems and the application of lock out tags.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC046 Employ tools, equipment and materials in a shipboard context**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to employ tools, equipment and materials to perform maintenance activities on a vessel. It includes the use of hand, power and machine tools, welding equipment, heat treatment processes, soldering operations, adhesives and bonding materials in performing routine and non-routine maintenance activities.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.
- This unit is one of the requirements to obtain certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Follow safe work practices**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (WHS/OHS) procedures relevant to using tools and equipment are complied with
- 1.2** Safety hazards are identified and reported according to safety and vessel procedures
- 1.3** Prior to use, tools and equipment needed to carry out maintenance activities are checked for correct operation and safety according to safety and vessel procedures
- 1.4** Before commencing maintenance activities, isolation precautions are implemented according to safety and vessel procedures

#### **2 Carry out heat treatment**

- 2.1** Requirements of job are determined from engineering drawings, job sheet or supervisor
- 2.2** Heat treatment equipment is selected for required heat treatment according to safety, workplace and manufacturer requirements
- 2.3** Equipment is set up and used according to standard operating procedures (SOPs) and manufacturer instructions
- 2.4** Personal protective equipment (PPE) is used according

- to SOPs
- 2.5** Emergency procedures are complied with according to approved safety instructions
  - 2.6** Safety signs and symbols are identified and complied with according to approved safety instructions
  - 2.7** Heat treatment process is applied according to job, safety and workplace requirements
  - 2.8** Hazardous conditions are identified, and risk control measures are implemented to maintain a safe work environment
- 3 Use hand tools**
- 3.1** Hand tools are used according to workplace procedures, WHS/OHS requirements and manufacturer instructions
  - 3.2** Faults with hand tools and equipment are identified and reported to appropriate personnel
- 4 Use hand power tools**
- 4.1** Hand power tools are used according to workplace procedures, WHS/OHS requirements and manufacturer instructions
  - 4.2** Faults with hand power tools and equipment are identified and reported to appropriate personnel
- 5 Perform pipe work**
- 5.1** Job requirements are determined from engineering drawings, job sheet or supervisor
  - 5.2** Sequence of operations is determined according to workplace, WHS/OHS and job requirements
  - 5.3** Pipe work is fabricated and joined according to relevant standards and job, safety and workplace requirements
  - 5.4** Pipe work is inspected for defects according to workplace procedures
  - 5.5** Pipe work is installed in specified location without damage or distortion to pipe work, surrounding environment or other services
  - 5.6** Type of filters and strainers in piping systems are identified using relevant engineering drawings and specifications
  - 5.7** Pipe work is tested for compliance with job specification and workplace requirements

- |   |   |
|---|---|
| <b>6 Use machine tools</b>                              | <p><b>6.1</b> Job requirements are determined from engineering drawings, job sheet or supervisor</p> <p><b>6.2</b> Sequence of operations is determined according to workplace, WHS/OHS and job requirements</p> <p><b>6.3</b> Machine tools are selected according to workplace procedures, WHS/OHS requirements and manufacturer instructions</p> <p><b>6.4</b> Machining operations are performed according to workplace, WHS/OHS and job requirements</p> <p><b>6.5</b> Components are measured in line with workplace, WHS/OHS and job requirements</p> <p><b>6.6</b> Machine is adjusted and maintained according to workplace, safety, manufacturer and job requirements</p>   |
| <b>7 Perform welding and thermal cutting operations</b> | <p><b>7.1</b> Job requirements are determined from engineering drawings, job sheet or supervisor</p> <p><b>7.2</b> Materials are prepared for welding using correct tools, equipment, materials and procedures</p> <p><b>7.3</b> Materials are welded using appropriate welding process according to relevant standards and job, safety and workplace requirements</p> <p><b>7.4</b> Joints are welded according to relevant standards and job, safety and workplace requirements</p> <p><b>7.5</b> Oxygen fuel gas cutting torch is used to cut straight lines and curves in mild steel plate up to 10 mm thick according to relevant standards and job, safety and workplace requirements</p> <p><b>7.6</b> Weld is inspected according to relevant standards, and job and workplace requirements</p> |
| <b>8 Perform soldering operations</b>                   | <p><b>8.1</b> Job requirements are determined from engineering drawings, job sheet or supervisor</p> <p><b>8.2</b> Materials are prepared for soldering using correct tools, equipment, materials and procedures</p> <p><b>8.3</b> Materials are soldered according to relevant standards and job, safety and workplace requirements</p>  |



- |          |   |  |
|----------|---|--|
|          | <b>8.4</b>  | Soldered joints are performed according to relevant standards and job, safety and workplace requirements                                     |
|          | <b>8.5</b>  | Soldered joints are inspected according to relevant standards and job, and workplace requirements  |
|          | <b>8.6</b>  | Materials are desoldered using correct procedure and minimising damage to materials/components   |
| <b>9</b> | <b>Select and use sealants, adhesives, bonding agents, gaskets and packings</b> |  |
|          | <b>9.1</b>  | Job requirements are determined from engineering drawings, job sheet or supervisor   |
|          | <b>9.2</b>  | Gaskets and packings are selected and used according to job requirements and manufacturer/component supplier instructions                    |
|          | <b>9.3</b>  | Sealants and adhesives are selected and used according to job requirements and manufacturer/component supplier instructions                  |
|          | <b>9.4</b>  | Plastic bonding is performed according to job requirements and manufacturer/component supplier instructions                                  |
|          | <b>9.5</b>  | Sealants, adhesives, bonding agents, gaskets and packings are stored according to workplace and manufacturer/component supplier instructions |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC018 Employ tools, equipment and materials in a shipboard context.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC046 Employ tools, equipment and materials in a shipboard context**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- communicating procedures associated with using hand and machine tools and equipment verbally and in writing
- identifying methods, procedures and materials needed for operating hand and power tools on vessels
- initiating timely action in response to defects or damage
- reading and interpreting written information related to operating tools and equipment used for maintenance operations onboard vessels, including technical manuals and specifications
- safely using hand and machine tools.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics, limitations and use of metals and non-metallic materials used in ship construction and repair
- hand and power tools and components, including:
  - maintenance
  - operational characteristics and performance specifications
  - types
- hand tools, including:
  - anvil
  - benders
  - brushes
  - chisels
  - chucks

- cutters
- drills
- drivers
- files
- gear pullers
- hacksaws
- hammers
- nippers
- pliers
- punchers
- reamers
- scissors
- scrapers
- spanners
- swage block
- taps and dies
- vices
- wrenches
- hand power tools, including:
  - drills
  - grinders
  - hand shear and nibbler
  - impact wrenches
  - portable jigsaw
  - sanders
- heat treatment, including:
  - applications, equipment and processes
  - batch and/or piece loading of furnaces
  - emergency procedures
  - hazards and control measures associated with heat treatment, including housekeeping
  - material characteristics
  - material condition during heat treating process
  - material preparation, quenching, and preheating requirements
  - safe loading of furnaces
  - safe work practices and procedures
  - use and application of personal protective equipment (PPE)
- heat treatment process, including:
  - annealing
  - hardening

- normalising
- tempering
- joints, including:
  - butt
  - corner joints
  - fillet joints
  - lap joints
  - tee joint plate edge preparations
  - throat length with concave and convex reinforcement
- machine tools, including:
  - basic marking out techniques, including datum points/lines
  - benefits of using correctly sharpened cutting tools
  - correct methods of mounting a variety of cutting tools
  - geometry of cutting tools for a range of materials and applications
  - hazards and control measures associated with general machining
  - machine operation
  - methods of work holding
  - reasons for selecting chosen sequence of operations
  - safe work practices and procedures
  - safety issues with regard to correct clamping, guards and shields
  - selection of feeds and speeds to suit a range of materials and operations within the scope of this unit
  - situations indicating need for machine adjustment, lubrication and cleaning
  - techniques, tools and equipment to measure materials and machined components
  - tolerances and limits of size
  - use and application of PPE
- machine tools, including:
  - drills
  - grinder
  - lathes
  - milling machines
- materials used in ship construction and repair, including:
  - limitations of materials
  - metallurgy principles
  - properties of materials
  - types of materials
- national and international regulations, International Maritime Organization (IMO) conventions and codes, including Australian Maritime Safety Authority (AMSA) Marine Orders applicable to managing plant and equipment maintenance and repair operations on vessels

- own ability and limits to rectify irregularities and faults
- pipe work, including:
  - capping/sealing pipe work and assembly methods
  - defects:
    - ovality
    - thinning
  - identifying location/layout of pipe work and assemblies, and application and characteristics of enclosure/hanging/supporting systems
  - installation techniques
  - leak testing, applications and uses
  - pipe work, ancillary installation and joining procedures
  - purging techniques, applications and precautions
- procedures for completing temporary and permanent repair and/or replacement procedures for plant and equipment onboard vessels at sea, alongside and in dry dock
- properties and parameters of engineering materials
- safety data sheets (SDS)/material safety data sheets (MSDS)
- sealants, gaskets, bonding agents, adhesives and packing, including:
  - dangers of working with sealants and adhesives
  - gasket installation procedures
  - operating principles of gaskets and their relationship to other components
  - sealant and adhesives application techniques
  - types, characteristics, uses and limitations of sealants and adhesives
- soldering, including:
  - cleaning solutions and properties, and cleaning procedures
  - heat and damage protection procedures
  - methods of joint preparation
  - procedures for preventing electrostatic discharge damage
  - properties of fluxes and their uses
  - reworking procedures and precautions
  - soldered joint testing and inspection procedures
  - use and application of PPE for manual soldering/desoldering
- soldered joints, including:
  - hard
  - soft
- testing procedures for materials under load, including:
  - compressive load testing procedures
  - shear load testing procedures
  - tensile load testing procedures
- welding, including:
  - characteristics and properties of common metals and welding materials

- effect of gas and electrical welding operations on metals
- effect of various treatments on a range of commonly used metals
- hazards and control measures associated with gas and electrical welding, including housekeeping
- use and application of PPE
- welding safety practices and procedures
- welding processes:
  - gas metal arc welding
  - gas tungsten arc welding
  - oxy-acetylene welding
  - shielded metal arc welding
- work health and safety (WHS)/occupational health and safety (WHS/OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARC047 Manage a propulsion unit using appropriate engine systems and support services**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to operate a propulsion unit using appropriate engine systems and support services according to technical specifications and safe operating limits.

It includes preparing for operation; operating propulsion unit, engine systems and support services; completing operations and checking propulsion unit, engine systems and support services.

This unit applies to people working in the maritime industry in the capacity of:

- Master on commercial vessels less than 35 metres in length within the exclusive economic zone (EEZ)
- Master on vessels less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on vessels less than 80 metres in length within the EEZ.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 35 metres Near Coastal and Mate less than 80 metres Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

C – Equipment Operations



## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Prepare for operation**

- 1.1** Routine pre-operational checks of propulsion unit, engine systems and support services are completed prior to use according to manufacturer specifications and organisational procedures
- 1.2** Propulsion unit, engine systems and support services are calibrated or set up correctly
- 1.3** Faults or malfunctions are identified and reported according to organisational procedures
- 1.4** Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified and risk is assessed and reported according to organisational procedures

#### **2 Operate propulsion unit, engine systems and support services**

- 2.1** Risks to self, others and the environment are identified according to organisational procedures
- 2.2** Suitable personal protective equipment (PPE) is selected and used according to organisational procedures
- 2.3** Controls of propulsion unit, engine systems and support services are operated in a safe and controlled manner
- 2.4** Performance and efficiency of propulsion unit, engine systems and support services operations are monitored
- 2.5** Safe operational practices are used to anticipate and control hazards
- 2.6** Adverse sea and weather conditions that may impact on operation of propulsion unit, engine systems and support services are identified and operational practices are adjusted to maintain safety of vessel and personnel

- |   |            |   |
|---|------------|---|
|   | <b>2.7</b> | Procedures to be undertaken in the event of emergencies are recognised and implemented  |
| <b>3 Complete operations and check propulsion unit, engine systems and support services</b> | <b>3.1</b> | Shutdown procedures are conducted according to manufacturer instructions and organisational procedures  |
|   | <b>3.2</b> | Malfunctions, faults, irregular performance or damage to propulsion unit, engine systems and support services are reported according to organisational procedures |
|   | <b>3.3</b> | Propulsion unit, engine systems and support services are cleaned and secured according to organisational procedures   |
|   | <b>3.4</b> | Operational records are completed according to organisational procedures  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC011 Manage a propulsion unit using appropriate engine systems and support services.

## Links

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC047 Manage a propulsion unit using appropriate engine systems and support services

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing propulsion unit
- communicating effectively with other personnel
- completing routine pre-operational wheelhouse checks of propulsion unit, engine systems and support services, including:
  - ancillary systems and controls
  - engine systems and controls
  - gearing systems
  - hydraulic systems and controls
  - performance indicators
  - power generating units and controls
  - pumps and pumping systems:
    - bilge systems
    - cooling water systems
    - water pumping systems
  - safety alarm systems
  - speed and fuel consumption indicators
  - steering gear
- conducting wheelhouse shutdown and securing procedures for propulsion unit, engine systems and support services, including:
  - ancillary systems and controls
  - cooling water systems
  - engine systems and controls
  - hydraulic systems and controls
  - power generating units and controls
  - pumps and pumping systems:
    - bilge systems
    - water pumping systems
  - safety alarm systems
  - speed indicators

- steering gear
- keeping records of monitoring and operation of safety and fire detection/suppression equipment, and any required remedial action
- maintaining records of operation and maintenance of propulsion unit, ancillary power units, equipment and any related safety incidents
- monitoring and evaluating performance of propulsion unit, ancillary power units and equipment
- reading and interpreting:
  - manufacturer instructions and recommended procedures for operation of propulsion systems and auxiliary systems
  - maritime regulations, rules and instructions
  - operational orders from the organisation's safety management system (SMS)
- recognising when performance of propulsion unit or ancillary power units and equipment is unsatisfactory or outside specified limits and taking appropriate action
- safely operating and monitoring propulsion unit, engine systems and support services, including:
  - ancillary systems and controls
  - engine systems and controls
  - gearing systems
  - hydraulic systems and controls
  - performance indicators
  - power generating units and controls
  - pumps and pumping systems:
    - bilge systems
    - cooling water systems
    - water pumping systems
  - safety alarm systems
  - speed and fuel consumption indicators
  - steering gear
- working collaboratively with other shipboard personnel and passengers during vessel operations.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics of propulsion units, ancillary power units and equipment, including operational limits, vessel stopping distances and turning circles at various draughts, speeds and conditions of loading
- dangers associated with operation of shipboard ancillary power units and related hazard

prevention strategies

- marine engineering terms
- methods for controlling and managing operation of shipboard propulsion units, ancillary power units and equipment
- operation of fire detection and suppression systems
- pre-start checks, operation, monitoring, shutdown and post-operational checks of:
  - bow and stern thruster units
  - controllable pitch propellers (CPP)
- principles of operation and control of various shipboard emergency systems
- procedures to be undertaken in the event of emergencies must include:
  - fire or explosion
  - flooding
  - loss of:
    - propulsion
    - electrical power
    - steering
- problems associated with remote control of propulsion unit, ancillary power units and equipment and appropriate preventative and remedial action and solutions
- procedures for monitoring and evaluating performance of propulsion unit, ancillary power units and equipment
- relationship between vessel speed and fuel consumption, including meaning of economical revolutions per minute (r.p.m.) and its application
- relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code related to operation of propulsion plants and ancillary equipment
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- requirements for waste management and control systems under the International Convention for the Prevention of Pollution from Ships (MARPOL)
- sequence of required action when power unit becomes overloaded
- support services.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the

normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length
- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), equipment manufacturer's instructions, workplace procedures and operational manuals
- tools, equipment, materials and personal protective equipment (PPE) currently used in industry
- plant and equipment manufacturer instructions and recommended procedures
- relevant sections of state and territory maritime regulations, NCSV and USL Code related to operation of propulsion plants and ancillary equipment
- propulsion unit and engine systems must include:
  - ancillary systems and controls
  - diesel engines
  - engine systems and controls
  - gearing systems
  - hydraulic systems and controls
  - performance indicators
  - power generating units and controls
  - propeller shafting arrangements
  - pumps and pumping systems
  - safety alarm systems
  - speed and fuel consumption indicators
  - steering gear.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC048 Monitor and manage vessel operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to plan and oversee activities associated with the regulatory and operational requirements for the continued performance and safety of a coastal vessel.

It includes developing operational strategies and procedures, supervising crew compliance with regulatory requirements, planning resources for vessel operations, planning vessel operations logistics and evaluating operational processes.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 35 metres in length within the exclusive economic zone (EEZ)
- Master of a vessel less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on a vessel less than 80 metres in length within the EEZ.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 80 metres in length as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Develop operational strategies and procedures**

**1.1** Action plan is developed to provide a clear and coherent direction according to organisational goals and objectives

**1.2** Work health and safety (WHS)/occupational health and safety (OHS) and environmental issues are identified, and strategies are implemented to minimise risk factors

**1.3** Quality system is developed for vessel in line with industry standards, compliance and organisational requirements

**1.4** Performance measures and operational targets are developed to conform with business plan

**1.5** Procedures are established and implemented according to organisational and legislative requirements

**1.6** Procedures are communicated to crew members

#### **2 Supervise crew compliance with regulatory requirements**

**2.1** Regulatory body requirements are correctly interpreted and applied

**2.2** Instructions for crew members are developed and implemented

**2.3** Crew members are briefed

**2.4** Liaison with regulatory body officials is undertaken

#### **3 Plan resources for vessel operations**

**3.1** Vessel resource and equipment requirements are investigated and documented

**3.2** Resource needs are prioritised and matched to vessel budget, and priorities are confirmed after consultation with crew members

**3.3** Procurement plan with prioritised purchasing is devised and resources are procured accordingly

#### **4 Plan vessel operations logistics**

**4.1** Operational work plans are developed



- 4.2 Operations are checked to ensure optimum use of human and physical resources
  - 4.3 Tasks are implemented according to plans and specifications
  - 4.4 Operational plans are implemented and crew members are briefed as to roles and responsibilities
  - 4.5 Operational plans are documented and amended according to procedures and crew expectations
  - 4.6 Proposed variations are investigated and negotiated in consultation with crew members
- 5 **Evaluate operational processes**
  - 5.1 Operational progress is closely monitored against required quality of work and adherence to both budget and time schedule
  - 5.2 Opportunities for preventative or corrective changes are identified using outcomes of monitoring activities and feedback from crew members
  - 5.3 Preventative and/or corrective action is recommended and implemented
  - 5.4 Changes are communicated to appropriate persons in a logical and easily understood manner
  - 5.5 Changes are monitored to confirm improvement in crew efficiency

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC012 Monitor and manage vessel operations.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC048 Monitor and manage vessel operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- collecting, organising and understanding information related to vessel resource and logistic requirements
- communicating ideas and information to enable input from crew and understanding by crew of plans developed
- completing a review of, and updating the process for, vessel operations
- developing effective action plan that have regard to:
  - cargo plan
  - dry-docking and slipping operations
  - planned maintenance system
  - safety management plan
  - voyage planning
- developing operational targets, including:
  - completion of survey and docking operations and routine maintenance
  - key performance indicators (KPIs)
  - optimal fuel usage
  - passage planning to achieve safe and efficient routing
- liaising with other crew members on a range of operational issues and challenges
- monitoring and responding to compliance issues and measuring progress against agreed objectives
- planning and organising activities, including consulting with crew to determine resource and logistics requirements, and developing, implementing and reviewing operational plans
- undertaking a job safety analysis (JSA) for working in areas of high risk
- using information gathering techniques to determine crew requirements and developing strategies to address these.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- analytical tools
- decision-making models and techniques
- budgets and estimation of material requirements
- information gathering strategies
- logistics and procurement management techniques
- operational plan development, including:
  - docking and repair plans
  - managing confined space entry
  - passage planning
  - periodic survey requirements
- resource availability
- work health and safety (WHS)/occupational health and safety (OHS) and environmental issues.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, materials, personnel and personal protective equipment (PPE) that replicate and are currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC049 Operate 240 to 440 voltage alternating current electrical systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate a 240 to 440 volt (V) alternating current (AC) electrical system according to technical specifications and safe operating limits.

It includes preparing for operation, operating electrical systems, and checking and completing operations of electrical systems.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

Note: Relevant state/territory training and qualification requirements must be fulfilled by any persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V AC or above, or 120 V direct current (DC) or above.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

<b>1 Prepare for operation</b>	<p><b>1.1</b> Risks to self, others and the environment are identified according to organisational procedures</p> <p><b>1.2</b> Routine pre-operational checks of electrical systems are completed prior to use according to manufacturer specifications and organisational procedures</p>
<b>2 Operate electrical systems</b>	<p><b>2.1</b> Suitable personal protective equipment (PPE) is selected and used according to organisational procedures</p> <p><b>2.2</b> Electrical systems are operated in a safe and controlled manner</p> <p><b>2.3</b> Performance of DC and AC electrical systems is monitored</p> <p><b>2.4</b> AC electrical demand is monitored and additional generators are paralleled or disconnected, as required</p> <p><b>2.5</b> Ship-to-shore electrical supply is connected and disconnected, when required, following established practices and organisational procedures</p> <p><b>2.6</b> Faults or malfunctions are identified and reported according to organisational procedures</p> <p><b>2.7</b> Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures</p> <p><b>2.8</b> Procedures to be undertaken in emergencies are recognised and implemented</p>
<b>3 Complete operations and check electrical systems</b>	<p><b>3.1</b> Shutdown procedures are conducted according to manufacturer instructions and organisational procedures</p> <p><b>3.2</b> Operational records are completed according to organisational procedures</p>

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC017 Operate 240 to 440 voltage alternating current electrical systems.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC049 Operate 240 to 440 voltage alternating current electrical systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing electrical systems, including:
  - adding resistors in series and parallel, and calculating current
  - battery ampere-hours and efficiency
  - series and parallel configuration of battery supply
- connecting to shore power
- isolating and locking out of electrical circuits
- maintaining records of operation of electrical systems, and any related safety incidents
- monitoring and evaluating performance of electrical systems
- performing switchboard operations, including the monitoring of electrical supply and procedures for paralleling generators
- starting emergency alternator and supply switchboard where available
- using hydrometer
- using multimeter to test for voltage and continuity.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- batteries, including:
  - charging circuits and hazards associated with charging batteries
  - operation
  - types, care and hazards
- characteristics of electrical systems
- dangers associated with operation of shipboard electrical systems and related hazard prevention strategies
- earth detection devices
- electrical distribution systems, including emergency arrangements
- electrical systems must include:



- alternators
- batteries and associated circuits
- control circuits
- motors
- starter circuits
- switchboards
- faults associated with electrical systems and appropriate preventative and remedial action, and solutions
- manufacturer instructions for the operation of electrical systems
- methods for managing operation of shipboard electrical systems
- motor and alternator construction
- motor starter circuits
- own ability and limits to rectify irregularities and faults
- principles of operation of various shipboard emergency systems, including fire detection system, internal communications system and emergency generator
- procedures for monitoring and evaluating performance of electrical systems
- relevant performance of electrical systems when unsatisfactory or outside of specified limits and appropriate actions to be taken
- relevant problems that may occur with electrical systems and appropriate preventative and remedial actions to be taken
- relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- safety devices fitted to switchboard and other electrical systems, including fuses and circuit breakers
- sequence of required action when power unit becomes overloaded
- shore power arrangements
- single and three phase alternating current (AC) power generation.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or

may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or appropriate engine and auxiliary system ashore
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC050 Operate auxiliary machinery systems up to 1500 kW

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to operate auxiliary machinery systems up to 1500 kW according to technical specifications and safe operating limit.

It includes preparing for operation, operating auxiliary machinery systems, completing operations and checking auxiliary machinery systems.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

Note: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment, especially with regard to preventing the escape of refrigerants into the atmosphere and to conduct electrical work.

## Pre-requisite Unit

Not applicable.

## Competency Field

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare for operation

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Risks to self, others and the environment are identified according to organisational procedures

**1.2** Routine pre-operational checks of auxiliary machinery systems are completed prior to use according to manufacturer specifications and organisational procedures

#### 2 Operate auxiliary machinery systems

**2.1** Suitable personal protective equipment (PPE) is selected and used according to organisational procedures

**2.2** Auxiliary machinery systems are operated in a safe and controlled manner

**2.3** Performance of auxiliary machinery system operations is monitored

**2.4** Adverse sea and weather conditions that may impact on operation of auxiliary machinery systems are identified and operational practices are adjusted to maintain safety of vessel and personnel

**2.5** Faults or malfunctions are identified and recorded according to organisational procedures

**2.6** Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures

**2.7** Procedures to be undertaken in emergencies are recognised and implemented

- 3 Complete operations and check auxiliary machinery systems**
- 3.1** Shutdown procedures are conducted according to manufacturer instructions and organisational procedures
- 3.2** Operational records are completed, as required, according to organisational procedures and regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC013 Operate auxiliary machinery systems up to 1500 kW.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC050 Operate auxiliary machinery systems up to 1500 kW**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- interpreting:
  - manufacturer instructions for the operation of auxiliary machinery systems
  - maritime regulations, rules and instructions
- maintaining records of the operation and maintenance of auxiliary machinery systems and any related safety incidents, including:
  - logbooks
  - maintenance records
- monitoring and evaluating performance of auxiliary machinery systems
- operating auxiliary equipment, including:
  - bilge, ballast and seawater systems
  - electrical system
  - fuel and lubricating oil system
  - propulsion and steering system
  - refrigeration system.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alarm panels
- auxiliary machinery systems, including:
  - cargo discharging or loading systems
  - commercial refrigeration and freezer plants
  - compressed air
  - control air systems
  - deck machinery
  - fire, bilge and ballast pumping systems

- freshwater generation
- sewage treatment
- auxiliary systems, identified components, materials and construction
- awareness of one's surroundings and changes to these surroundings
- causes of deck machinery faults
- characteristics of auxiliary machinery systems
- closing devices and remote shut-offs
- dangers associated with operating shipboard auxiliary machinery systems and related hazard prevention strategies
- drive systems, belts, clutches and motors
- electro-hydraulic steering gear
- emergency operation in electrical or hydraulic failure
- emergency procedures, including:
  - loss of:
    - control air pressure
    - electrical power
    - steering system
    - hydraulic system
- emergency shut-offs and closures
- fire detection and fire alarm systems
- fixed firefighting installations, including CO<sub>2</sub>, foam, water mist and pyrogen
- function and importance of:
  - grease
  - lubricating oil
- hydraulic systems, including steering gear and deck machinery
- identification and operation of rudder and stock support bearings, glands, packing and seals
- identification of:
  - faults in refrigeration systems
  - plant and its operation
  - refrigeration cycle
  - refrigeration system components
- methods for controlling and managing operation of shipboard auxiliary machinery systems
- operation of deck machinery
- problems associated with auxiliary machinery systems, and appropriate preventative and remedial action and solutions
- relevant sections of Commonwealth, state and territory maritime regulations, and National Standard for Commercial Vessels (NSCV)
- relevant unsatisfactory performance of auxiliary machinery systems outside specified limits and appropriate action requirements
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- requirements for waste management and pollution control from auxiliary machinery systems

under the International Convention for the Prevention of Pollution from Ships (MARPOL)

- rudder construction and rudder types
- safe operational practices and working procedure of auxiliary machinery
- safeguards and protective devices for deck machinery
- simple hydraulic circuits
- strainers, mud-boxes and foot valves
- terminology of materials technology
- types of:
  - fixed firefighting systems, including gas and foam flooding systems
  - pumps and associated safety devices
  - refrigerant
  - winches and windlass.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or appropriate engine, propulsion plant and auxiliary system ashore
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARC051 Operate deck machinery and steering gear on a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate steering gear and deck machinery on a vessel less than 80 metres.

It includes preparing for operation, operating steering gear and deck machinery, and completing operations.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 35 metres in length within the exclusive economic zone (EEZ)
- Master of a vessel less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on a vessel less than 80 metres in length within the EEZ.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 80 metres in length as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Prepare for operation**

- 1.1** Routine pre-operational checks of steering gear or deck machinery are completed prior to use according to manufacturer specifications and organisational procedures
- 1.2** Equipment is set up in accordance with organisational procedures
- 1.3** Tools and equipment appropriate to work requirements are selected, checked for safety and set up for operation
- 1.4** Equipment faults or malfunctions are identified and reported according to organisational procedures
- 1.5** Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified, and risks are assessed and reported according to organisational procedures

#### **2 Operate steering gear and deck machinery**

- 2.1** Suitable personal protective equipment (PPE) is selected and used according to organisational procedures
- 2.2** Steering gear and deck machinery are operated in a safe and controlled manner
- 2.3** Performance and efficiency of steering gear and deck machinery operations is monitored
- 2.4** Safe operational practices are used to anticipate and control hazards
- 2.5** Adverse sea and weather conditions which may impact on the operation of steering gear and deck machinery are identified and operational practices are adjusted to maintain safety of vessel and personnel

#### **3 Complete operations**

- 3.1** Shutdown procedures are conducted according to manufacturer instructions and organisational procedures
- 3.2** Malfunctions, faults, irregular performance or damage to steering gear and deck machinery are reported according to organisational procedures

- 3.3** Steering gear and deck machinery are cleaned and secured according to organisational procedures
- 3.4** Operational records are completed according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC014 Operate deck machinery and steering gear on a vessel up to 80 metres.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC051 Operate deck machinery and steering gear on a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying instructions on the operation of steering gear and deck machinery
- communicating effectively with others
- completing required records relating to the operation of steering gear and deck machinery
- following work schedules in accordance with organisational instructions and safety management system (SMS)
- initiating and operating emergency steering systems
- recognising faulty equipment and taking appropriate action
- recognising routine hazards and problems while operating steering gear and deck machinery
- selecting and using relevant tools and equipment
- working safely and collaboratively with others when operating and maintaining deck machinery and steering gear.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of hydraulics
- communication techniques and signals needed during the operation of steering gear and deck machinery on vessels less than 80 metres
- principal features and operating characteristics of steering gear and deck machinery used on vessels less than 80 metres
- problems related to the operation of steering gear and deck machinery and appropriate actions and solutions
- procedures for checking and inspecting steering gear and deck machinery used on vessels less than 80 metres
- procedures for the safe operation of steering gear and deck machinery
- procedures for, and operation of, emergency steering systems
- records that must be maintained on a vessel less than 80 metres
- relevant state and territory maritime work health and safety (WHS)/occupational health and safety (OHS) and pollution control regulations and policies

- safety, environmental and hazard control precautions and procedures relevant to the operation of steering gear and deck machinery.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length or realistic simulated workplace
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery and materials currently used in industry, including:
  - basic hydraulic systems
  - emergency steering gear
  - personal protective equipment (PPE)
  - winch or windlass or capstan.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC052 Operate deck machinery, cargo handling gear and equipment on a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate deck machinery and cargo handling gear and equipment on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Deck
- Integrated Rating

on a range of vessels.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Deck or Integrated Rating and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Prepare for operations

- 1.1 Routine pre-operational checks of deck machinery or cargo handling gear and equipment are completed prior to use according to manufacturer specifications and workplace procedures
- 1.2 Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is established
- 1.3 Preparations for operations are made and lifting equipment is set up according to workplace procedures
- 1.4 Tools and equipment appropriate to work requirements are selected, checked for safety and set up for operation
- 1.5 Safety equipment appropriate to work requirements are made ready and confirmed to be in good condition
- 1.6 Methods of communication are established and agreed to
- 1.7 Equipment faults or malfunctions are identified and reported according to workplace procedures
- 1.8 Work health and safety (WHS)/occupational health and safety (OHS) hazards in work area are identified, and risks are assessed and reported according to workplace procedures

#### 2 Undertake deck machinery, cargo handling gear and equipment operations

- 2.1 Suitable personal protective equipment (PPE) is selected and used according to workplace procedures
- 2.2 Hazard control procedures are identified and applied to ensure safe operation of deck machinery and cargo handling equipment

- 2.3 Deck machinery and cargo handling gear and equipment are operated in a safe and controlled manner
- 2.4 Performance and efficiency of deck machinery and cargo handling gear and equipment operations is monitored
- 2.5 Safe operational practices are used to anticipate and control hazards
- 2.6 Adverse sea and weather conditions that impact on operation of deck machinery, cargo handling gear and equipment are identified, and operational practices are adjusted to maintain safety of vessel and personnel
- 2.7 Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and workplace procedures
- 2.8 Spill containment procedures are correctly implemented according to regulatory requirements and workplace procedures
- 3 Complete operations
  - 3.1 Shutdown procedures are conducted according to manufacturer instructions and workplace procedures
  - 3.2 Malfunctions, faults, irregular performance or damage to deck machinery and cargo handling gear and equipment are reported according to workplace procedures
  - 3.3 Deck machinery and cargo handling gear and equipment are maintained and secured according to workplace procedures
  - 3.4 Operational records are completed according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.



## Unit Mapping Information

This unit replaces and is equivalent to MARC028 Operate deck machinery, cargo handling gear and equipment on a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC052 Operate deck machinery, cargo handling gear and equipment on a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying risk assessment and hazard control strategies
- communicating with other workplace personnel using effective:
  - handheld radios
  - hand signals
  - listening techniques
  - questioning to confirm understanding and appropriate worksite protocol
  - signage
  - written instructions
- completing required records related to the operation of deck machinery and cargo handling gear and equipment
- exercising safety, environmental and hazard control precautions and procedures during the operation of deck machinery, cargo handling gear and equipment on a vessel
- following work schedules in accordance with workplace instructions and safety management system (SMS)
- operating anchoring equipment under various conditions, such as anchoring, weighing anchor, securing for sea and in emergencies
- reading, interpreting and applying instructions on the operation of deck machinery and cargo handling gear and equipment
- recognising cargo handling gear hazards and problems while operating deck machinery and cargo handling gear and equipment
- recognising faulty equipment and taking appropriate actions
- recognising routine hazards that can arise on a chemical and oil and liquefied gas tanker
- selecting and using relevant tools and equipment
- setting up, shutting down and storing welding, brazing and cutting equipment
- using and handling deck and cargo handling gear and equipment
- using signals to direct the operation of equipment, including winches, cranes, windlasses and hoists

- working safely and collaboratively with others
- working safely at heights, and correctly applying and using safety equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- access arrangements, including:
  - freight elevators
  - hatch covers
  - hatches
  - ramps
  - side, bow and stern doors
- appropriate selection and use of personal protective equipment (PPE)
- boom/jib movements and the safe positioning of the operator for any lift
- cargo, including:
  - chemicals and oils
  - explosives
  - general cargo, break bulk, unitised or in containerised
  - hazardous or dangerous goods, both break bulk and containerised
  - heavy lifts
  - liquefied gas
  - liquids in portable containers
  - livestock
  - mineral concentrates
  - refrigerated cargo
  - scrap, pig iron ingots, steel coils and sheets
  - solid bulk materials
  - timber
- cargo handling gear and equipment
- characteristics and features of bulk carriers, chemical and oil tankers and liquefied gas tanker layouts and cargo
- function and uses of:
  - cranes, pumps, hoists, booms, derricks and related equipment
  - hatches, watertight doors, port hole, port cover and related equipment
  - winches, windlasses, capstans and related equipment
- fundamental properties of liquid and liquefied cargo and their impact on safety, the environment and vessel operations
- hazards and control measures associated with bulk carriers, chemical and oil tankers, and liquefied gas tanker cargo operations, including:
  - electrostatic hazards

- environmental hazards
- explosion and flammability
- extremely low temperatures
- insufficient lighting
- low temperatures
- other personnel in area of operation
- overhead obstructions
- pressure hazards
- reactivity and corrosion
- source of ignition
- toxicity
- vapour leaks and clouds
- weather conditions
- hazard and risk control procedures, including:
  - anti-static measures
  - atmospheric control
  - cargo inhibition
  - checking compatibility
  - confined space entry precautions
  - correct use of safety data sheets (SDS)/material safety data sheets (MSDS) information
  - ensuring operation is visible to operator at all times or a watchperson is utilised to ensure a lift is monitored at all times
  - gas testing
  - identifying hazards and assessing risks of the operation
  - inerting, drying and monitoring techniques
  - inspecting equipment and record books before commencing operations
  - providing adequate lighting
  - segregation of cargo
  - ship/shore checklist
  - ventilation
  - wearing appropriate PPE
- hazards and related safety precautions relevant to basic welding, brazing and cutting
- hoisting and dipping of flags and main single-flag signals
- hydraulic and pneumatically operated mechanical tools and equipment
- identifying faulty and damaged wire and/or rope
- identifying fibre and wire ropes, cables and chains, including their construction, use, markings, maintenance and proper stowage
- pipeline systems – bilge and ballast suctions and wells
- piping systems, valves, loading and unloading, care in transit and emergency shutdown (ESD) procedures
- principal features and operating characteristics of steering gear and deck machinery used on a

range of vessel types

- problems related to operating deck machinery and cargo handling gear and equipment, and appropriate actions and solutions
- procedures for:
  - checking and inspecting deck machinery and cargo handling gear and equipment used on vessels
  - marlin spike seamanship, including proper use of knots, splices and stoppers
  - rigging and unrigging pilot ladders, hoists, rat-guards and gangways
  - safe operation of deck machinery and cargo handling gear and equipment
- records that must be maintained on a vessel relevant to cargo handling and stowage
- relevant sections of maritime regulations, codes and conventions related to tankers and gas carriers
- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- safe working loads of ropes, wires, blocks, chains and lifting gear
- safety, environmental and hazard control precautions and procedures relevant to the operation of deck machinery and cargo handling gear and equipment
- signals for the operation of equipment, including winches, cranes, windlasses and hoists
- standard communication techniques and signals used during the operation of deck machinery and cargo handling gear and equipment
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- the correct method of replacing winch wire and/or rope and attaching new wire and/or rope to winch drum
- use and general maintenance of lifting equipment and basic slinging techniques.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARC053 Operate marine internal combustion engines and associated systems up to 1500 kW**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to operate a marine internal combustion engine and associated systems less than 1500 kW according to technical specifications and safe operating limits.

It includes operating marine internal combustion engines and associated systems and completing operations.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Prepare for operation**

**1.1** Risks to self, others and the environment are identified according to organisational procedures

**1.2** Routine pre-operational checks of marine internal combustion engines and associated systems are completed prior to use according to manufacturer specifications and organisational procedures

#### **2 Operate marine internal combustion engines and associated systems**

**2.1** Suitable personal protective equipment (PPE) is selected and used according to organisational procedures

**2.2** Marine internal combustion engines and associated systems are operated in a safe and controlled manner

**2.3** Performance of marine internal combustion engines and associated systems operations is monitored

**2.4** Adverse sea and weather conditions that may impact on operating marine internal combustion engines and associated systems are identified and operational practices are adjusted to maintain safety of vessel and personnel

**2.5** Faults or malfunctions are identified and recorded according to organisational procedures

**2.6** Faults or malfunctions are rectified, where possible, and corrective actions are taken and recorded according to organisational procedures

**2.7** Restrictions are applied to operations, as necessary, and are agreed to with the Master

**2.8** Procedures to be undertaken in the event of an emergency are recognised and implemented



### **3 Complete operations**

- 3.1** Shutdown procedures are conducted according to manufacturer instructions and organisational procedures
- 3.2** Operational records are completed according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC015 Operate marine internal combustion engines and associated systems up to 1500 kW.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC053 Operate marine internal combustion engines and associated systems up to 1500 kW**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing marine internal combustion engines and associated systems, including calculating:
  - areas and volumes of various shapes and circumference of circles
  - calibration tables
  - lubricating oil and fuel/oil consumption, rate of fuel consumption (RFC), specific fuel consumption (SFC), effects on RFC and fuel requirements due to change in vessel speed or voyage deviations
  - relationship between vessel speed and fuel consumption, including the meaning of economical revolutions per minute (r.p.m.) and its application
  - tank capacities and pumping capacities for filling and emptying
- maintaining records of operating and maintaining marine internal combustion engines and associated systems, and any related safety incidents, including:
  - logbooks
  - maintenance records
  - operational orders
- monitoring various gauges and instruments to evaluate the performance of marine internal combustion engines and associated systems
- operating marine internal combustion engines and associated systems in accordance with manufacturer instructions, maritime regulations, rules and instructions
- recognising problems that may occur with marine internal combustion engines and associated systems, responding to alarms and taking appropriate preventative and remedial action
- recognising when performance of marine internal combustion engines and associated systems is unsatisfactory or outside of specified limits and taking appropriate action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- associated systems, including:

- air start
- control systems
- cooling system
- cooling water system and components
- dual fuel systems
- exhaust systems
- fuel system, including pumps and injectors
- lubricating oil systems and components
- lubrication systems
- characteristics of marine internal combustion engines and associated systems, including operational limits
- control systems
- crankcase explosions and appropriate preventative and remedial action and solutions
- dangers associated with operating shipboard marine internal combustion engines and associated systems, and related hazard prevention strategies
- emergency procedures, including:
  - explosion
  - failure or major fault in propulsion engines and associated control systems
  - fire
  - loss of:
    - bridge control
    - electrical supply
    - major breakdowns
    - propulsion power
    - steering
- engine protection arrangements
- methods for controlling and managing the operation of shipboard marine internal combustion engines and associated systems
- pollution control measures under relevant local, state, territory and commonwealth legislation
- problems associated with marine internal combustion engines and associated systems, and appropriate preventative and remedial actions and solutions
- procedures for monitoring and evaluating performance of marine internal combustion engines and associated systems
- relevant sections of state and territory maritime regulations and the National Standard for Commercial Vessels (NSCV)
- relevant work health and safety (WHS)/occupational health and safety (OHS)/occupational safety and health (OSH) legislation and policies
- requirements for emission control from internal combustion engines under the International Convention for the Prevention of Pollution from Ships (MARPOL)
- sequence of required action when there is a major fault on main propulsion engine
- surroundings and changes to these surroundings
- technological changes in engine and control system designs

- turbocharging systems.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or appropriate engine, propulsion plant and auxiliary system ashore
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC054 Operate propulsion transmission systems up to 1500 kW**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate propulsion transmission systems up to 1500 kW according to technical specifications and safe operating limits.

It includes preparing for operations, operating propulsion transmission systems and completing operations.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 meters in length with propulsion power up to 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Prepare for operation</b>                   | <p><b>1.1</b> Risks to self, others and the environment are identified and precautions are taken to minimise risk according to organisational procedures</p> <p><b>1.2</b> Routine pre-operational checks of propulsion transmission systems are completed prior to use according to manufacturer specifications and organisational procedures</p>  |
| <b>2 Operate propulsion transmission systems</b> | <p><b>2.1</b> Suitable personal protective equipment (PPE) is selected and used according to organisational procedures</p> <p><b>2.2</b> Propulsion transmission systems are operated in a safe and controlled manner</p> <p><b>2.3</b> Performance of propulsion transmission system operations is monitored</p> <p><b>2.4</b> Faults or malfunctions are identified and recorded according to organisational procedures</p> <p><b>2.5</b> Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures</p> <p><b>2.6</b> Procedures to be undertaken in emergencies are recognised and implemented</p> |
| <b>3 Complete operations</b>                     | <p><b>3.1</b> Shutdown procedures are implemented according to manufacturer instructions and organisational procedures</p> <p><b>3.2</b> Operational records are completed according to organisational procedures</p>   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC016 Operate propulsion transmission systems up to 1500 kW.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC054 Operate propulsion transmission systems up to 1500 kW**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing propulsion transmission systems, including:
  - calculating gearbox ratios
  - propeller slip
  - theoretical distance
- maintaining records of operating and maintaining propulsion transmission systems and any related safety incidents
- monitoring various gauges and evaluating performance of propulsion transmission systems
- operating propulsion transmission system in a safe and controlled manner to manufacturer technical specifications.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic reverse/reduction propulsion transmission systems operation
- bearings
- characteristics of propulsion transmission systems, including operational limits
- construction and materials of propulsion transmission systems
- fault identification on propulsion transmission systems
- lubricating and cooling systems for propulsion transmission systems
- manufacturer instructions for operating propulsion transmission systems
- maritime regulations, rules and instructions
- methods for controlling and managing the operation of shipboard propulsion transmission systems
- problems associated with propulsion transmission systems and appropriate preventative and remedial actions and solutions
- procedures for monitoring and evaluating performance of propulsion transmission systems
- propeller and intermediate shaft systems



- propeller shape, design and materials
- propeller types and arrangements, including fixed pitch and controllable pitch propellers
- propulsion transmission systems, including:
  - control system
  - gearbox and reduction gear arrangements
  - intermediate bearings
  - propeller types and arrangements
  - shafting arrangements
  - stern tube and their systems
  - transmission system
- recognising operational faults and problems that may occur with propulsion transmission systems and taking appropriate preventative and remedial actions
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- seals and glands
- shafting materials
- steerable/rudder propellers
- stern and jet water drive
- stern tube bearing systems, including lubrication, materials and components
- types of gear trains.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of greater than or equal to 375 kW or appropriate engine, propulsion plant and auxiliary system ashore
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently

used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC055 Operate remote controls of propulsion plant, engineering systems and services**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to remotely operate shipboard plant, propulsion systems, auxiliary machinery and equipment according to technical specifications and within safe operating limits at all times.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment operation

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Operate remote controls</b>                                 | <p><b>1.1</b> Remote controls of propulsion plant, other engineering systems and auxiliary machinery are operated according to company procedures and manufacturer instructions</p> <p><b>1.2</b> Clear and concise communication is used with engine room and communication is acknowledged according to established procedures</p> <p><b>1.3</b> Performance of propulsion plant, other engineering systems and auxiliary machinery and equipment is monitored and evaluated using remote performance indicators</p> <p><b>1.4</b> Appropriate corrective action is taken in conjunction with the Chief Engineer when performance of propulsion plant or other engineering systems is found to be unsatisfactory or outside of specified limits</p> <p><b>1.5</b> Relationship between speed and fuel consumption is monitored and action is taken, as required, according to operational instructions</p> <p><b>1.6</b> Safety and hazard minimisation procedures and regulations are followed to maintain the safety of personnel, propulsion and engineering systems, cargo and vessel</p> |
| <b>2 Coordinate deck, bridge and engine room resources</b>       | <p><b>2.1</b> Coordination of deck, bridge and engine room operations and resources is maintained during daily vessel operation</p> <p><b>2.2</b> Responses are coordinated, and appropriate action is taken in a breakdown in the remote control systems for propulsion plant, other engineering systems and auxiliary machinery</p> <p><b>2.3</b> Correct logbook entries are made relating to equipment operations and incidents during a voyage</p>   |
| <b>3 Manage emergencies involving the use of remote controls</b> | <p><b>3.1</b> Remote controls of relevant emergency systems and auxiliary machinery and equipment are correctly operated in a shipboard emergency</p>   |

- 3.2** Clear and concise communication is used and communication is acknowledged at all times during emergency situations

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC026 Operate remote controls of propulsion plant and engineering systems.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC055 Operate remote controls of propulsion plant, engineering systems and services**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adapting to differences in vessels, propulsion plant, remote controls, engineering systems and related standard operating procedures (SOPs)
- applying required safety and hazard control procedures when operating vessel remote controls
- assessing operational capability and performance of propulsion and other engineering plant and auxiliary equipment
- communicating effectively and working collaboratively with other personnel when operating propulsion plant and engineering system remote controls
- identifying and evaluating problems that can occur when operating propulsion plant and engineering system remote controls
- identifying and implementing improvements to engineering control procedures
- interpreting and following SOPs for operating propulsion plant and engineering system remote controls
- interpreting equipment performance readings and instrumentation
- interpreting vessel and machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams
- monitoring and evaluating performance of vessel propulsion plant, other engineering systems, and auxiliary machinery and equipment using remote performance indicators
- selecting and using equipment required for operating propulsion plant and engineering system remote controls safely, including:
  - in berthing and unberthing operations
  - in normal and adverse weather conditions
  - in normal and emergency situations
  - when anchoring or mooring.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- auxiliary systems and controls, including:
  - air starting
  - ballast water
  - bilge
  - cooling water
  - fuel
  - lubrication
  - waste management and pollution control systems
- bridge communications techniques, including issuing of engine room orders
- dangers associated with shipboard electrical plants and related hazard prevention strategies
- documentation and records, including:
  - Australian Maritime Safety Authority (AMSA) Marine Orders
  - company procedures for the remote control of propulsion plant and other engineering systems
  - instructions of relevant maritime authorities
  - International Maritime Organization (IMO) and International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) conventions and codes
  - International Safety Management (ISM) Code, safety management system (SMS) plans, procedures, checklists and instructions
  - operational orders
  - plant and equipment manufacturer instructions and recommended procedures
  - relevant Australian and international standards
  - vessel log
- emergencies situations, including
  - fire or explosion in engine room
  - flooding of engine room
  - loss of electrical power
  - loss of propulsion
  - loss of steering
- methods for remotely controlling the operation of shipboard propulsion plant and other engineering systems, including auxiliary machinery and equipment
- operating principles of marine power plants, including:
  - diesel engines
  - gas turbine systems
  - propeller
  - propeller shaft
  - steam turbine systems
- principles of operation and functions of various systems and controls, including:
  - bridge located engine controls
  - hydraulic systems and controls

- pumps and pumping systems
- various auxiliary systems and controls, such as cooling water, fuel system, air starting, lubrication system, ballast water and bilge system
- various shipboard emergency systems
- procedures and precautions for bunkering operations
- procedures and arrangements for establishing appropriate and effective engineering watches, including:
  - cargo operations
  - normal safety conditions
  - unmanned machinery space (UMS) operations
- procedures for coordinating deck and engineering resources
- procedures for monitoring and evaluating the performance of propulsion plant, other engineering systems and auxiliary machinery and equipment
- propulsion plant configurations, including:
  - controllable pitch propellers (CPP)
  - direct drive shaft
  - electric diesel
  - reduction gear
  - steam
- relationship between vessel speed and fuel consumption, including the meaning of economical revolutions per minute (r.p.m.) and its application
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures
- requirements for waste management and control systems under the International Convention for the Prevention of Pollution from Ships (MARPOL)
- ships auxiliary machinery, including:
  - air conditioning
  - alternators
  - deck machinery
  - distillation
  - electrical distribution
  - freshwater systems
  - generators
  - oily water separators
  - refrigeration
  - sewage treatment plants
  - stabilisers
  - ventilation
- typical characteristics of propulsion machinery and control systems for vessels of 500 gross tonnage (GT) or more, including operational limits, fuel consumption/speed relationships,



- stopping distances and turning circles at various draughts, speeds and loading
- typical problems with the remote control of propulsion plant, other engineering systems and auxiliary machinery and equipment, and appropriate preventative and remedial actions and solutions
- vessel SMS and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC056 Operate roll-on and roll-off machinery and equipment on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to operate equipment and machinery used to open, close and secure hull openings and maintain a safe ventilation of roll-on and roll-off (ro-ro) ventilation systems during voyages.

This unit applies to people working in the maritime industry in the capacity of:

- operating ro-ro machinery and equipment.

## Licensing/Regulatory Information

There are currently no legislative and licensing requirements applicable to this unit.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare for ro-ro operations

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1.1 Routine pre-operational checks of ro-ro equipment and machinery are completed according to workplace procedures and manufacturer instructions

- 1.2 Methods of communication are established and agreed to
  - 1.3 Faults or malfunctions are identified and reported according to workplace procedures
  - 1.4 Work health and safety (WHS)/occupational health and safety (OHS) hazards in work area are identified, and risks are assessed and reported according to workplace procedures
- 2 Undertake ro-ro operations
  - 2.1 Suitable personal protective equipment (PPE) is selected and used according to workplace procedures
  - 2.2 Hazard control procedures are identified and applied to ensure safe operation of deck machinery and cargo handling equipment
  - 2.3 Ro-ro equipment, machinery and cargo handling gear are operated in a safe and controlled manner
  - 2.4 Bow, stern and side doors are opened, closed and secured in accordance with workplace procedures
  - 2.5 Ramps are operated in accordance with workplace procedures
  - 2.6 Surveys are conducted to ensure proper sealing in accordance with workplace procedures
  - 2.7 Atmosphere in ro-ro spaces is monitored in accordance with workplace procedures
  - 2.8 Ventilation of ro-ro spaces are maintained at recommended safe limits, throughout the voyage in accordance with workplace procedures
  - 2.9 Performance and efficiency of ro-ro machinery, equipment and operations are monitored
  - 2.10 Safe operational practices are used to anticipate and control hazards
  - 2.11 Adverse sea and weather conditions that impact on operation of ro-ro machinery and equipment are monitored and safe work practices are implemented to maintain safety of vessel and personnel
  - 2.12 Measures to prevent pollution during normal and emergency situations are applied according to regulatory

requirements and workplace procedures

### **3 Complete operations**

- 3.1** Shutdown of machinery and equipment is conducted according to manufacturer instructions and workplace procedures
- 3.2** Malfunctions, faults, irregular performance or damage to ro-ro machinery and cargo handling gear and equipment are reported according to workplace procedures
- 3.3** Ro-ro equipment, machinery and cargo handling gear and equipment are maintained and secured according to workplace procedures
- 3.4** Operational records are completed according to workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This is a new unit. No equivalent unit

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC056 Operate roll-on and roll-off machinery and equipment on board a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures
- applying risk assessment and hazard control measures
- communicating with others effectively
- completing required records related to roll-on and roll-off (ro-ro) machinery and equipment
- recognising routine hazards and problems while operating ro-ro machinery and cargo handling gear and equipment
- reporting faulty equipment and taking appropriate action
- using ro-ro machinery and equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- communication techniques needed during vessel operation
- hazard and risk control procedures, including:
  - ventilation
  - wearing appropriate personal protective equipment (PPE)
- problems related to operating ro-ro machinery and equipment and appropriate actions and solutions
- procedures for checking and inspecting ro-ro machinery and equipment used on vessels
- records relevant to ro-ro machinery and equipment
- relevant WHS/OHS requirements, work procedures and pollution control regulations and policies
- ro-ro machinery and equipment operating characteristics and principal features.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC057 Perform dogging on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to apply slinging techniques select and inspect lifting gear and/or direct crane/operator in moving a load.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Engine/Deck or Integrated Rating who apply safe work practices when undertaking basic dogging on a range of vessels
- Navigational Watch - Deck/Engine.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine/Deck, Integrated Rating or Navigational Watch - Deck/Engine and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

## **1 Plan job**

- 1.1** Relevant site information is obtained for related task in accordance with workplace procedures
- 1.2** Sea conditions and use of tag lines are assessed in accordance with workplace procedures
- 1.3** Hazards and potential hazards associated with slinging and directing loads are identified in accordance with workplace procedures
- 1.4** Hazard control measures consistent with appropriate standards are identified to ensure safety of personnel and equipment in accordance with workplace procedures
- 1.5** Weight, dimensions and load centre of gravity (CG) are identified and assessed
- 1.6** Suitable lifting/slinging points on load are established
- 1.7** Appropriate lifting equipment needs are assessed, including rig/vessel crane limitations, in accordance with workplace procedures
- 1.8** Appropriate communication methods are established in consultation with crane/operators and other appropriate personnel
- 1.9** Manufacturer specifications/information is obtained for special loads, as required

## **2 Select and inspect equipment**

- 2.1** Lifting equipment appropriate to task is selected and inspected for serviceability in accordance with workplace procedures
- 2.2** Damaged or excessively worn lifting equipment is identified, labelled and isolated in accordance with workplace procedures
- 2.3** Appropriate communication equipment is selected and serviceability checked
- 2.4** Appropriate personal protective equipment (PPE) is selected and checked

## **3 Prepare site and equipment**

- 3.1** Hazard prevention/control measures are applied consistent with appropriate standards to ensure safety of personnel and equipment in accordance with workplace



procedures

**3.2** Clear communications and roles of deck crew are established when working cargo with a rig crane or another vessel in accordance with workplace procedures

**3.3** Appropriate slinging method is selected

**3.4** Lifting equipment is prepared and assembled, as required

**3.5** Load landing destination is prepared

#### **4 Perform tasks**

**4.1** Knots, hitches and bends using fibre and synthetic ropes are correctly made and used in course of deck operations

**4.2** Lifting equipment is attached and secured to lifting hook using appropriate techniques

**4.3** Lifting hook is positioned over load CG

**4.4** Lifting equipment is attached and secured to load in an appropriate manner

**4.5** Tag line is attached and secured, as required

**4.6** Test lift is conducted to ensure load security

**4.7** Load is moved, and stability and control are maintained at all times

**4.8** Appropriate communication methods and communication signals are applied to safely coordinate load movement within sight and out-of-sight of ship's crane operator

**4.9** Loads are correctly rigged using appropriate ropes and rigging gear in accordance with workplace procedures

**4.10** Load is landed to ensure it is stable and secure from movement, is in position to be lashed with appropriate consideration given to effects of vessel's motion on stowed cargo when lashing cargo

#### **5 Shut down job, clean up and maintain equipment**

**5.1** Lifting equipment is removed or disconnected from load and prepared for next task or storage

**5.2** Defective equipment is isolated and tagged in accordance with workplace procedures

- 5.3 Lifting equipment is stored in accordance with workplace procedures
- 5.4 Hazard prevention/control measures are removed, as required, in accordance with workplace procedures
- 5.5 Excess materials from work area are removed, as required, in accordance with workplace procedures
- 5.6 Defects are reported and recorded in accordance with workplace procedures, and appropriate action is taken
- 5.7 Rope, wire and cables are stowed and maintained in accordance with workplace procedures and manufacturer instructions

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC032 Perform dogging on board a vessel

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC057 Perform dogging on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adapting to differences in vessels, equipment and standard operating procedures (SOPs)
- applying different methods for making temporary connections to loads using fibre and synthetic ropes
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying risk assessment and hazard control strategies, including hierarchy of control
- appropriately using and selecting personal protective equipment (PPE)
- calculating rated capacity of lifting equipment
- communicating with other personnel through:
  - adopting appropriate worksite protocol
  - fixed channel two-way radio
  - hand signals
  - listening
  - questioning to confirm understanding
  - signage
  - written instructions
- directing crane operators to move loads in a safe manner, using a slewing crane
- inspecting and caring for a wide range of lifting equipment to appropriate Australian Standards and/or manufacturer specifications
- interpreting rated capacity and working load limit tags
- selecting and inspecting lifting equipment, ropes and chains
- splicing natural fibre and synthetic ropes
- taking actions to promptly report and/or rectify accidents, safety incidents and operational problems according to regulations and procedures
- using and maintaining ropes, wires and chains
- using communications signals for directing crane operators to move loads in a safe manner, using a slewing crane, including:
  - hoist down – hand
  - hoist down – whistle

- hoist up – hand
- hoist up – whistle
- luff boom down – hand
- luff boom down – whistle
- luff boom up – hand
- luff boom up – whistle
- slew left – hand
- slew left – whistle
- slew right – hand
- slew right – whistle
- stop – hand
- stop – whistle
- telescope in – hand
- telescope in – whistle
- telescope out – hand
- telescope out – whistle
- working safely and collaboratively with others during lifting operations on a vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate mathematical procedures for estimating and measuring loads
- appropriate standards relevant to the full range of techniques for undertaking dogging activities, including:
  - International Safety Management (ISM) Code, safety management system (SMS) plans, procedures, checklists and instructions
  - manufacturer specifications
  - relevant Australian and international standards and regulations
  - relevant WHS/OHS requirements and work practices
  - vessel and company procedures
- appropriate selection and use of personal protective equipment (PPE)
- defective equipment, including:
  - broken or stretched wires
  - cut/damaged fibres
  - damaged lifting and associated equipment
  - excessive wear
- work hazards, including:
  - equipment in load path
  - heights

- insufficient lighting
- pedestrian and plant traffic
- radio interference
- sea conditions and weather, including wind, lightning and storms
- trip hazards
- hierarchy of hazard identification and control, including:
  - administrative controls
  - elimination
  - engineering controls
  - isolation
  - substitution
- lifting equipment, including:
  - beam clamps
  - blocks
  - chains
  - eyebolts
  - fibre ropes
  - grabs
  - hoists
  - hooks
  - lifting beams
  - pallet forks and cages
  - personnel boxes
  - plate clamps
  - shackles
  - spreaders
  - tackles
  - trolleys wire ropes
  - winches
- load destination, including:
  - ground
  - loading platforms
  - suspended floors
  - vehicles
  - other vessels and barges
- stability and safety factors of load to be lifted are in line with manufacturer specifications
- site information, including:
  - deck conditions (even, uneven, steel and wood)
  - local conditions, such as access and egress
  - sea conditions

- work method statements
- types of cranes and their functions
- types of knots, bends and hitches in common use, their characteristics, applications and limitations, and methods of tying them using synthetic and fibre rope of varying construction and size
- types of lifting equipment and slinging techniques, and their limitations and performance in a wide range of conditions, including slings (wire and synthetic), beams, accessories, clamps, work boxes, bins and pallets
- use of dunnage
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC058 Perform rigging on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to perform basic rigging operations and to use associated equipment in the maritime industry.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer – Deck or Integrated Rating who apply safe work practices when undertaking basic rigging on a range of vessels.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer- Deck or Integrated Rating and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |
|---|--|
| <b>1 Rig and maintain personnel and pilot access ways</b> | <b>1.1</b> Personnel access equipment is checked and correctly rigged according to workplace procedures and applicable standards   |
|   | <b>1.2</b> Requirements and recommendations for safe access by alternative means are identified and organised according to workplace procedures and recognised standards |
| <b>2 Perform tasks aloft and over vessel's side</b>       | <b>2.1</b> Site and equipment for working aloft and over the side are prepared according to workplace procedures and recognised standards                                |
|   | <b>2.2</b> Required precautions are taken when working aloft or over the side  |
|   | <b>2.3</b> Chairs, stages, safety harnesses and appropriate safety equipment are used according to workplace procedures and applicable standards                         |
|   | <b>2.4</b> Portable ladders are correctly used and maintained  |
|   | <b>2.5</b> Equipment used when working aloft and over the side is correctly maintained and stored  |
| <b>3 Lash and secure cargo</b>                            | <b>3.1</b> Lashing equipment is inspected and maintained according to workplace procedures and applicable standards  |
|   | <b>3.2</b> Faulty lashing equipment is identified and isolated, reported and maintained according to workplace procedures and applicable standards                       |
|   | <b>3.3</b> Cargo is lashed and secured according to workplace procedures and applicable standards  |
|   | <b>3.4</b> Appropriate consideration is given to effects of vessel's motion on stowed cargo when lashing cargo   |
|   | <b>3.5</b> Lashing equipment is correctly stored after use   |
|   | <b>3.6</b> Loads are correctly rigged using appropriate ropes and rigging gear according to workplace procedures and safety requirements                                 |
|   | <b>3.7</b> Effective communication is maintained with crew to ensure the safety and integrity of the vessel and crew   |



## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC029 Perform rigging on board a vessel.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC058 Perform rigging on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adapting to differences in vessels, equipment and standard operating procedures (SOPs)
- applying rigging operations and using associated equipment in accordance with safe working practices, including:
  - checking and using rigging gear when rigging loads
  - lashing cargo in a range of situations
  - rigging a sea anchor to control a specified rate and direction of drift and/or angle to sea
  - rigging accommodation ladders, gangways and man baskets
  - rigging and unrigging pilot ladders and hoists
  - splicing natural fibre and synthetic ropes
  - using and maintaining ropes, wires and chains
- applying rigging operations under normal and adverse conditions of sea and weather, including:
  - during berthing and unberthing operations
  - when berthed, anchored or moored
  - while anchoring or mooring
  - while underway
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating with other personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- completing work systematically with required attention to detail
- complying with relevant maritime regulations
- following required work schedule in accordance with company requirements
- reading and applying instructions, safety and SOPs and precautions, including:
  - housekeeping processes
  - International Safety Management (ISM) Code and safety management system (SMS)

- procedures
  - manufacturer guidelines
  - shipboard rigging procedures
  - WHS/OHS regulations and hazard prevention policies and procedures
- recognising routine problems during rigging operations on a vessel
- selecting and using rigging and lifting slings and equipment according to operating instructions
- taking actions to promptly report and/or rectify accidents, safety incidents and operational problems according to regulations and procedures
- tying required knots and demonstrating rope handling skills, including:
  - back splice
  - becket/buntline hitch
  - bowline
  - clove hitch
  - common seizing
  - common whipping
  - double sheet bend
  - eye splice
  - figure of eight
  - marlin spike hitch
  - racking seizing
  - reef knot
  - rolling hitch
  - sail maker's whipping
  - sheep shank
  - sheet bend
  - short splice
  - timber hitch
  - truckie hitch
  - west country whipping
- working safely and collaboratively with others during rigging operations on a vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable sections of relevant maritime regulations
- appropriate use and selection of personal protective equipment (PPE)
- breaking strain and safe working load for slings and equipment
- cargo to be lashed, including:

- containers
- general cargo
- roll-on and roll-off (ro-ro) vehicles
- timber deck cargo
- legal requirements for constructing a pilot ladder
- maintenance and storage procedures for equipment used when working aloft or over the side
- maritime communication techniques
- personnel access equipment, including:
  - accommodation ladders
  - brows
  - combined pilot accommodation ladders and pilot hoists
  - gangways
  - personnel baskets
  - pilot ladders
- precautions and procedures for working aloft and over the side
- principles and procedures for lashing and securing cargo, including inspection and maintenance requirements for lashing equipment
- principles of rigging equipment, deterioration and care, and maintenance requirements for different types of rope and wire
- procedures for rigging and preparing personnel access ways
- procedures for rigging and unrigging pilot ladders, hoists, rat-guards and gangways
- procedures for splicing natural fibre and synthetic ropes
- relevant WHS/OHS requirements and work practices
- type and function of rigging, safety and associated equipment, and their limitations
- types of knots, bends and hitches in common use, their characteristics, applications and limitations, and methods of tying them using synthetic and fibre rope of varying construction and size.

## Assessment Conditions

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental

damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC059 Transmit and receive information by marine VHF radio within Australian Territorial Waters**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to transmit and receive information by marine very high frequency (VHF) radio on a vessel according to regulations and includes operating an emergency position indicating radio beacon (EPIRB).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as defined in the National Standard for Commercial Vessels (NSCV) Part D.
- This unit applies to all boaters using marine VHF radio equipment to transmit and receive information to and from shore and vessel-based operators within Australian Territorial Waters – defined as all waters within 12 nautical miles from the coastal baseline.
- This unit is consistent with the requirements of the Radiocommunications (Maritime Ship Station – 27 MHz and VHF) Class Licence 2001.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

### **ELEMENTS**

### **PERFORMANCE CRITERIA**

Elements describe the essential Performance criteria describe the performance needed to

outcomes.

demonstrate achievement of the element.

**1 Operate VHF radio equipment to transmit and receive messages**

- 1.1** VHF radio equipment is selected for operation within limits of specifications
- 1.2** VHF radio equipment is operated to transmit and receive various types of signal according to manufacturer instructions, established radio operation procedures and regulatory requirements
- 1.3** Regulations and procedures applicable to vessel stations equipped with radio and digital selective calling (DSC) facilities are applied during radio communication
- 1.4** Work health and safety (WHS)/occupational health and safety (OHS) procedures and hazard control strategies are applied when operating radio equipment

**2 Access search and rescue (SAR) VHF radio facilities**

- 2.1** Information that may be required is identified and documented
- 2.2** Request is made to the appropriate organisation for the provision of the information in the required format and on the correct channel
- 2.3** Information is provided and received in the required format and on the correct channel

**3 Operate an EPIRB in a distress situation**

- 3.1** Routine checks and maintenance are carried out on EPIRBs, including float free EPIRBs, to confirm their operational capability according to manufacturer instructions and specifications
- 3.2** EPIRB is operated according to manufacturer instructions and regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC019 Transmit and receive information by marine VHF radio within Australian Territorial Waters

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARC059 Transmit and receive information by marine VHF radio within Australian Territorial Waters**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accurately and consistently using very high frequency (VHF) equipment to send and receive messages and signals under normal and emergency situations according to international and national VHF radio regulations/standards
- applying the principles of marine radio and digital selective calling (DSC) to accurately transmit and receive messages, including distress calls
- cancelling an inadvertent distress alert or call
- carrying out radio communications in compliance with the relevant sections of the maritime provisions of the Radio Regulations adopted by the World Radiocommunication Conference (as amended), including Chapters VII and IX
- communicating effectively with other stations by using standard voice procedures, the phonetic alphabet, push to talk (PTT) switch and common radio terminology
- deploying an emergency position indicating radio beacon (EPIRB)
- documenting communication problems
- proper housing, securing and automatic release of float-free EPIRB
- reading and interpreting regulations and procedures
- sending and receiving distress alerts, and urgency and safety announcements by DSC
- sending, acknowledging and relaying distress, urgency and safety communications by voice using recognised format
- setting up VHF equipment for use, including selecting the channel, adjusting transmitter power level, adjusting squelch and using dual watch facility
- using correct procedures for transmitting and receiving signals using VHF equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian maritime search and rescue (SAR) system, including satellite distress beacons
- available radio services, including:

- automated weather stations
- DSC
- public communications
- scheduled broadcasts (skeds)
- SAR
- EPIRB frequencies:
  - 406 MHz
  - 121.5/MHz (homing)
- marine VHF repeater stations
- methods of communicating vessel position
- organisations with which radio communication may be conducted, including:
  - coast stations
  - fishing organisations and co-operatives
  - limited coast stations
  - private shore stations, including boating clubs
  - state/territory police forces
- principles of, and procedures for, marine VHF radio communications
- procedures for transmitting and decoding the phonetic alphabet
- purpose of monitoring the VHF Channel 70 used for DSC, including an awareness of the procedures used in making a DSC distress alert, urgency and safety announcement
- radio communication, including:
  - distress, urgency and safety communications
  - normal vessel-to-shore service (ship-to-shore)
  - normal vessel-to-vessel service (ship-to-ship)
- sections of relevant regulations related to marine VHF radio communications
- VHF radio calling, replying and relaying procedures.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or assessment must occur via an online radio simulator or simulated VHF radio communications activities and exercises covering a range of normal and emergency communication situations that are typically experienced on a vessel.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse

weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or simulations
- documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including:
  - Marine Radio Operators VHF Handbook
  - Radiocommunications (Maritime Ship Station – 27 MHz and VHF) Class Licence 2001
  - Radiocommunications Act 1992
  - relevant state/territory legislation – for carriage requirements
- VHF transceiver equipment – either fixed or handheld, or approved personal computer (PC)-based simulator, which includes a DSC facility.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC060 Use and care for hand and power tools

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to use and care for hand tools and air, battery and electric power tools, onboard a range of vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer – Engine/Deck
- Integrated Rating.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine/Deck or Integrated Rating and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |            |   |
|--|------------|---|
| <b>1 Select appropriate tools for work</b>           | <b>1.1</b> | Work requirements are interpreted in accordance with workplace procedures and manufacturer instructions   |
|  | <b>1.2</b> | Appropriate hand and power tools are selected for required tasks  |
|  | <b>1.3</b> | Selected hand and power tools are checked for serviceability in accordance with workplace procedures  |
|  | <b>1.4</b> | Defective tools are identified, reported and appropriate repair or replacement action is taken in accordance with workplace procedures  |
|  | <b>1.5</b> | Blunt or worn tools are identified and appropriate action is taken to replace, sharpen or rectify in accordance with workplace procedures and manufacturer instructions       |
|  | <b>1.6</b> | Instructions for the use of tools are accessed and interpreted, as required, in accordance with workplace procedures  |
| <b>2 Use hand and power tools</b>                    | <b>2.1</b> | Work area, work pieces and tools are prepared for required tasks in accordance with workplace procedures  |
|  | <b>2.2</b> | Other personnel in work area are made aware of work being carried out as required by safety management procedures   |
|  | <b>2.3</b> | Work is marked out using appropriate marking out tools in accordance with workplace procedures  |
|  | <b>2.4</b> | Hand and power tools are used as directed in accordance with workplace procedures and manufacturer instructions   |
|  | <b>2.5</b> | Desired work outcomes are achieved to job specifications in accordance with workplace procedures  |
| <b>3 Follow safety and hazard control procedures</b> | <b>3.1</b> | Required safety precautions are followed when using hand and power tools in accordance with workplace procedures and regulations  |
|  | <b>3.2</b> | Operational hazards are identified when using hand and power tools and action is taken to minimise or eliminate risk to self, other personnel, the vessel and the environment |
| <b>4 Care for hand and power tools</b>               | <b>4.1</b> | Tools are used for intended purpose according to manufacturer instructions in accordance with workplace   |

procedures

- 4.2 Tools are cleaned and stored after use according to manufacturer instructions and in accordance with workplace procedures
- 4.3 Tools are sharpened according to manufacturer instructions and in accordance with workplace procedures
- 4.4 Tools are adjusted, tightened and/or lubricated according to manufacturer instructions in accordance with workplace procedures
- 4.5 Grinding wheels are dressed and made true according to manufacturer instructions and in accordance with workplace procedures
- 4.6 Defective or worn tools and tool components are identified, marked as required and reported, and appropriate repair or replacement action is taken in accordance with workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC030 Use and care for hand and power tools.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC060 Use and care for hand and power tools

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adapting to differences in vessels, equipment and standard operating procedures (SOPs)
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- caring for air-operated tools, their supply hoses and hose connections, safely and correctly
- caring for hand and power tools safely and correctly, including cleaning, sharpening or adjusting tools according to SOPs
- communicating with other workplace personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- completing work systematically with required attention to detail
- complying with relevant maritime and safety regulatory requirements
- dressing and truing a grinding wheel
- following required work schedule according to company requirements
- following the orders and instructions of the officer of the watch or designated supervisor
- marking out work to specifications, measuring and checking the quality of finished work, including the correct use of:
  - adjustable gauge
  - callipers
  - centre punch hammers
  - dividers
  - rules and tapes
  - scribes
  - squares
  - trammels
  - vernier callipers and micrometer
- reading, interpreting and applying documentation that includes technical specificity, including:

- basic instructions and SOPs
- work specifications and drawings
- recognising routine problems that may occur when using and caring for hand and power tools, including identifying:
  - glazed, loaded or untrue grinding wheel condition
  - hand and power tools that are found to be defective or worn
  - incidents and problems involving the use of hand and power tools
- selecting appropriate hand and power tools to complete assigned tasks
- storing tools and equipment after use according to SOPs
- taking appropriate action to promptly report incidents, problems and hazards, including equipment faults
- using personal protective equipment (PPE), including:
  - boots
  - eye and ear protection
  - masks
- using tools and equipment safely according to:
  - International Safety Management (ISM) Code and associated vessel safety management system (SMS) and procedures
  - tool manufacturer instructions
  - WHS/OHS regulations and hazard prevention policies and procedures
  - workplace procedures and housekeeping processes
- working safely and collaboratively with others when using and caring for hand and power tools.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate selection of PPE
- characteristics and identifying features of common engineering drill bits
- environmental protection measures when carrying out basic engineering tasks
- established procedures for the use and care of hand or power tools required for work tasks
- hazards and related safety precautions when using hand or power tools onboard a vessel, including:
  - electric shock
  - moving and rotating blades and attachments
  - non-compliance with safe working procedures
  - poor housekeeping procedures
  - sharp blades
  - sparks in areas where flammable and explosive substances are stored
  - unsecured machinery, components or equipment



- using tools beyond safe working limits or faulty equipment
- ISM Code and safety management procedures as they relate to the use of hand and power tools onboard a vessel
- procedures for dressing and/or truing a grinding wheel
- procedures for identifying a glazed, loaded or untrue grinding wheel condition
- relevant WHS/OHS and pollution control legislation and policies, including the International Convention for the Prevention of Pollution from Ships (MARPOL)
- standard procedures for marking out work to specifications and measuring and checking the quality of finished work.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

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<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARD004 Manage business and administration on vessels limited by tonnage or near coastal operations**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to manage the business and administration of a commercial ocean-going vessel and its personnel in compliance with Australian and international regulations and guidelines, and to ensure the protection of the marine environment and the safety of the vessel and people on board.

Managing vessel business operations and resources includes legal and commercial responsibilities, the safety management system (SMS), procedures to obtain a safety management certificate and subsequent audits, managing work health and safety (WHS)/occupational health and safety (OHS) procedures and practices, monitoring and controlling expenditure, and analysing and preparing reports.

It also involves organising and managing crew, and includes allocating duties, conducting required training, and assessing and maintaining expected standards of work and behaviour.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ).

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

D – Administration and Human Resources

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Develop plans for general and specific vessel operations**

- 1.1** Vessel operation goals and objectives are identified according to company procedures, operational orders, regulatory requirements and established marine management practices
- 1.2** General and specific vessel operations plans are drawn up according to company procedures
- 1.3** Correct procedures for emergency response onboard a vessel are developed according to company procedures, operational orders, regulatory requirements and established marine management practices
- 1.4** Appropriate validation measures and standards are devised to monitor progress of operations against plans, and appropriate contingency plans are developed for any discrepancies or variations that may occur during operations
- 1.5** Service procedures and systems improvement opportunities are identified and appropriate measures are taken to act on these opportunities according to company procedures and established marine management practices
- 1.6** Plans, goals, objectives and instructions for general and specific vessel operations and emergency and contingency procedures are distributed to relevant personnel according to company procedures and established marine management practices

#### **2 Ensure legal requirements are fulfilled**

- 2.1** Legal basis under which a commercial vessel operates is interpreted and followed, and ship Master safety, legal and commercial obligations are identified and carried out in a relevant range of operational circumstances
- 2.2** National and international conventions, laws and

- regulations pertaining to vessel operations and contingencies are implemented
- 2.3** Entries are made into vessel logbooks, as required, and carriage of all required vessel certification is confirmed and ensured
- 2.4** Appropriate arrangements are made for preparing vessel for statutory survey and certification
- 2.5** Relevant code of conduct and industrial agreements are applied to vessel operations and management, and ship Master responsibilities as they relate to crew health and safety are implemented
- 2.6** Vessel security procedures are consistent with International Maritime Organization (IMO) International Ship and Port Facility Security (ISPS) Code
- 2.7** Procedures and requirements relating to state/territory port control are implemented
- 2.8** Procedures and requirements relating to customs, quarantine and immigration clearances are implemented
- 3 Ensure commercial and business requirements are fulfilled**
  - 3.1** Contracts of carriage and bills of lading under which vessel owners and cargo owners operate are interpreted and adhered to according to company procedures, legal requirements and established marine management practices
  - 3.2** Commercial and legal aspects of general average, salvage and towage are identified, interpreted and implemented according to company procedures, legal requirements and established marine management practices
  - 3.3** Commercial and legal aspects of marine hull and cargo insurance are identified, interpreted and implemented according to company procedures, legal requirements and established marine management practices
  - 3.4** Accident and incident investigation processes are identified and implemented according to company procedures, legal requirements and established marine management practices
- 4 Monitor and control vessel expenditure**
  - 4.1** Accrual accounting procedures are correctly used to monitor and control vessel expenditure and, where relevant, vessel budget is prepared according to

		established vessel financial procedures and established accounting practices, with relevance to commercial market in which a vessel operates
	<b>4.2</b>	Plans and appropriate contingency procedures are developed to correct any variation from vessel budget and identified expenditure, and records are maintained according to established vessel financial procedures and established accounting practices
	<b>4.3</b>	Appropriate action is taken when expenditure varies from vessel budget according to contingency plans, company procedures and established accounting practices
<b>5</b>	<b>Develop and implement vessel SMS</b>	
	<b>5.1</b>	Vessel SMS is developed according to relevant maritime regulations and company procedures
	<b>5.2</b>	SMS safety procedures and related documentation are developed in collaboration with relevant vessel personnel
	<b>5.3</b>	SMS documentation structure and content are maintained according to requirements, and appropriate action is taken to ensure correct procedures are followed to obtain a safety management certificate according to maritime regulatory requirements
	<b>5.4</b>	Appropriate measures are taken to ensure all personnel onboard vessel are familiar with SMS documentation, that familiarisation arrangements for new crew members are carried out, and that all personnel apply SMS procedures relevant to their functions
<b>6</b>	<b>Monitor and control vessel physical resources</b>	
	<b>6.1</b>	Vessel inventory of plant, equipment and other physical resources is maintained according to company procedures, vessel survey requirements and established marine management practices
	<b>6.2</b>	Reports on status of vessel physical resources are prepared and submitted to relevant personnel within company and regulatory authority requirements according to company procedures, vessel survey requirements and established practices
<b>7</b>	<b>Analyse and compile operational and voyage data</b>	
	<b>7.1</b>	Operational and voyage data is collected and compiled according to company practices, regulatory requirements and established marine management practices

- |  |            |   |
|--|------------|---|
|  | <b>7.2</b> | Voyage report is prepared and validated according to company procedures, vessel survey requirements and established marine management practices         |
|  | <b>7.3</b> | Voyage report is submitted to designated personnel according to company procedures, vessel survey requirements and established practices                |
| <b>8 Provide leadership to officers and crew</b>                           | <b>8.1</b> | Feedback and support are provided to crew on achievements and performance in their day-to-day work  |
|  | <b>8.2</b> | Crew are treated fairly, equitably, effectively and honestly in matters related to their day-to-day work  |
|  | <b>8.3</b> | Appropriate action is taken to prevent harassment and, where it has occurred, harassment is dealt with promptly, effectively and fairly                 |
|  | <b>8.4</b> | Crew suggestions for work improvements are listened to, acted upon and credit for achievements is shared with crew                                      |
|  | <b>8.5</b> | Good example is provided of a responsible, fair, sympathetic, equitable and diligent member of shipboard team   |
| <b>9 Allocate duties and maintain set standards of work onboard vessel</b> | <b>9.1</b> | Work requirements and crew competencies required for work duties are identified and clarified   |
|  | <b>9.2</b> | Crew member competencies are assessed and confirmed, and duties are assigned to crew according to crew competencies and capabilities                    |
|  | <b>9.3</b> | Competency deficiencies in personnel are identified and remedial action is initiated through counselling and training                                   |
|  | <b>9.4</b> | Crew members are advised of rostered duties and required performance standards are set in conjunction with crew members according to company procedures |
|  | <b>9.5</b> | Crew members are motivated to achieve set standards of work performance using appropriate methods   |
|  | <b>9.6</b> | Performance of crew members is monitored, as required, using appropriate methods according to company procedures  |

- 9.7** Performance assessments are discussed with relevant crew members and agreement is reached on appropriate action to be taken where performance is below set standards
- 10 Resolve conflict**
  - 10.1** Conflict situations are recognised and issues are clarified with personnel involved
  - 10.2** Solutions to conflict are negotiated using appropriate mediation and conflict resolution techniques
- 11 Plan, organise, promote and evaluate shipboard training and assessment**
  - 11.1** Workplace trainer and assessor requirements are identified and appropriate staff are trained and assigned, as required
  - 11.2** Work-related training opportunities are planned and organised for crew according to identified needs and company policy
  - 11.3** Shipboard drills are organised according to regulations and company procedures
  - 11.4** Assessment of crew members during and after training activities and shipboard drills is carried out to confirm required competencies and related knowledge have been acquired
  - 11.5** Crew members are debriefed after training, drill and assessment activities using appropriate methods and efficacy of training, drill and assessment activities is evaluated based on feedback from participating crew members and other relevant evidence
  - 11.6** Outcomes of evaluations of training and assessment are discussed with trainers and assessors, and appropriate action is taken to make required improvements
  - 11.7** Reports on training and assessment are evaluated and resultant action is maintained and/or entered into vessel log, as required

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARD001 Manage business and administration on vessels limited by tonnage or near coastal operations.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARD004 Manage business and administration on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- analysing and compiling operational and voyage data, and preparing reports
- communicating effectively verbally and in writing
- complying with mandatory rules and regulations and International Maritime Organization (IMO) conventions and codes, including the relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders and ensuring applicable codes, guidelines and standards recommended by IMO, classification societies and maritime industry organisations are taken into account
- conducting management meetings
- coordinating an audit to maintain a safety management certificate
- developing effective planning documents
- establishing and developing dynamic groups and teams onboard a vessel
- following correct procedures for obtaining a safety management certificate
- implementing human resource management responsibilities
- interpreting and applying information on contracts of carriage, marine insurance, salvage and towage, including:
  - labour-related regulations
  - national administrative procedures for accident investigation, and vessel and port security
  - procedures relating to customs, quarantine and immigration clearance
- investigating and arbitrating shipboard conflict
- investigating, analysing and compiling casualty data and preparing related reports
- leading officers and crew
- maintaining vessel security
- motivating shipboard personnel
- organising training evaluation processes
- planning, implementing and monitoring goals and performance requirements for vessel operations and emergencies
- planning, implementing and monitoring requirements related to:
  - Master duties, obligations, commercial and legal responsibilities under national and

international laws and conventions

- port state control (PSC)
- vessel documentation, certification and survey
- planning, implementing and monitoring work health and safety (WHS)/occupational health and safety (OHS) procedures and practices
- promoting correct safety management onboard vessels
- providing high-quality reports
- recognising and interpreting non-verbal communication
- taking actions promptly to report and/or rectify management problems according to established procedures
- using management skills effectively.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- competency requirements for typical shipboard operations
- conflict resolution and mediation strategies and techniques
- contracts of carriage, marine insurance, salvage and towage
- equal employment policies and regulations
- established marine resource management procedures and practices
- general principles of integrated vessel and bridge management
- human resource management problems, and appropriate action and solutions
- laws and regulations pertaining to vessel operations and contingencies, including:
  - agency
  - customs and quarantine
  - deaths and disappearances
  - drugs
  - immigration
  - marine pollution (Australian laws and IMO conventions)
  - operational safety (Australian regulations and IMO conventions)
  - security and anti-terrorism
  - smuggling and piracy
  - stowaways and refugees
  - wrecks, salvage and towage
- legal issues relevant to Master responsibilities, including:
  - characteristics of a contract of carriage
  - functions and responsibilities of Master, vessel owner and charterer in various types of charters and contracts of carriage
  - functions of a bill of lading
  - insurance arrangements

- international conventions relating to liability of a sea carrier
- investigations and courts of marine inquiry
- lay time, demurrage and dispatch
- legal principles of pilotage
- salvage and towage contracts
- tort liability
- vessel owner obligation of reasonable dispatch
- vessel registration requirements
- maritime communication techniques, including barriers to effective communication and how to overcome them
- methods for:
  - evaluating efficacy of shipboard training, drills and competency assessment
  - identifying problems in services to other departments or in procedures and systems
  - motivating shipboard personnel
- national administrative procedures for accident investigation, and vessel and port security
- national Training Packages and competency standards relevant to shipboard personnel
- principles of effective leadership and teamwork
- procedures for:
  - collecting, compiling, analysing and reporting on safety incidents and casualties onboard a vessel, including format and characteristics of a good safety incident report
  - obtaining a safety management certificate and undergoing subsequent audits to maintain it
  - planning, implementing and monitoring goals and performance requirements for vessel operations and emergencies
  - customs, quarantine and immigration clearance
- regulatory requirements for shipboard drills
- relevant:
  - industrial award requirements as they relate to shipboard personnel responsibilities, obligations and entitlements
  - maritime regulations
  - WHS/OHS and marine pollution control legislation, codes of practice, policies and procedures
- requirements related to:
  - PSC
  - vessel documentation, certification and survey
- role of vessel Master, including duties, obligations, and commercial and legal responsibilities under national and international laws and conventions
- techniques for:
  - evaluating and seeking alternatives for improvement of shipboard operational and emergency procedures and systems
  - setting of performance standards and evaluating performance of shipboard personnel
- training and competency assessment techniques and options suitable for shipboard personnel

- vessel operation, including:
  - berthing and unberthing
  - bridge operations
  - cargo handling and care
  - catering operations
  - deck operations and maintenance
  - emergency and damage control operations
  - engine room operations and maintenance
  - mooring operations
  - navigation
  - passenger service operations
  - personnel training
  - pollution control operations
  - radio operations
  - safety/emergency drills
  - slipping operations
- vessels physical resources, including:
  - accommodation equipment and facilities
  - bridge equipment and resources
  - catering equipment and facilities
  - documents and certification
  - engine room propulsion plant and equipment and related auxiliary systems
  - navigation charts, marine publications, manufacturer manuals and other reference documentation
  - radio equipment and facilities
  - tools and maintenance equipment
  - vessel deck equipment, fittings and related systems
  - vessel structures and fittings
- vessel safety management system (SMS), including:
  - general provisions for developing and monitoring vessel SMS
  - aims, objectives, advantages and disadvantages of SMS
  - requirements of relevant maritime authorities for SMS.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
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# **MARD005 Manage operations and maintenance on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage the operations of a commercial vessel limited by tonnage or near coastal operations. It includes administration of vessel stability, cargo operations and planned maintenance system in compliance with Australian and international regulations and guidelines, protection of the marine environment and the safety of the vessel and people on board.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

D – Administration and Human Resources

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <b>1 Manage maintenance of vessel stability and safety parameters</b>                                    | <b>1.1</b> Vessel dynamic stability is interpreted and analysed<br><br><b>1.2</b> Vessel transverse and longitudinal stability is correctly maintained in normal and adverse operational conditions<br><br><b>1.3</b> Vessel safety parameters are correctly maintained within normal operational limits during cargo operations   |
| <b>2 Administer planning of cargo operations on vessel limited by tonnage or near coastal operations</b> | <b>2.1</b> Impact of cargo operations on vessel stability is identified and managed<br><br><b>2.2</b> Draft survey is conducted and the calculated results used<br><br><b>2.3</b> Appropriate procedures are administered for all cargo operations   |
| <b>3 Administer planned maintenance system</b>   | <b>3.1</b> Vessel routine preventative maintenance, testing and inspection plan is correctly interpreted and implemented<br><br><b>3.2</b> Arrangements are made for maintenance activities to be carried out at required times<br><br><b>3.3</b> Maintenance materials are obtained<br><br><b>3.4</b> Repairs to vessel hull or equipment and/or repair or replacement of equipment or components are organised according to procedures |
| <b>4 Dock or slip vessel limited by tonnage or near coastal operations</b>                               | <b>4.1</b> Type of slipway, dock or vessel lifting facility is identified and suitability for type of hull assessed<br><br><b>4.2</b> Hull data is correctly interpreted and recorded<br><br><b>4.3</b> Appropriate plan is prepared for procedures to be taken onboard vessel prior to, during and on completion of proposed slipping or docking operations   |

- |          |  |   |
|----------|--|---|
|          | <b>4.4</b>   | Cradle is correctly prepared prior to slipping of vessel  |
|          | <b>4.5</b>   | Appropriate precautions are taken prior to slipping and refloating of vessel and when shoring/supporting vessel   |
|          | <b>4.6</b>   | Vessel is correctly refloated after slipping and maintenance operations   |
| <b>5</b> | <b>Carry out inspection and maintenance procedures on vessel limited by tonnage or near coastal operations</b> | <p><b>5.1</b> Inspections of vessel hull, equipment and components are carried out according to company maintenance schedules and vessel manufacturer instructions</p> <p><b>5.2</b> Deterioration of vessel structure and fittings are identified and appropriate maintenance action is initiated according to work health and safety (WHS)/occupational health and safety (OHS) and pollution control requirements, company procedures and manufacturer instructions</p> <p><b>5.3</b> Lubricants, marine preservatives or finishes are applied correctly using appropriate application equipment according to WHS/OHS requirements, company procedures and manufacturer instructions</p> <p><b>5.4</b> Problems in application of lubricants, marine preservatives, finishes and other maintenance materials and chemicals are identified and reported, and appropriate remedial action is initiated</p> <p><b>5.5</b> Records of maintenance and lubrication work carried out are completed according to procedures</p> |
| <b>6</b> | <b>Administer correct selection and use of maintenance equipment and materials</b>                             | <p><b>6.1</b> Tools and equipment are correctly identified and used according to WHS/OHS requirements</p> <p><b>6.2</b> Defective equipment and materials are identified and reported</p>   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARD002 Manage operations and maintenance on vessels limited by tonnage or near coastal operations.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARD005 Manage operations and maintenance on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out operational management of vessel while underway, when berthed or moored, when slipped or in dry dock, during routine or unplanned events
- communicating effectively with other personnel when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- communicating with multilingual crew using established techniques
- complying with relevant maritime regulations
- identifying problems that can occur when managing operations and maintenance of vessel and initiating appropriate action
- interpreting and following all safety management procedures and precautions when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- interpreting and monitoring application procedures for managing operations and maintenance of vessel limited by tonnage or near coastal operations
- monitoring selection and use of publications, materials, tools and other equipment involved in managing operations and maintenance of vessel limited by tonnage or near coastal operations
- preparing appropriate reports on outcomes of inspection and maintenance activities
- providing leadership to other shipboard personnel when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- reading and interpreting:
  - safety data sheets (SDS)/material safety data sheets (MSDS)
  - vessel and machinery specifications, gross and net tonnage, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams
- recognising and adapting appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others
- taking appropriate precautions to prevent pollution of marine environment
- taking prompt action to report and/or rectify operational and maintenance problems.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable legislation, regulations and codes of practice
- documents and records, including:
  - company maintenance procedures
  - maintenance schedules and records
  - relevant maritime authorities and regulations related to operations and maintenance of vessels, including Marine Orders
  - stability and cargo documents pertaining to the vessel
  - vessel and equipment manufacturer instructions, specifications and recommended procedures
- maintenance records that must be kept on vessel to meet requirements of company and regulatory authorities
- nature and causes of corrosion of marine surfaces and structures, and available methods for its control
- operational management and maintenance:
  - administering repairs of minor faults and imperfections in painted surfaces and managing preparation of marine surfaces prior to application of prescribed marine coating
  - identifying deterioration of vessel structure and fittings
  - identifying faulty equipment or fittings and arranging for repair or replacement
  - managing application of lubricants to moving parts of vessel equipment
  - managing vessel cargo operation procedures
  - managing vessel stability both normal and adverse operational conditions
  - routine maintenance inspections
- principal features of structure of vessel, with a basic understanding of properties and application of materials used in vessel construction
- procedures for:
  - checking and inspecting vessel stability during a range of operational conditions, including loading and discharging of cargo, as part of routine procedures to ensure compliance with company requirements and established safety rules and regulations
  - initiating and coordinating repair and/or replacement procedures onboard vessels
- the use of publications, tools and equipment required for operational management and maintenance:
  - cargo and stability calculators and publications
  - safe use of electric and pneumatic power tools, such as grinders, sanders, drills and hand tools, including chipping hammers and scrapers
  - marine preservative finish application equipment, such as brushes, spray guns, rollers and greasing and lubrication tools
  - the correct selection and use of personal protective equipment (PPE), including:
    - eye and ear protection

- safety boots
- dust and fume masks
- rinsing and storing equipment
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation and policies
- safety, environmental and hazard control precautions and procedures relevant to inspection and maintenance operations
- slipping and docking procedures suitable for various types of hull forms, including communication techniques used
- typical problems relating to slipping and maintaining vessels and appropriate actions and solutions.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARD006 Monitor and control compliance with legislative requirements**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and the protection of the marine environment.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited), Engineer Class 2 (STCW Second Engineer Unlimited), Master of a commercial vessel less than 500 gross tonnage (GT) or Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

D – Administration and Human Resources

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Determine legislative obligations and requirements**

- 1.1** Legal obligations in relation to vessel operations are ascertained
- 1.2** Legislative requirements relating to vessel operations are recognised
- 1.3** Obligations and legislative requirements are clarified with relevant government and licensing agencies

#### **2 Develop strategies for compliance with legislative obligations and requirements**

- 2.1** Obligations and legislative requirements are analysed to develop compliance strategies
- 2.2** Strategies are reviewed with relevant stakeholders to determine suitability
- 2.3** Strategies are used to develop regular, cyclical compliance checks
- 2.4** Strategies and compliance requirements are communicated to crew members
- 2.5** Relevant training is conducted to facilitate compliance

#### **3 Undertake scheduled compliance checks**

- 3.1** Compliance checks are delegated to relevant crew members
- 3.2** Problems that may lead to potential non-compliance are identified and reported
- 3.3** Timing and outcomes of compliance checks are recorded according to regulatory and organisational requirements
- 3.4** Information from compliance checks is analysed to identify non-compliance or potential non-compliance

		instances
<b>4 Rectify non-compliance with legislative obligations and requirements</b>	<b>4.1</b>	Course of action to take to address non-compliance instances is determined
	<b>4.2</b>	Timely remedial action is undertaken and legislative obligations and requirements are complied with
	<b>4.3</b>	Training and instruction are conducted to ensure compliance with regulations
	<b>4.4</b>	Checks are made to ensure non-compliance has been addressed
	<b>4.5</b>	Specific area is monitored to ensure continuing compliance
	<b>4.6</b>	Reason for non-compliance is analysed to guide future compliance
<b>5 Maintain required certification of shipboard items and equipment</b>	<b>5.1</b>	Documentation held by the vessel is completed against authorised inventory
	<b>5.2</b>	Continuous validity of certification extensions and requirements for renewals is ensured through timely attention
	<b>5.3</b>	Continuing effectiveness of tests, checks and maintenance programs is reflected in certificate conditions of surveyed items and equipment
	<b>5.4</b>	Organisational and issuing authority requirements are complied with through timely survey arrangements
<b>6 Maintain documentation related to legislative requirements</b>	<b>6.1</b>	Certificates and documentation are stored in a manner that optimises their use and accessibility for vessel operations
	<b>6.2</b>	Clear, concise and accurate records are kept
	<b>6.3</b>	Regulatory and organisational requirements, and format for records are complied with
	<b>6.4</b>	Validity of records is maintained when required corrections to records are made
	<b>6.5</b>	Documentation is secured and confidentiality is

maintained according to organisational procedures

- 6.6** Organisational procedures are followed to back-up computer
- 6.7** Records and reports are distributed to required authorities at appropriate times

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARD003 Manage legal requirements of a vessel and MARJ005 Manage compliance with environmental legislation.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARD006 Monitor and control compliance with legislative requirements**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to appropriate level of detail in recordkeeping
- developing effective planning documents
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring currency of relevant reference material
- ensuring procedures for monitoring operations and maintenance comply with legislative requirements
- identifying potential non-compliance promptly and fully
- interpreting information relevant to legislative requirements to ensure the security and safety of life of crew, passengers and others at sea
- planning renewal and extension of certificates to ensure continued validity of surveyed items and equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- assistance and salvage, including:
  - Convention on Limitation of Liability for Maritime Claims
  - International Convention on Salvage
  - Lloyds Standard Form of Salvage Agreement
  - Special Compensation P and I Club (SCOPIC)
- classification societies
- general average and marine insurance, including:
  - the York-Antwerp Rules
- international maritime law embodied in international agreements and conventions that impact on the role of management level deck officers, including:
  - Convention on Facilitation of the International Maritime Traffic

- International Convention for the Unification of Certain Rules of Law with Respect to Collision Between Vessels
- Maritime Labour Convention (MLC)
- United Nations Convention on the Law of the Sea (UNCLOS)
- international maritime law embodied in international agreements and conventions in relation to:
  - certificates and other documents to be carried onboard ships by international conventions, how they may be obtained and their period of validity
  - responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended
  - responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended
  - responsibilities under the International Convention for Prevention of Pollution from Ships (MARPOL), as amended
  - responsibilities under international instruments affecting the safety of the ship, passengers, cargo and crew, including:
    - Casualty Investigation Code
    - charter parties
    - Hamburg Rules maritime legislation
    - International Convention for the Unification of Certain Rules of Law Relating to Bills of Lading
- maritime declarations of health and the requirements of International Health Regulations
- methods and aids to prevent pollution of the maritime environment by ships, including:
  - convention of the prevention of marine pollution by dumping of wastes and other matter
  - International Convention on Civil Liability for Oil Pollution Damage
  - International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties
  - Protocol Relating to Intervention in the High Seas in Cases of Pollution by Substances other than Oil
- marine insurance and liability, including:
  - letter of protest
  - noting and extending protests
- Master and pilot relationship
- national legislation for implementing international agreements and conventions
- port of refuge procedures
- procedures for maintaining security and confidentiality of information
- relevant regulations, codes and conventions related to business and legal requirements, security and safety of life of crew, passengers and others on a vessel, including:
  - Ballast Water Convention
  - port state control (PSC)
- ships agent and agency
- sources of reference and information on detailed survey and certification requirements

- stowaways
- strategies for compliance, including:
  - conducting drills required under SOLAS and relevant Marine Orders applicable to firefighting and lifesaving appliances
  - ensuring survey items are subject to required checks, inspections and maintenance programs
  - maintaining correct documentation and records
  - maintaining valid certification dates
  - using relevant safety management system checklists
- systems and methods for recording, retrieving and storing information
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace operational situations or an industry-approved marine operations site, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF031 Apply leadership and team working capability

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to apply leadership and team working capability in accordance with Australian and international regulations and guidelines.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Master of a commercial ship less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Watchkeeper Deck.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

#### Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

#### Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Master on a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Establish working systems and procedures**

- 1.1** Principles of resource management are interpreted to establish the functions and responsibilities of the crew
- 1.2** Principles of resource management are interpreted to establish arrangements and procedures
- 1.3** Operations are planned, and arrangements and procedures applied and evaluated according to regulatory requirements and company procedures
- 1.4** Working systems are documented, as required, and communicated to relevant personnel
- 1.5** Schedules are developed with due consideration to crew's experience

#### **2 Assign resources and allocate duties**

- 2.1** Current competency of crew is evaluated and appropriate measures are taken to ensure all personnel have the required level of competency
- 2.2** Clear and unambiguous roles and responsibilities of crew are determined
- 2.3** Crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned

- 2.4** Resources are allocated and assigned as needed in correct priority to perform necessary tasks to obtain and maintain situational awareness
- 3 Manage personnel**
- 3.1** Crew are informed of current and predicted vessel and operational status and external environment
- 3.2** Operations are undertaken in accordance with established functions and responsibilities
- 3.3** Effective communication is maintained with crew on matters relevant to safety and integrity of vessel
- 3.4** Questionable decisions and/or actions are dealt with using an appropriate challenge and response
- 3.5** Fatigue management strategies are applied
- 3.6** Operations are monitored and appropriate action is taken if found to be in breach of established arrangements, regulations and procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF022 Apply maritime resource management principles

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF031 Apply leadership and team working capability**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying principles of resource management
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing competency and experience of vessel officers and crew, and their suitability for specific roles
- assisting team members to develop and maintain the required level of competency
- communicating effectively with others on issues, arrangements and requirements
- demonstrating effective leadership and management skills
- developing, implementing and overseeing operating procedures
- establishing and maintaining appropriate internal and external communication systems
- establishing and managing operations on an operational commercial vessel in an appropriate range of contexts
- identifying and evaluating problems using risk assessment techniques, determining appropriate courses of action and evaluating outcome of effectiveness
- investigating and arbitrating shipboard conflicts
- monitoring arrangements and taking appropriate action where there is an identified breach of established arrangements, regulations or procedures
- planning and coordinating timelines, tasks, prioritisation and workload
- reading, interpreting and applying instructions, procedures and information relevant to procedures and responsibilities
- recognising and interpreting signs of fatigue among crew and initiating appropriate action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- cultural differences and how to deal with them
- documentation and procedures, including:
  - Australian Maritime Safety Authority (AMSA) Marine Orders

- company procedures
- International Chamber of Shipping (ICS) Bridge Procedures Guide
- International Maritime Organization (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), including the Manila Amendments
- International Safety Management (ISM) Code, safety management system (SMS) plans, procedures, checklists and instructions
- navigational charts
- operational orders
- vessel log
- effective decision-making techniques
- factors to take into account when establishing watchkeeping arrangements, including:
  - attention necessary when navigating in or near traffic separation schemes or other routing measures
  - bridge or engine room must never be left unattended
  - operational status of bridge/engine room instrumentation, controls and alarms
  - professional competency and experience of vessel officers and crew and their familiarity with the vessel's equipment, procedures and manoeuvring capability
  - provision of unmanned machinery space (UMS) controls, alarms and indicators
  - proximity of navigational hazards
  - size of the vessel and the field of vision available from the conning position
  - traffic density and other activities occurring in the area in which the vessel is navigating
  - unusual demands on the watch arising from operational conditions
  - use and operational condition of navigational aids
  - weather and sea conditions, visibility and whether there is daylight or darkness
  - whether the vessel is fitted with an automatic steering system
  - whether there are radio duties to be performed
- fatigue management principles, strategies and techniques, including:
  - appropriate dietary habits
  - arranging to take a break when symptoms of fatigue are identified
  - avoiding excessive consumption of alcohol prior to watchkeeping duties
  - maintaining personal fitness and health
  - recognition of symptoms of fatigue
- functions and responsibilities of shipboard personnel management and training
- importance of situation awareness to decision making
- related international maritime conventions, recommendations, and national legislation, including Maritime Labour Convention (MLC)
- resource management principles, including:
  - allocation, assignment and prioritisation of resources
  - assertiveness and leadership, including motivation
  - consideration of team experience, including decisions that reflect team experiences



- effective communication onboard and ashore
- obtaining and maintaining situational awareness
- watchkeeping principles as described in AMSA Marine Orders, including:
  - assistance must be available to be summoned to the bridge or engine room if required by a change in the vessel's situation
  - duties of lookout and/or helmsman must be kept separate
  - lookout must give full attention to keeping a proper lookout and must not be given other duties which could interfere with the task
  - necessary precautions must be taken to avoid polluting the marine environment
  - proper lookout must be maintained at all times
- ways of assessing the current competency of vessel officers and crew, and their familiarity with the vessel's equipment, procedures and manoeuvring capability
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF032 Apply medical first aid on board ship

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to provide immediate first aid in the event of accident or illness onboard a ship.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Master on a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Master on a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### Pre-requisite Unit

Not applicable.

### Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Prepare to respond to emergency onboard vessel</b>                  | <b>1.1</b> Casualty condition is assessed and appropriate response is determined in order to minimise hazards and determine the need for emergency medical assistance<br><br><b>1.2</b> Options for transporting casualty or waiting for medical assistance are evaluated in relation to environmental issues, transport availability and casualty condition<br><br><b>1.3</b> Casualty is sheltered from elements according to environmental conditions, as required   |
| <b>2 Provide first aid onboard vessel</b>                                | <b>2.1</b> Nature of casualty injury/condition and relevant first aid procedures are determined and explained to the casualty<br><br><b>2.2</b> Consent is sought from the casualty prior to applying first aid<br><br><b>2.3</b> First aid is provided to address casualty condition and according to effective first aid principles<br><br><b>2.4</b> Casualty condition is monitored and ongoing first aid is provided as required<br><br><b>2.5</b> Casualty is calmly reassured according to effective first aid principles<br><br><b>2.6</b> Condition of casualty is documented over time to assist in providing ongoing first aid |
| <b>3 Work in conjunction with medical and emergency services support</b> | <b>3.1</b> Communication links are established with medical services using relevant communication equipment to ensure prompt control action is taken<br><br><b>3.2</b> Appropriate medical assistance is sought according to the circumstances<br><br><b>3.3</b> Medication is administered under direction from an   |

authorised health worker as required

**3.4** Directions given by emergency services are followed to assist in the evacuation of the casualty, if required

**4 Participate in debriefings** **4.1** Information is provided on the incident and the first aid assistance provided

**4.2** Clarifications are provided, where required

**4.3** Suggestions are provided to improve future operations

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit is equivalent to MARF013 Provide medical first aid on board a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF032 Apply medical first aid on board ship

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- administering medication under direct instruction from an authorised health worker
- completing identification of probable cause, nature and extent of injuries according to current first aid practice to minimise immediate threat to life promptly
- conducting an initial casualty assessment
- demonstrating adequate infection control procedures
- evaluating available options for transporting or maintaining condition of casualty
- examining casualty or patient
- identifying and preparing an area for safe evacuation
- improvising treatment and associated resources
- listening to, clarifying and applying medical instructions accurately
- minimising the risk of harm to self and others at all times
- planning an appropriate first aid response in line with established first aid principles, policies and procedures
- preparing incident reports, including description of injury
- using available communication methods and equipment to access medical assistance.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- body structure and function
- burns, scalds and the effects of heat and cold
- cardiac arrest, drowning and asphyxia
- first aid kit
- fractures, dislocations and muscular injuries
- incident documentation
- medical care of rescued persons
- pharmacology

- radio medical advice
- sterilisation
- toxicological hazards onboard a vessel, including use of the Medical First Aid Guide (MFAG) for Use in Accidents Involving Dangerous Goods or its national equivalent
- transporting casualty or waiting for medical assistance options
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and current relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF033 Assist in an emergency response

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to assist in responding to an emergency or incident and to apply control procedures on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer – Engine/Deck
- Integrated Rating.

It involves responding to an emergency individually, or as a member of an emergency response team.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine/Deck or Integrated Rating and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### Pre-requisite Unit

Not applicable.

### Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Raise alarms

- 1.1 Emergency or incident is correctly identified in accordance with workplace procedures
- 1.2 Emergency response plan is accessed, reviewed and clarified with appropriate personnel and/or emergency response team members
- 1.3 Duties allocated to minimise risk are carried out in accordance with workplace procedures
- 1.4 Distress signals are activated according to manufacturer instructions and in accordance with workplace procedures

#### 2 Act in an emergency

- 2.1 Immediate action required is identified and taken according to emergency procedures
- 2.2 Safety and security procedures are complied with in all actions in accordance with workplace procedures
- 2.3 Personal protective equipment (PPE) is selected and used according to requirements of the situation, work health and safety (WHS)/occupational health and safety (WHS/OHS), and emergency procedures
- 2.4 Emergency equipment is selected and used appropriate to the emergency or incident in accordance with emergency procedures
- 2.5 Orders are acknowledged and followed
- 2.6 Allocated duties for emergency situations are performed in accordance with workplace procedures
- 2.7 Communications are maintained with others to facilitate emergency response process

#### 3 Assist others in distress

- 3.1 Distress signals from others are recognised and



- acknowledged
- 3.2** Nature of assistance required is established
  - 3.3** Capability to safely assist or relay emergency is determined taking into account own safety and physical proximity to emergency or incident
  - 3.4** Appropriate response to emergency or incident is prepared for and implemented
  - 3.5** Communications are maintained with others to facilitate emergency response process
- 4 Monitor environment and incident**
- 4.1** Factors that may create or increase risk of injury or damage are constantly assessed and reported to the Master
  - 4.2** Measures taken to relieve an emergency situation are monitored to ensure continued effectiveness
  - 4.3** Changes in conditions and behaviour are identified and reported
- 5 Assist with recovery from emergency or incident**
- 5.1** Evidence relating to cause of emergency or incident is preserved and recorded
  - 5.2** Appropriate assistance is provided according to emergency procedures
  - 5.3** Emergency equipment is returned to a state of readiness as soon as is reasonably possible
  - 5.4** Debriefings are attended and participated in as required

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF018 Assist in an emergency response.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF033 Assist in an emergency response

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely in an emergency or incident
- identifying, isolating and reporting faulty or non-operational emergency equipment and distress signals
- reading and following emergency procedures
- reading and interpreting basic instructions and standard operating procedures (SOPs) for emergencies
- recognising routine problems that may occur when operating emergency equipment and distress signals
- selecting and using appropriate emergency equipment and distress signals
- working effectively with team members when responding to an emergency or incident.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable sections of relevant maritime regulations dealing with emergency equipment and procedures
- distress signals, including:
  - dye markers
  - flags
  - hand signals
  - internal public address (PA) system
  - light signals
  - mobile phone
  - radio
  - reflective mirror
  - ship's whistle

- sound signal, including voice
- V-sheet
- duties and responsibilities of shipboard personnel during emergencies
- emergency duties and alarm signals applied and used on the vessel
- emergencies and incidents, including:
  - anchoring
  - capsize
  - contaminated fuel
  - engine breakdown or malfunction
  - fire
  - flooding
  - fouled propeller
  - fuel supply system failure
  - grounding
  - hypothermia
  - injuries/illness
  - person overboard
  - person retrieval from water
  - sinking
  - swamping
- functions and purpose of pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs)
- International Convention for the Safety of Life at Sea (SOLAS) and related regulations
- location and purpose of pyrotechnic expiry dates
- location of escape routes on the vessel
- location of firefighting equipment on the vessel
- procedures for:
  - activation of maritime emergency alarms
  - emergency response onboard a vessel
  - testing EPIRBs and SARTs
- range of emergency/safety equipment available on the vessel
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- role and responsibility of self and other crew members
- measures to relieve an emergency situation, including:
  - enhanced lookout activities
  - fire watch
  - measurement of water ingress
  - monitoring distress frequencies
  - monitoring patient recovery

- techniques for avoiding false distress alerts and actions to be taken in an accidental activation
- types of emergency incidents and measures taken to address them.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF034 Carry out fast rescue craft operations

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release.

### Application

This unit involves the skills and knowledge required to carry out fast rescue craft operations and includes maintaining fast rescue craft; preparing fast rescue craft and crew for operations; taking charge of a fast rescue craft during and after launch; responding to craft, equipment and crew emergencies or malfunctions; locating and retrieving casualties; and recovering and securing fast rescue craft after operations.

Work is performed relatively independently under broad operational requirements and requires the ability to take charge of the rescue boat and its crew, and to take responsibility for self and others in achieving the required outcomes.

Work involves applying established maritime survival principles and practices for launching and operating fast rescue craft and using related survival equipment. Implementing established survival strategies and procedures is also involved.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification in fast rescue craft operations and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Maintain fast rescue craft for operations**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Fast rescue craft design characteristics and fittings are identified

**1.2** Fast rescue craft capabilities are outlined

**1.3** Fast rescue craft and items of equipment are maintained in accordance with manufacturer specifications and operational requirements

#### **2 Prepare fast rescue craft and crew for operations**

**2.1** Fast rescue craft launching equipment design and operation are outlined

**2.2** Motion compensation system operation and associated fail safe devices are outlined

**2.3** Motion compensation system operation and associated fail safe devices are maintained in accordance with manufacturer instructions

**2.4** Pre-launch checks are conducted in accordance with manufacturer specifications and operational requirements

**2.5** Appropriate specialised emergency equipment is stowed onboard fast rescue craft

**2.6** Operational responsibilities and lines of communication are confirmed with relevant personnel

**2.7** Appropriate personal protective equipment (PPE) and foul weather gear is worn, as required

**2.8** Readiness of fast rescue craft, crew and equipment for

- launch is confirmed with relevant personnel
- 3 Take charge of fast rescue craft during and after launch**
- 3.1** Fast rescue craft is launched in a controlled and safe manner according to craft and launch system manufacturer specifications and instructions
  - 3.2** Hook release system is operated according to manufacturer specifications, and launch vessel and launch equipment are cleared safely
  - 3.3** Engine power is managed within manufacturer torque range in a way that ensures smooth and efficient movement
  - 3.4** Damage to engine and accessories is minimised
  - 3.5** Fast rescue craft is operated within safe operational limits of craft for the prevailing conditions
  - 3.6** Manoeuvres are performed with due regard to drive system manoeuvring characteristics
  - 3.7** Manoeuvres are performed in a way that ensures the safety of personnel onboard and in the water
  - 3.8** Navigational equipment is used according to manufacturer specifications
  - 3.9** Communication and signalling equipment is used according to manufacturer specifications and operational requirements
  - 3.10** Communications are established and maintained between craft, other vessels, rig and helicopters, as required
  - 3.11** Emergency equipment is used according to manufacturer specifications, supervisor instructions and emergency conditions
- 4 Respond to emergencies or malfunctions involving craft, equipment and crew**
- 4.1** Capsized fast rescue craft is righted using craft righting system, with due concern for crew safety and possible damage to craft and equipment
  - 4.2** Swimming is performed as required in standard PPE, foul weather gear or other specialised protective equipment
  - 4.3** Appropriate procedures for reboarding fast rescue craft



- and for wearing operational clothing and equipment are implemented
- 4.4** Emergency repairs and maintenance to fast rescue craft and equipment are performed according to manufacturer specifications and emergency conditions
- 5 Locate and retrieve casualties**
- 5.1** Appropriate search patterns are followed according to search coordinator instructions
- 5.2** Search patterns and rescue procedures are coordinated with other fast rescue craft where appropriate
- 5.3** Casualties are approached in a way that ensures casualty and crew safety
- 5.4** Fast rescue craft is positioned to ensure safe and quick retrieval of casualties
- 5.5** Casualty condition is determined and appropriate recovery procedures are implemented
- 5.6** Appropriate lifting procedures are adopted to ensure safe retrieval of casualty
- 5.7** Emergency first aid procedures are applied as appropriate
- 5.8** Master or medical officer is notified of casualty condition and medical instructions are followed as appropriate
- 5.9** Casualty is transferred to vessel, rig, helicopter or other place of safety with concern for types of injuries sustained
- 6 Recover fast rescue craft**
- 6.1** Stand-down procedures are followed
- 6.2** Fast rescue craft is recovered in a controlled and safe manner according to craft, hook release systems and recovery system manufacturer specifications and instructions
- 6.3** Fast rescue craft and equipment are secured onboard and prepared for future operations

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARF016 Carry out fast rescue craft operations.

## **Links**

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF034 Carry out fast rescue craft operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- calculating equipment to conduct pre-launch checks
- conducting pre-launch and ongoing craft and equipment checks in relation to:
  - ancillary equipment required onboard
  - batteries
  - bowsing line operability
  - communications equipment
  - compass
  - crane operability
  - drive units, including oil levels, clearance from obstruction, tilt levels and nozzle operation where applicable
  - electrical equipment
  - engine levels, including oil, water and v-belts
  - engine operability
  - fuel lines and pumps
  - hull integrity
  - launch capability
  - lifting sling or hook
  - lines of communication
  - operational procedures and requirements
  - personal protective equipment (PPE) availability and operability
  - search light
  - specialised emergency equipment
  - steering
  - switches
  - tow ropes
- effectively using PPE and foul weather gear, including:
  - eye protection, sunscreen, protective footwear, safety helmet and gloves

- immersion suits, inflatable life jacket, overalls and wet weather gear
- implementing appropriate casualty recovery procedures
- implementing emergency first aid procedures, including:
  - cardiopulmonary resuscitation (CPR)
  - care following fuel ingestion
  - care of burns, breaks and fractures
  - control of hypothermia, control of internal or external bleeding and shock
  - determining the extent of head and spine injury and appropriate care
  - expired air resuscitation
  - monitoring of vital signs
- implementing personal survival techniques required of seafarers as referenced in Section A VI/1 of the International Maritime Organization (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)
- launching and operating fast rescue craft and equipment by day or night in both normal and emergency situations under normal and adverse conditions of sea and weather while:
  - anchored or moored
  - hove to
  - under way
- maintaining and undertaking emergency repair of craft and auxiliary equipment
- operating fast rescue craft in prevailing sea and weather conditions, including:
  - broken or rough water
  - cross-winds, swell and/or tide
  - wind, swell and/or tide running against the craft
  - wind, swell and/or tide running with the craft
- reading and interpreting IMO safety symbols by night and day
- reading, interpreting and completing vessel logbooks
- swimming in PPE, foul weather gear or specialised protective equipment
- undertaking appropriate search patterns, including:
  - creeping line
  - expanding square
  - parallel track search using one, two or three craft
  - sector search
  - ship/aircraft coordinated pattern
- using launch and recovery equipment, including:
  - buoyant bailer, ladles, rescue buoyant quoits with 30 metre line, 15 metre painter, 50 metre buoyant towing line
  - compass, whistle, waterproof electric torch and waterproof search light
  - first aid kit
  - sea anchor
  - tool kit
- using signals and communications equipment, including:

- flair pack containing handheld orange smoke flairs, handheld red flairs and handheld rocket flairs
- radar reflector
- using specialised emergency equipment, including:
  - buoyant safety line
  - fire-extinguisher
  - foot pump
  - safety boat hook
  - safety buoyant clasp knife
  - thermal protective aids.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- craft righting systems, including:
  - inflatable bag supported by stern mounted roll bar that is accessible from outside the craft
  - rope mounted on the outside of the craft
- drive systems and manoeuvres, including:
  - inboard/outboard
  - jet
  - jet drives
  - rudder
  - single propeller
  - twin propeller
- effects of sea and weather conditions on fast rescue craft operations
- emergencies, including:
  - capsize
  - collision
  - crew or equipment overboard
  - electrical or mechanical failure
  - injury to crew
  - leaks or flooding
- equipment maintenance and emergency repair procedures
- fast rescue craft, including:
  - hull construction, including inflatable hulls, rigid hulls and semi-rigid hulls
  - hull flotation systems, including foam filled collar, inflatable collar, inflatable pontoons and sealed floor
- International Safety Management (ISM) Code for the Safe Operation of Ships and for Pollution Prevention, safety management system (SMS) plans, procedures, checklists and

instructions

- launch and recovery equipment, procedures and safety precautions
- launch systems and recovery systems, including:
  - deck crane or davit
  - four-point sling with fixed eye
  - rig crane
  - solid mounted frame using fixed hook assembly
- manoeuvring and engine characteristics for fast rescue craft, including handling strategies to overcome hazards caused by a head sea, a following sea and a beam sea
- manoeuvres, including:
  - approaching a casualty in the water
  - coming alongside and leaving a moving vessel
  - coming alongside or leaving a pontoon, jetty or other fixed object
  - following search patterns
  - high-speed approaches
  - pacing a vessel or helicopter
  - positioning craft for casualty pick-up
  - towing or being towed by other craft
  - transferring personnel or equipment to or from a stationary or moving point
  - turning through 180 degrees in a narrow channel requiring forward and reverse movement
- operational features and correct use of the motion compensation system in use
- outfitting of fast rescue craft, such as auxiliary equipment, specialised emergency equipment and communications equipment
- personal survival techniques required of all seafarers
- procedures and sequences of action for correctly operating and using fast rescue craft
- relevant sections of:
  - IMO STCW Code and Australian Maritime Safety Authority (AMSA) Marine Orders
  - International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
  - relevant AMSA publications, such as Survival at Sea: Training and Instruction Manual
  - relevant international and Australian Standards
  - relevant international, Australian and state/territory work health and safety (WHS)/occupational health and safety (OHS) legislation, regulations, codes of practice, policies and procedures, such as the International Convention for the Safety of Life at Sea (SOLAS)
- search patterns and environmental factors affecting their execution
- signals and communications protocols
- symptoms of hypothermia, its prevention and treatment and the related use of protective covers and garments, such as immersion suits and thermal protective aids
- types of fast rescue craft and relevant ancillary equipment, including construction, features and starting and operating characteristics.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, rescue/survival equipment, fast rescue craft, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF035 Contribute to fire prevention and firefighting (basic firefighting)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to prevent and control fires and to respond effectively to any fire emergency onboard a vessel.

It applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Integrated Rating
- Master of a commercial ship less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg VI/1 and Code Section A-VI/1 (2), Table A-VI/1-2.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal



as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

#### Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Chief Integrated Rating, Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Integrated Rating, Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

F - Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Actively prevent fire**

**1.1** Fire hazards (pre-conditions for fire) onboard a vessel are identified and rectified according to workplace procedures

**1.2** Onboard procedures for preventing fire are accessed and implemented

#### **2 Prepare response to fire**

**2.1** Location and class of fire is identified

**2.2** Alarm is raised

**2.3** Condition of firefighting equipment and systems in work area is monitored according to planned maintenance schedules

- 2.4 Realistic drills and musters are practised to ensure pre-incident readiness of response personnel
  - 2.5 Appropriate protective equipment (PPE), including self-contained breathing apparatus (SCBA) is made ready
  - 2.6 All available means to limit the spread of fire and smoke are employed
  - 2.7 Appropriate pumps and ancillary equipment are readied to support firefighting operations
  - 2.8 Extinguishing media/agent is selected according to the class/classes of fire
- 3 **Combat fire**
  - 3.1 Threats to life or health are identified within the emergency area
  - 3.2 Activities and tactics to combat the fire are selected so that the safety of the vessel and all onboard is not compromised
  - 3.3 Fire is located and access is gained in the safest and most timely manner
  - 3.4 Fire is attacked using the extinguishing media/agent and application techniques appropriate to the class and size of fire
  - 3.5 SCBA is donned and used correctly while undertaking fire extinguishment and rescue
  - 3.6 Effectiveness of combat activities and tactics is evaluated and altered, as required
  - 3.7 Communication is maintained to ensure safety and efficiency of firefighting operation
- 4 **Complete post-fire activities**
  - 4.1 Fire watch is maintained to prevent further outbreak
  - 4.2 Fire scene is preserved prior to investigation, as appropriate
  - 4.3 Information relating to the incident is provided as part of fire debriefing session

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF008 Prevent and fight fires on board a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF035 Contribute to fire prevention and firefighting (basic firefighting)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying extinguishing media to fire
- applying safe working practices at all times
- assisting in the setting up and use of foam making equipment
- correctly donning and using self-contained breathing apparatus (SCBA) while undertaking fire extinguishment and rescue in a heated smoke-filled compartment
- correctly donning and using SCBA while undertaking a drill in a smoke-filled compartment
- correctly using fireman's outfit
- entering and moving through a compartment filled with high expansion foam with the aid of a lifeline and without breathing apparatus
- extinguishing a fire with a fire blanket
- logging SCBA wearers correctly on a control board
- operating charged hose-lines and nozzles
- operating portable firefighting extinguishers
- performing after-use maintenance on SCBA
- working effectively with team members when responding to a fire.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken:
  - in an emergency
  - onboard ship
- alarms and signals during onboard emergencies
- firefighting activities, including:
  - boundary control
  - containing the spread of fire
  - evacuation of casualties from heated smoke-filled environments

- extinguishment
- overhaul/fire watch
- chemistry of fire, including the fire tetrahedron and its relationship to materials typically found on vessels
- classification of fire and applicable extinguishing agents
- correct use of lifesaving appliances and firefighting appliances
- different classes of fire, their characteristics and strategies and equipment needed for their extinguishment
- elements of fire and explosion (the fire triangle)
- extinguishing media, including firefighting foams
- fire and smoke detection and automatic alarm systems
- fire hazards types and sources of ignition
- firefighting tactics, techniques and procedures
- flammable materials, fire hazards and spread of fire
- hazards and threats to life or health during onboard firefighting operations
- lifeline signals
- location of firefighting appliances and emergency escape routes
- need for constant vigilance
- onboard Emergency Response Organisation and procedures
- portable fire-extinguishers
- precautions for and use of fixed installations
- principles and methods of fire extinguishment
- principles underlying the spread of fire
- purpose, function and location of fixed installations/systems
- role and responsibility of self and team members
- safe working practices
- shipboard firefighting organisation
- statutory requirements pertaining to lifesaving appliances and firefighting appliances
- types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, procedures for their use and problems that can occur
- ventilation procedures
- vessel construction as it relates to fire prevention/protection
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF036 Coordinate search and rescue operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to assist in planning and coordinating search and rescue (SAR) operations at sea.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Activate SAR support plan**

- 1.1** Distress and emergency signals, and communications are recognised and evaluated
- 1.2** Type of emergency, and level and nature of assistance required is assessed and its practicability is considered
- 1.3** Communications are established, where possible, with the parties in distress, other vessels and relevant authorities/agencies
- 1.4** SAR parameters are identified based on available information
- 1.5** SAR strategy is developed based on all available information and after consultation with others in the established chain of command
- 1.6** Required resources are identified according to the strategy
- 1.7** Strategy is evaluated and reviewed as determined by the input of all information and review of available resources
- 1.8** Organisation and command chain with other stations involved in the SAR is established in collaboration with SAR authorities

#### **2 Coordinate crew in SAR operations**

- 2.1** Crew members are informed of the scenario and strategy
- 2.2** Crew members are briefed on their roles and responsibilities and the way the crew will operate, and are deployed to the required stations
- 2.3** Tasks are allocated to crew members according to their roles in the crew and level of competence
- 2.4** Confirmation is gained from crew members of their understanding of the scenario, their role and the roles of other crew members
- 2.5** Performance of crew members is monitored and



- reviewed as the scenario unfolds, to determine ongoing requirements
- 2.6** Directions are given to others involved in the SAR operation according to agreed plan and established chain of command
  - 2.7** Manoeuvres of vessel are made according to agreed plan and with due regard to limits of the vessel and the environment
  - 2.8** Feedback from crew members and others involved in the SAR operation is received and relayed to others according to agreed plan and established chain of command
- 3 Liaise with internal and external authorities/agencies**
- 3.1** Radio communication is established and maintained with all parties involved in the SAR operations
  - 3.2** Briefings are provided to appropriate people according to operational procedures
  - 3.3** SAR progress is monitored and information is provided to internal and external authorities/agencies
  - 3.4** Issues are negotiated with internal and external authorities/agencies
  - 3.5** Resources are monitored and reviewed to meet changing requirements according to operational procedures
  - 3.6** SAR problems/potential problems are identified and solutions are developed in liaison with internal and external authorities/agencies
  - 3.7** Guidance and support are provided and sought from internal and external authorities/agencies according to requirements
- 4 Manage communications systems**
- 4.1** Communications systems are identified as appropriate to the situation and the strategy
  - 4.2** Communications systems are selected according to agreed plan and established chain of command
  - 4.3** Communications systems are managed to provide optimum capability
- 5 Conclude SAR support**
- 5.1** Duration of the SAR operation is determined by the

level of emergency

- 5.2** Instructions from internal and external authorities/agencies about the duration of the SAR are complied with
  - 5.3** All information is collected and preserved
  - 5.4** Debrief is conducted with relevant people involved
  - 5.5** Items for improvement are identified and action is taken to have improvements built into support plans
- 6 Manage SAR records**
- 6.1** Records of the SAR are made in the vessel log
  - 6.2** Other documentation is completed as required by regulatory requirements
  - 6.3** Reports are completed and disseminated according to organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF020 Coordinate search and rescue operations.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF036 Coordinate search and rescue operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying procedures from the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to appropriate level of detail in recordkeeping
- establishing radio communications and following correct communications procedures at all stages of search and rescue (SAR) operations
- identifying and solving problems that may arise during SAR operations, reporting problems and issues, and taking appropriate action based on available information
- liaising effectively with internal and external authorities/agencies
- modifying activities according to vessel contingencies, risk situations and environments
- monitoring and anticipating hazards and risks that may arise during SAR operations and taking appropriate action
- planning to coordinate SAR operations according to international guidelines and standards
- providing one of the following high-quality reports:
  - briefings to authorities
  - initial advice forms
  - management reports and briefings
  - messaging systems
- taking appropriate initiative for SAR operations
- using relevant publications, charts, meteorological data, particulars of vessels involved, radio communications equipment and other available facilities.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- chain of command and organisational requirements used in SAR operations
- external authorities/agencies

- IAMSAR Manual
- limits of the vessel and the environment, including:
  - fuel range
  - prevailing weather
  - propulsion
  - sea conditions
  - steering
  - vessel stability
- maritime communications techniques applicable to SAR operations
- principles involved in determining the duration and scope of a SAR
- responsibilities when participating in SAR operations
- SAR techniques and procedures
- sequence of actions to be taken after sighting or receiving a distress signal or call for assistance
- types of emergency signals
- types of distress and emergency, and response required in each case, including:
  - ditched aircraft
  - person/s in distress in sea
  - person/s in distress in survival craft
  - vessel/s in distress
- types of search patterns and their application
- typical SAR problems and appropriate actions and solutions
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace

procedures and operational manuals

- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including one or more of the following resources:
  - communications systems
  - electronic aids
  - equipment
  - facilities
  - fuel
  - instructions
  - maps/charts
  - people
  - vessels.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF037 Follow vessel security procedures (security awareness training)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to recognise and report security threats.

It applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Integrated Rating
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel unlimited
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions

- STCW Reg VI/6 (1) and Code Section A-VI/6 (4), Table A-VI/6-1.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Near Coastal or Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

**Blue Waters Qualifications:**

- This unit is one of the requirements to obtain AMSA certification as a Chief Integrated Rating, Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Integrated Rating, Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

**Pre-requisite Unit**

Not applicable.

**Competency Field**

F - Operational Quality and Safety

**Unit Sector**

Not applicable.

**Elements and Performance Criteria****ELEMENTS****PERFORMANCE CRITERIA**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Contribute to enhancing security through heightened awareness**

- |            |   |
|------------|---|
| <b>1.1</b> | Legislative and organisational requirements related to maintaining security of a vessel are identified and followed |
| <b>1.2</b> | Organisational security procedures are identified and followed  |
| <b>1.3</b> | Duty of care requirements are ascertained and complied with   |
| <b>1.4</b> | Need for, and methods of, maintaining security awareness and vigilance are identified                               |
| <b>1.5</b> | Own role and responsibilities are recognised  |
| <b>1.6</b> | Role of designated personnel for security response is ascertained   |

	<b>1.7</b>	Work health and safety (WHS)/occupational health and safety (OHS) requirements are recognised and complied with
<b>2</b>	<b>Recognise potential security threats</b>	
	<b>2.1</b>	Potential security threats relating to a vessel are identified in accordance with ships security plan
	<b>2.2</b>	Procedures for monitoring security of a vessel are recognised
	<b>2.3</b>	Factors with increased security risk are identified
	<b>2.4</b>	Types and purpose of security equipment are explained
	<b>2.5</b>	Emergency and evacuation procedures are identified and implemented
	<b>2.6</b>	Appropriate actions for maintaining security and safety of self, others and the vessel are identified and followed
<b>3</b>	<b>Comply with reporting processes</b>	
	<b>3.1</b>	Organisational procedures for reporting security risks and incidents are accessed and followed
	<b>3.2</b>	Chain of command of designated personnel is ascertained

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF003 Follow vessel security procedures.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARF037 Follow vessel security procedures (security awareness training)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying basic security legislative requirements applicable to a vessel
- applying procedures for monitoring security in a marine environment
- being aware of one's surroundings and changes to these surroundings (ship and port operations)
- identifying a range of security threats and risks relevant to a vessel
- observing chain of command and communication channels
- operating security equipment
- recognising potential security threats
- reporting identified security threats and risks in a marine environment and providing appropriate level of detail in these reports.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable work health and safety (WHS)/occupational health and safety (OHS) requirements
- appropriate actions for maintaining security and safety, including:
  - access control to the vessel
  - monitoring restricted areas
- chain of command communication
- duty of care requirements of self and others
- emergency preparedness, drills and exercises, including:
  - awareness of contingency plans, including plans for:
    - bomb threat
    - damage to and destruction of facility
    - hijacking
    - persons posing as a potential security threat
    - piracy and armed robbery

- security threat levels
- stowaways
- unidentified objects and explosives on ship
- security drills and exercises, including:
  - training, drill and exercise requirements under relevant conventions, codes and International Maritime Organization (IMO) circulars, including those relevant for anti-piracy and anti-armed robbery
- potential security threats, including elements related to piracy and armed robbery
- weapons, dangerous substances and devices and awareness of the damage they can cause
- general procedures for emergency, evacuation and first aid response
- maritime security policy, including:
  - applicable relevant government legislation and regulations
  - definitions
  - handling sensitive security-related information and communications
  - international conventions, codes and recommendations relevant to the marine environment and own work role, including the International Convention for the Safety of Life at Sea (SOLAS) Chapter X1-2 of SOLAS 74 as amended
- maritime security terms and definitions, including elements relating to piracy and armed robbery
- need for, and methods of, maintaining security awareness and vigilance
- reporting security risks to designated personnel in accordance with ship security procedures, including:
  - company security officer
  - port facility security officer
  - seafarers with designed security duties
  - ship security officer
- requirements when handling security-related information and security-related communications
- security levels and their impact on security measures, including procedures aboard ship and in port facilities
- security responsibilities, including:
  - company security officer
  - contracting governments
  - other personnel
  - port facility personnel with designated security duties
  - port facility security officer
  - seafarers with designated security duties
  - ship security officer
  - the company
  - the port facility
  - the ship

- security threats and patterns, including:
  - cargo theft
  - collateral damage
  - contraband smuggling
  - piracy and armed robbery
  - stowaways and refugees
  - terrorism
- ship and port operations and conditions, including:
  - characteristics of the intermodal nature of transportation and the interfaces between ships and other modes
- situation awareness
- ship security actions, including:
  - actions required by different security levels
  - security drills and exercises
- techniques used to circumvent security measures
- threat identification, recognition and response, including:
  - recognition and detection of weapons, dangerous substances and devices
  - recognition, on a non-discriminatory basis, of persons posing potential security risks
  - techniques used to circumvent security measures
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF038 Manage provision of medical care on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to provide medical care to people who are sick and/or injured while they remain onboard a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited)
- Master of a commercial vessel Unlimited
- Master of a commercial vessel less than 500 gross tonnage (GT)

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited), Engineer Class 2 (STCW Second Engineer Unlimited) or Master of a commercial vessel less than 500 gross tonnage (GT) or Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Manage vessel medical care**

- 1.1** Availability of adequate resources is monitored and maintained to support medical responses
- 1.2** Regular inspections of stock and equipment are conducted to ensure currency and operational readiness according to organisational requirements
- 1.3** Equipment and resources are stored and maintained according to regulatory requirements and manufacturer/supplier instructions
- 1.4** Risks on the vessel are reviewed and organisational policies and procedures related to the provision of medical care are validated
- 1.5** Planning is conducted for responses to major incidents onboard the vessel

#### **2 Take charge of a casualty onboard vessel**

- 2.1** Safety of injured or ill person, bystanders and self in an accident situation is assessed according to first aid procedures
- 2.2** Safety requirements associated with providing medical care and vessel environmental requirements are adhered to
- 2.3** Condition of injured or ill person is assessed according to first aid procedures
- 2.4** Position of injured or ill person is adjusted to optimise personal comfort for the medical condition or injury
- 2.5** Injured or ill person is reassured and supported during the wait for medical assistance
- 2.6** Nature of the illness/injury is explained to injured or ill person

- 2.7 Significance of changes in person's condition is promptly recognised and appropriate action is taken if there are signs of deterioration in injured or ill person
      - 2.8 Calm, confident and reassuring personal attitude is conveyed
- 3 Provide medical care**
  - 3.1 Medical emergencies and injuries are identified and assessed correctly, and appropriate action is taken to prevent further injury
  - 3.2 Symptoms and appropriate treatment are identified based on the concepts of clinical examination and medical history
  - 3.3 Medical emergencies and injuries are diagnosed and managed according to accepted medical practice, and relevant national and international guides
  - 3.4 Manufacturer recommendations and accepted medical practice with regard to dosage and application of drugs and medication are complied with
  - 3.5 Complete and effective methods to protect against infection and spread of diseases are used
  - 3.6 Resuscitation techniques are performed following safety procedures, if required
  - 3.7 Appropriate techniques for moving injured or ill person are used
  - 3.8 Resources and equipment are recovered and reprocessed, and waste is disposed of safely
- 4 Seek external assistance**
  - 4.1 Condition of injured or ill person is documented over time to assist with ongoing management
  - 4.2 Communication links are established with external medical services to ensure prompt control action is taken
  - 4.3 Clinical examination procedures are completed and instructions received are complied with
  - 4.4 Assessment of person's condition is relayed to external medical advisors
  - 4.5 Medical procedures are carried out under medical instruction using relevant communication equipment

and instructions received are complied with

- 4.6 Condition of injured or ill person is evaluated to determine transport requirements for additional medical care
- 4.7 Preparation for the evacuation of injured or ill person by emergency services is provided, if required, according to organisational procedures and welfare of person is maximised
- 4.8 Resources and equipment are recovered and reprocessed, and waste is disposed of safely

## 5 Manage first aid records

- 5.1 Documentation is completed in accordance with regulatory and organisational requirements and records maintained
- 5.2 Relevant documents are sent to appropriate bodies in accordance with regulatory and organisational requirements
- 5.3 Confidentiality of records and information is maintained in accordance with privacy principles and regulatory and organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF015 Manage provision of medical care on board a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>





# Assessment Requirements for MARF038 Manage provision of medical care on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- caring of casualty involving:
  - burns, scalds and frostbite
  - external and internal bleeding
  - fractures, dislocations and muscular injuries
  - head and spinal injuries
  - injuries of ear, nose, throat and eyes
  - wounds, wound healing and infection
- completing documents, including:
  - casualty history forms
  - first aid risk assessment
  - incident/injury reports
  - infection control records
  - management records
  - medical histories
  - medication registers
- dealing with a death at sea
- dressing and bandaging
- giving vaccinations or other injections
- managing acute abdominal conditions
- preparing for evacuation, including:
  - communicating with helicopter, vessel or ambulance conducting the evacuation
  - relevant medical and first aid supplies and resources
  - selecting relevant communication equipment
- providing:
  - dental care
  - gynaecological, pregnancy and childbirth support
  - medical care of rescued persons

- minor surgical treatment
- pain relief
- treating:
  - alcohol and drug abuse
  - sexually transmitted diseases
  - tropical and infectious diseases
- using disease prevention techniques, including disinfection, de-infestation and de-ratting
- using suturing and clamping techniques
- using company policies.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alcohol and drug abuse
- care of:
  - burns, scalds and frostbite
  - external and internal bleeding
  - fractures, dislocations and muscular injuries
  - head and spinal injuries
  - injuries of ear, nose, throat and eyes
  - wounds, wound healing and infection
- death at sea
- dental care
- disease prevention, including disinfection, de-infestation and de-ratting
- dressing and bandaging
- general principles of nursing
- gynaecology, pregnancy and childbirth
- hygiene
- international and national maritime medical regulations and publications, including:
  - International Medical Guide for Ships
  - International Code of Signals
  - Medical First Aid Guide (IMFAG)
- management of acute abdominal conditions
- medical care of rescued persons
- medical care of sick seafarers involving cooperation with port health authorities or out-patient wards in port
- medical conditions and emergencies
- minor surgical treatment
- nursing care
- pain relief

- quarantine regulations and required advices such as pratique, notification of disease on board
- radio medical advice
- sexually transmitted diseases
- techniques of suturing and clamping
- transportation of injured or ill persons including helicopter evacuation
- tropical and infectious diseases
- vaccinations
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF039 Manage safety and security of vessel, crew and passengers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to develop emergency and damage control plans, and to respond and manage navigational and emergency situations to maintain the safety and security of vessel crew and passengers.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited)
- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited), Engineer Class 2 (STCW Second Engineer Unlimited) or Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Develop emergency and damage control plans**

- 1.1** Potential emergencies and damage scenarios are identified
- 1.2** Plans of action are developed for responding to potential emergencies and damage scenarios according to regulatory and organisational requirements
- 1.3** Procedures, checklists and instructions for dealing with emergencies and damage scenarios are documented according to regulatory and organisational requirements
- 1.4** Resources are organised in readiness for potential implementation of emergency and damage control plans
- 1.5** Information on emergency and damage control plans is distributed and made available to crew
- 1.6** Appropriate instruction is organised for crew about their roles and responsibilities during various emergencies and damage control scenarios

#### **2 Develop security risk management plans**

- 2.1** Security risk management plans are prepared according to regulatory and organisational requirements
- 2.2** Explanatory information on the importance of security and the organisation's security objectives is contained in plans
- 2.3** Threat assessments undertaken, current exposure and current protective security arrangements are summarised in plans
- 2.4** Security strategies for implementing, monitoring and evaluating countermeasures are outlined in plans
- 2.5** Appropriate instruction is organised for crew about their roles and responsibilities in a security threat

- |          |  |            |   |
|----------|--|------------|---|
| <b>3</b> | <b>Maintain the operational condition of firefighting, lifesaving and safety systems</b> | <b>3.1</b> | Safety management system (SMS) processes and outcomes for maintaining the operational condition of firefighting, lifesaving and safety systems are identified |
|          |  | <b>3.2</b> | Procedures and supporting documentation for the routine maintenance of firefighting, lifesaving and safety systems are developed                              |
|          |  | <b>3.3</b> | Personnel roles and responsibilities are allocated and communicated   |
|          |  | <b>3.4</b> | Checks are conducted according to SMS requirements  |
|          |  | <b>3.5</b> | Non-compliances are identified and analysed   |
|          |  | <b>3.6</b> | Appropriate responses to non-compliances are initiated according to SMS requirements  |
|          |  | <b>3.7</b> | Outcomes are recorded and reported according to regulatory and organisational requirements  |
| <b>4</b> | <b>Organise fire and abandon vessel drills</b>   | <b>4.1</b> | Fire and abandon vessel drills are planned and conducted according to regulatory requirements and organisational procedures                                   |
|          |  | <b>4.2</b> | Instruction is provided to others on organisational procedures and the correct use of firefighting and lifesaving equipment                                   |
|          |  | <b>4.3</b> | Musters and drills are reviewed against objectives  |
|          |  | <b>4.4</b> | Records are completed according to regulatory requirements and organisational procedures  |
| <b>5</b> | <b>Manage navigational and other emergencies</b>   | <b>5.1</b> | Initial actions for an emergency are undertaken according to contingency plans, urgency of the situation and nature of the emergency                          |
|          |  | <b>5.2</b> | Onboard personnel are given information and instructions clearly and accurately   |
|          |  | <b>5.3</b> | Procedures are implemented to combat navigational and other emergencies to protect persons onboard vessel   |
|          |  | <b>5.4</b> | Communications are established with others to facilitate the emergency response process   |
|          |  | <b>5.5</b> | Assistance is coordinated and provided by appropriate   |

- personnel
- 5.6** Contact is maintained with others at all times to keep them briefed on the emergency response process
  - 5.7** Preparation for abandoning vessel is undertaken, as required
  - 5.8** Cessation of emergency is communicated to appropriate personnel
- 6 Maintain operational safety**
- 6.1** Environmental factors are continually monitored, assessed and reviewed to identify distinctive features and any change in characteristics that might indicate unusual or suspicious behaviour
  - 6.2** Personal safety checks are made on a systematic and routine basis according to organisational procedures
  - 6.3** Resources and equipment are organised in readiness for potential security risk situations
- 7 Respond to security risks**
- 7.1** Security risk situations are accurately identified and assessed for degree of risk to self, others and vessel
  - 7.2** Response to security risk is formulated and carried out according to security risk management plan
  - 7.3** Safety and security of self, others and vessel is maximised through response initiative
  - 7.4** Changing circumstances are monitored and responses are adjusted, as required, to maintain security
  - 7.5** Relevant documentation is completed and securely maintained according to confidentiality requirements and organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.



## Unit Mapping Information

This unit replaces and is equivalent to MARF021 Manage safety and security of vessel crew and passengers.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF039 Manage safety and security of vessel, crew and passengers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying procedures for monitoring fire detection and safety systems to ensure all alarms are detected promptly and acted upon according to established emergency procedures
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating using appropriate channels and communication codes and signals
- completing documentation and reporting requirements on matters related to the development of emergency and damage control plans
- determining response appropriate to security risk situations
- developing effective planning documents
- developing emergency procedures according to established plans for emergency situations to maximise of safety of persons onboard
- identifying and complying with security incident response procedures
- identifying security risk factors and conducting risk assessments
- instructing personnel on procedures to be taken during emergency situations onboard a vessel
- interpreting and applying security and safety practices and regulations
- maintaining the operational condition of lifesaving, firefighting and other safety systems
- managing the handling of emergency situations onboard a vessel
- minimising hazards and risks to the safety of self and others
- preparing contingency plans for response to emergencies
- providing the required amount of detail in reports
- reporting emergency situations onboard a vessel.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken when:
  - collision is imminent and after collision
  - emergencies arise in port

- grounding is imminent and after grounding
- impairment of the watertight integrity of the hull by any cause
- bomb threat and counter-terrorism procedures
- concept of reserve buoyancy and its relevance to damage control in vessels
- cybersecurity
- damage control assessment
- emergency steering, including auxiliary steering gear
- emergency towing arrangements and procedures
- environmental and exposure factors
- faults that can occur with fire detection, firefighting, lifesaving and safety equipment, and systems and appropriate remedial action and solutions
- fire and abandon vessel drills, including planning, scheduling and conducting drills according to regulatory requirements and organisational procedures
- functions and use of lifesaving appliances
- general principles of damage control and the manner in which the watertight integrity of the hull is maintained on a vessel
- importance of maintaining fire detection, firefighting, lifesaving and safety equipment and systems, and potential consequences if the equipment or systems are not operational during an emergency
- lifesaving appliance regulations (International Convention for the Safety of Life at Sea (SOLAS))
- methods and aids for fire prevention, detection and extinction
- methods for checking and replacing consumable materials in fire detection, firefighting, lifesaving and safety equipment and systems
- minimisation effects of malfunction of the ship's systems
- precautions when breaching a ship
- procedure for person overboard
- procedures to be followed and actions to be taken to protect and safeguard all persons onboard in emergencies and to limit further damage to the vessel
- procedures to be followed and actions to be taken when re-floating a grounded ship with or without assistance
- regulations related to security risk management
- regulatory requirements for emergency response plans
- regulatory requirements related to maintaining fire detection, firefighting, lifesaving and safety equipment and systems
- relevant Australian Maritime Safety Authority (AMSA) Marine Orders and Notices, International Ship and Port Facility Security Code (ISPS Code), and other relevant International Maritime Organization (IMO) conventions and codes
- procedures for rescue of persons from a vessel in distress or from a wreck
- routine maintenance of firefighting, lifesaving and safety systems are developed
- safety management system (SMS) plans, procedures, checklists and instructions
- ship construction, including damage control measures
- statutory requirements pertaining to damage control in vessels
- types of fire detection, firefighting, lifesaving and safety equipment and systems onboard

- vessels and the procedures for their use
- ways of controlling damage during a flooding emergency
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARF040 Manage ship security (Ship Security Officer)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to manage ship security.

This unit applies to people working in the maritime industry in the capacity of:

- Ship Security Officer.

### **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg VI/5 and Code Section A-VI/5 (1-4), Table A-VI/5.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Ship Security Officer and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Pre-requisite Unit**

Not applicable

### **Competency Field**

F – Operational Quality and Safety

### **Unit Sector**

Not applicable

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Supervise and maintain the implementation of ship security plan**

- 1.1** Ship security plan is implemented and modified in accordance with the International Ship and Port Facility Security (ISPS) Code and the International Convention for the Safety of Life at Sea (SOLAS), as amended
- 1.2** Legislative requirements for security are identified correctly
- 1.3** State of readiness is established and maintained in accordance with procedures to ensure changes in maritime security levels are responded to
- 1.4** Communication in the Ship Security Officer's area of responsibility for supervising and implementing ship security plan is clear, concise and understood
- 1.5** Implementation of ship security plan is coordinated with Company Security Officer and relevant Port Facility Security Officer

**2 Assess security risk, threat and vulnerability**

- 2.1** Risk assessment procedures and actions are implemented in accordance with the ISPS Code and SOLAS, as amended principles
- 2.2** State of readiness is established and maintained in accordance with procedures to ensure changes in maritime security levels are responded to
- 2.3** Communication in the Ship Security Officer's area of responsibility for assessing and maintaining threat and vulnerability is clear, concise and understood
- 2.4** Security incidents are reported to Company Security Officer in accordance with workplace procedures

**3 Undertake regular ship inspection**

- 3.1** Ship inspection procedures and actions are implemented in accordance with the ISPS Code and SOLAS, as amended
- 3.2** State of readiness is established and maintained in accordance with procedures to ensure changes in maritime security levels are responded to

- |          |            |  |
|----------|------------|--|
|          | <b>3.3</b> | Security inspections are conducted to ensure that appropriate security measures are maintained   |
|          | <b>3.4</b> | Communication in the Ship Security Officer's area of responsibility when undertaking inspections is clear, concise and understood  |
|          | <b>3.5</b> | Deficiencies and non-conformities are identified during inspections conducted as part of internal audits, periodic reviews and verifications of compliance and reported to the Company Security Officer and corrective actions are implemented |
| <b>4</b> |            | <b>Establish security equipment and systems are properly operated, tested and calibrated</b>   |
|          | <b>4.1</b> | Ship inspection procedures and actions are implemented in accordance with the ISPS Code and SOLAS, as amended  |
|          | <b>4.2</b> | Security equipment is operated, tested, calibrated and maintained in accordance with security ship procedures  |
| <b>5</b> |            | <b>Maintain security awareness and vigilance</b>   |
|          | <b>5.1</b> | Ship inspection procedures and actions are implemented in accordance with the ISPS Code and SOLAS, as amended  |
|          | <b>5.2</b> | Communication in the Ship Security Officer's area of responsibility when maintaining vigilance is clear, concise and understood  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **Assessment Requirements for MARF040 Manage ship security (Ship Security Officer)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying International Ship and Port Facility Security Code (ISPS) Code and International Convention for the Safety of Life at Sea (SOLAS)
- assessing security risk, threat and vulnerability
- communicating clearly and concisely within scope of responsibility
- conducting ship inspection
- establishing state of readiness using correct procedures
- identifying legislative requirements relevant to ship security plan
- implementing ship security plan
- implementing state of readiness using correct procedures
- operating, testing and calibrating security equipment and systems in accordance with relevant procedures
- reporting deficiencies and non-conformities to Company Security Officer.

### **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- controlling access to ship and restricted areas onboard a ship
- crowd management and control techniques
- enabling recognition, including:
  - non-discriminatory basis of persons posing potential security risks
  - weapons, dangerous substances, devices and awareness of the damage they can cause
- handling sensitive security-related information and security-related communications
- implementing and coordinating searches
- international maritime security policy and responsibilities of governments, companies and designated persons, including elements that relate to piracy and armed robbery
- maritime security levels and the consequential security measures and procedures aboard ship and in the port facility environment
- maritime security terms and definitions, including elements that relate to piracy and armed

robbery

- methods and effective monitoring of deck areas and areas surrounding the ship
- methods and procedures used to modify the ship security plan
- methods for physical searches and non-intrusive inspections
- methods for assessing the effectiveness of drills and exercise
- methods for controlling the embarkation, disembarkation and access while onboard of persons and their effects
- methods for enhancing security awareness and vigilance onboard a vessel
- methods for testing, calibrating and maintaining security systems and equipment, particularly whilst at sea
- procedures to be employed in implementing a ship security plan and reporting of security incidents, purpose of and the elements that make up a ship security plan, related procedures and maintenance of records, including piracy and armed robbery
- procedures, instructions and guidance on the use of ship security alert systems
- requirements and procedures for conducting internal audits, on-scene inspections, control and monitoring of security activities specified in ship security plan
- requirements and procedures for reporting to the Company Security Officer any deficiencies and non-conformities identified during internal audits, periodic reviews and security inspections
- requirements for designating and monitoring restricted areas
- risk assessment and assessment tools
- security aspects relating to the handling of cargo and ship's stores with other shipboard personnel and relevant port facility Security Officers
- security assessment documentation and Declaration of Security
- security-related contingency plans and the procedures for responding to security threats and breaches of security, including:
  - elements that relate to piracy and armed robbery
  - provisions for maintaining critical operations of the ship/port interface
- security training and requirements
- techniques used to circumvent security measures, including those used by pirates and armed robbers
- training, drill and exercise requirements under relevant conventions, codes and International Maritime Organization (IMO) circulars, including those relevant to anti-piracy and anti-armed robbery
- various types of security equipment and systems and their limitations, including those that could be used in case of attacks by pirates and armed robbers.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the

time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARF041 Observe personal safety and social responsibility (PSSR)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 6.0.

### **Application**

This unit involves the skills and knowledge required to contribute to the safety management system (SMS) processes where there is responsibility for own work outputs.

It applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Integrated Rating
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

### **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions

- STCW Reg VI/1 and Code Section A-VI/1 (2), Table A-VI/1-4.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA)

certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal as defined in Marine Order 505 (Certificates of competency – National law) 2013.

#### Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Chief Integrated Rating, Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Integrated Rating, Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

### Pre-requisite Unit

Not applicable.

### Competency Field

F - Operational Quality and Safety

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan and conduct work safely**

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Individual rights and responsibilities onboard a vessel are interpreted and fulfilled
- 1.2** Work is planned in accordance with work health and safety (WHS)/occupational health and safety (OHS) legislation and SMS requirements
- 1.3** Work is carried out according to established performance standards
- 1.4** Hazards are identified as part of work planning and work processes

- |          |   |  |
|----------|---|--|
|          | <b>1.5</b>  | Identified hazards are addressed prior to starting work  |
|          | <b>1.6</b>  | Inadequacies in control measures are reported according to the SMS   |
|          | <b>1.7</b>  | Incidents and injuries are reported according to organisational procedures   |
|          | <b>1.8</b>  | WHS/OHS housekeeping is undertaken in own work area  |
| <b>2</b> | <b>Contribute to WHS/OHS participation processes</b>                                    |  |
|          | <b>2.1</b>  | WHS/OHS representatives and committees are supported to undertake their roles and responsibilities   |
|          | <b>2.2</b>  | WHS/OHS issues are raised according to organisational procedures   |
|          | <b>2.3</b>  | Contributions to WHS/OHS meetings, vessel inspections or other consultative activities are provided in a constructive manner to improve safety |
| <b>3</b> | <b>Contribute to hazard identification, risk assessment and risk control activities</b> |  |
|          | <b>3.1</b>  | Vessel is checked for hazards using itemised checklists according to the SMS   |
|          | <b>3.2</b>  | Identified hazards and inadequacies in risk controls are reported according to the SMS   |
|          | <b>3.3</b>  | Contributions to risk assessments are made   |
|          | <b>3.4</b>  | Input is provided to development and implementation of control measures, with reference to the hierarchy of control                            |
|          | <b>3.5</b>  | Where relevant, procedures and precautions for entry into pump room, fuel tanks or other confined spaces on a vessel are correctly followed    |
|          | <b>3.6</b>  | Fatigue management methods are used to ensure fitness for duties   |
| <b>4</b> | <b>Contribute to effective communication and human relationships onboard ship</b>       |  |
|          | <b>4.1</b>  | Communication with individuals onboard vessel is clear and effective at all times  |
|          | <b>4.2</b>  | Standards of work and behaviour are observed at all times in accordance with workplace procedures  |

- |  |            |  |
|--|------------|--|
| <b>5 Participate in controlling WHS/OHS emergency situations</b> | <b>5.1</b> | Scale of the emergency situation is correctly recognised   |
|  | <b>5.2</b> | Prompt, accurate and clear information is given on raising alarm   |
|  | <b>5.3</b> | Initial action is taken to control/confine emergency according to organisational procedures, taking account of the nature and scope of the emergency |
|  | <b>5.4</b> | Emergency response procedures are implemented  |
| <b>6 Complete WHS/OHS records</b>                                | <b>6.1</b> | WHS/OHS records for vessel are correctly completed   |
|  | <b>6.2</b> | Legal requirements for the maintenance of records of occupational injury and disease are followed  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF006 Observe personal safety and social responsibility.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF041 Observe personal safety and social responsibility (PSSR)

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying the hierarchy of risk control, including the preferred order of risk control measures from most to least preferred
- communicating with crew and others, as appropriate, about work health and safety (WHS)/occupational health and safety (OHS) matters
- conforming to established emergency response procedures for initial and follow-up action
- identifying and checking hazards relating to personal safety
- identifying WHS/OHS training needs of crew
- interpreting and following information on WHS/OHS legislation, safety management system (SMS), organisational procedures, written job instructions, specifications, standard operating procedures (SOPs), charts, lists, and other applicable reference documents
- investigating incidents according to organisational procedures
- keeping accurate records/minutes of discussions with consultation forums on WHS/OHS matters
- keeping records for monitoring the effectiveness of practices and procedures with respect to the safety of the vessel
- maintaining incident records according to standard workplace procedures
- obtaining results of safety audits according to organisational procedures
- participating in consultation forums
- participating in safety drills
- reporting and documenting the processes and outcomes of WHS/OHS requirements
- scheduling meetings with the relevant consultation forums to discuss WHS/OHS matters.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable Commonwealth, state or territory WHS/OHS legislation, regulations, codes of practice and standards
- basic awareness of the impact of mental health on crew health and wellbeing
- dangers of drug and alcohol abuse



- difference between hazards (something or a source or situation with the potential to harm life or health) and risks (chance of something occurring that will result in injury or damage)
- emergency situations, contingency plans and procedures for responding to emergencies situations, including:
  - collision
  - fire
  - foundering
  - ingress of water into the ship, oil or chemical spill
  - person overboard
- fatigue management and the importance of adequate rest, including the effects of:
  - changes to schedules
  - environmental stressors in and outside of the ship
  - physical stressors
  - schedules and the circadian rhythm on fatigue
  - sleep
- fundamental teamworking principles and practices, including conflict resolution
- handling and stowage of dangerous, hazardous and harmful substances and liquids
- hazard identification procedures, including vessel inspections and review of WHS/OHS data
- hierarchy of risk control measures and its application
- importance of maintaining good human and working relationships aboard ships
- international measures for accident prevention at sea, including the International Labour Organization (ILO) conventions
- location and use of firefighting equipment
- location of escape routes
- legal rights and responsibilities of management, crew and others, as appropriate
- nature of common hazards, including chemicals, bodily fluids, noise, manual handling, work postures, underfoot hazards and moving parts of machinery
- organisation-specific information, including:
  - designated person for raising WHS/OHS issues, including health and wellbeing
  - hazards of the particular work environment
  - organisation and work procedures particularly those related to performance of own work
  - specific hazards and risk control, including:
    - reporting of hazards
    - incidents and injuries
    - WHS/OHS issue resolution and consultation
    - use of personal protective equipment (PPE) and emergency response
- PPE requirements, including correct use, storage and maintenance
- potential emergency situations, alarms and signals, and required response
- principles of basic risk assessment
- principles of, and barriers to, effective communications between individuals and teams onboard a ship

- purpose of safety data sheets (SDS)/material safety data sheets (MSDS)
- roles and responsibilities of:
  - employees, supervisors and managers in the organisation
  - safety representatives and committees
- safety signs and their meanings, including signs for:
  - dangerous goods class signs
  - emergency equipment
  - PPE
- social responsibilities, employment conditions, individual rights and individual responsibilities
- sources of WHS/OHS information
- specific hazards, such as sharps and radiation
- standard emergency signals, alarms and required responses, including:
  - drills
  - muster lists
  - muster stations
- precautions to prevent pollution of the marine environment, including fundamental knowledge of:
  - complexity and diversity of marine environment
  - effects of operational and accidental pollution
  - environmental protection procedures
  - impact of shipping on the marine environment
- value of training and drills
- WHS/OHS records, including:
  - accident reports
  - hazard reports
  - incident reports
  - injury reports.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or

may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF042 Operate emergency equipment and apply emergency procedures**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to participate in monitoring emergency prevention and applying control procedures in an emergency onboard a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer – Engine/Deck on a range of vessels
- Integrated Rating.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine/Deck or Integrated Rating on a range of vessels and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Apply emergency procedures**

- 1.1** Emergencies are correctly identified in accordance with workplace procedures
- 1.2** In the event of an emergency or abnormal situation, workplace procedures for initial action are confirmed with the officer of the watch
- 1.3** Emergency and distress alerting systems are activated according to manufacturer instructions and workplace procedures
- 1.4** False distress alerts are avoided and appropriate action is taken in an accidental activation of a distress alert according to workplace procedures
- 1.5** Orders are acknowledged and followed
- 1.6** Allocated duties for emergency situations are performed according to workplace procedures
- 1.7** Communications are maintained with others to facilitate the emergency response process

#### **2 Maintain integrity of emergency and distress alerting systems**

- 2.1** Emergency and distress alerting systems maintenance requirements are specified and managed
- 2.2** Systems maintenance is checked for compliance
- 2.3** Systems are assessed for useability and accessibility, and are reported according to workplace procedures
- 2.4** Procedures are followed to correct systems defects and deficiencies

#### **3 Report and record emergency and distress alerting systems faults**

- 3.1** Schedule for verifying and reporting faults is developed and implemented

- 3.2 Details and nature of faults are recorded and rectified according to manufacturer instructions and workplace procedures
- 3.3 Reports on faults are provided and recommendations are made for improvements according to workplace procedures
- 3.4 Frequency of occurrence of faults is monitored and reported according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF019 Operate emergency equipment and apply emergency procedures.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF042 Operate emergency equipment and apply emergency procedures**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely in an emergency or abnormal situation
- identifying, isolating and reporting faulty or non-operational emergency and distress alerting systems
- reading and following emergency procedures
- reading and interpreting basic instructions and standard operating procedures (SOPs) for emergency and distress alerting systems
- recognising routine problems that may occur when operating emergency and distress alerting systems
- selecting and using emergency and distress alerting systems, including:
  - internal public address (PA) system
  - pyrotechnic distress signals
  - satellite emergency position indicating radio beacons (EPIRBs), including float-free EPIRB
  - search and rescue transponders (SARTs)
  - ship's whistle.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable sections of relevant maritime regulations dealing with emergency equipment and procedures
- duties and responsibilities of shipboard personnel during emergencies
- emergency duties and alarm signals commonly used on a vessel
- emergencies, including:
  - any situation leading to abandonment of a vessel
  - responding to distress alerts from other vessels

- escape routes from machinery spaces on a vessel
- functions and purpose of pyrotechnic distress signals, satellite EPIRBs and SARTs
- identification of pyrotechnic expiry dates
- International Convention for the Safety of Life at Sea (SOLAS) and related regulations
- procedures for:
  - activating maritime emergency alarms
  - emergency response onboard a vessel
  - testing EPIRBs and SARTs
- relevant WHS/OHS requirements and work practices
- systems defects and deficiencies, including:
  - EPIRB function test failure, improper housing and securing
  - out-of-date pyrotechnics distress signals
  - SART not operating
- techniques for avoiding false distress alerts and action to be taken in an accidental activation.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARF043 Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to comply with accepted safety practices and standards in responding to abandon ship and survival situations.

This unit applies to crew members required to assist in the operation of survival craft and rescue boats other than fast rescue boats on a range of vessels.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Integrated Rating
- Master of a commercial vessel less than less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

### **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg VI/2 (1) and Code Section A-VI/2 (1-4), Table A-VI/2-1.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organisation Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Chief Integrated Rating, Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Integrated Rating, Master of a commercial vessel of less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck. and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Launch survival craft and rescue boats**

- 1.1** Preparations for the launch of the survival craft or rescue boat are made according to manufacturer instructions and organisational procedures
- 1.2** Launch strategy is adopted appropriate to the prevailing circumstances and conditions
- 1.3** Launching equipment is operated according to manufacturer instructions and organisational procedures
- 1.4** Survival craft or rescue boat is launched smoothly according to accepted safety practices and standards

#### **2 Operate survival craft and rescue boats**

- 2.1** Pre-start checks are conducted on the engine
- 2.2** Engine is started according to manufacturer instructions

- and organisational procedures
- 2.3 Orders are given for survivors to board the survival craft
- 2.4 Survival craft is cleared of the vessel and operated according to manufacturer instructions and organisational procedures
- 2.5 Survival craft is manoeuvred appropriately for the prevailing circumstances and conditions
- 3 **Operate lifesaving and survival equipment**
  - 3.1 Location and accessibility of all lifesaving and survival equipment is established
  - 3.2 Survival equipment is checked and operated according to manufacturer instructions and organisational procedures
  - 3.3 Lifesaving clothing is correctly donned and used according to manufacturer instructions and organisational procedures
  - 3.4 Strategies are implemented to counter threats to survival according to accepted survival practice
- 4 **Recover survival craft**
  - 4.1 Persons are disembarked from the survival craft according to organisational procedures
  - 4.2 Survival craft is recovered according to manufacturer instructions and organisational procedures
  - 4.3 Survival craft and equipment are checked for signs of damage and faulty equipment
  - 4.4 Identified faulty equipment or damage is reported according to organisational procedures
- 5 **Organise abandon vessel musters and drills**
  - 5.1 Abandon vessel musters and drills are arranged according to regulatory requirements and organisational procedures
  - 5.2 Instruction is provided to others on organisational procedures and the correct use of lifesaving equipment
  - 5.3 Musters and drills are reviewed against objectives
  - 5.4 Reporting obligations are completed according to regulatory requirements and organisational procedures
  - 5.5 Risk control processes are implemented

- 6 Assume responsibility for survival of crew and passengers**
- 6.1** Survivors are checked for signs of hypothermia or other injuries and first aid is applied, where necessary
  - 6.2** Water and food are rationed
  - 6.3** Lookout for vessels and aircraft in the vicinity is maintained and distress signals are released on sighting
  - 6.4** Instructions given by rescue personnel are followed to safely access rescue craft
  - 6.5** Persons are disembarked from survival craft or rescue boat according to organisational procedures
  - 6.6** Survival craft or rescue boat is recovered and checked for signs of damage

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF007 Operate survival craft and other lifesaving appliances.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF043 Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- acting appropriately in the prevailing circumstances and conditions in response to abandon ship and survival situations according to accepted safety practices and standards
- communicating effectively with others, as required, when operating survival craft and ancillary survival equipment
- conducting inspections of other survival equipment at intervals determined by the safety management system (SMS)
- conducting tests and pre-start checks of equipment at intervals determined by the SMS
- giving correct commands for launching and boarding survival craft and clearing the ship
- interpreting and applying International Convention for the Safety of Life at Sea (SOLAS) practices and regulations
- launching and operating various types of survival craft
- operating off-load and on-load release devices safely
- organising abandon vessel drills
- reading and interpreting instructions relevant to the safe operation of lifesaving appliances onboard a vessel
- recognising and interpreting muster signals, and taking action that is appropriate to emergency and complies with established procedures
- recovering survival craft and rescue boats and resetting release devices
- rowing and steering a survival craft and rescue boat
- selecting and using appropriate lifesaving appliances and communications equipment
- using a compass
- using portable radio equipment, pyrotechnics and other signalling equipment
- using survival craft equipment, including rigging devices to aid location.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken when aboard a survival craft, including:
  - apportionment of food and water
  - initial actions
  - routines for survival
  - use of equipment
- actions to be taken to maximise detectability and location of survival craft
- construction and outfit of survival craft and rescue boats
- dangers associated with the use of on-load release devices
- drills in launching and recovering rescue boats
- drills in launching life rafts, including:
  - boarding a life raft from the water
  - davit-launched life rafts
  - throw-overboard life rafts
- emergency muster abandon vessel signals and public address (PA) system
- evacuation and recovery of survival craft and rescue boats, including:
  - clearing the ships side and actions to be taken
  - launching
  - launching survival craft and rescue boats in rough sea
  - marshalling life rafts and rescuing survivors from the sea
  - recovery of rescue boats in rough sea
  - recovery of survival craft and rescue boats
- first aid and management of injured persons, including:
  - first aid kit
  - resuscitation
- handling of survival craft and rescue boats in rough weather, including beaching
- helicopter assistance and pick-up, including:
  - communicating with helicopter
  - evacuating from ship and survival craft
- International Code of Signals (ICS), purpose and meaning of signals
- International Maritime Organization (IMO) safety symbols
- International Safety Management (ISM) Code, SMS plans, procedures, checklists and instructions
- launching arrangements, including:
  - boat davits
  - float-free arrangements
  - free-fall
  - life raft davits
  - marine evacuation systems
  - rescue boat davits
- lifeboat engine and accessories

- maintenance procedures for survival craft and rescue boats
- manoeuvring characteristics of survival craft and rescue boats
- Maritime Labour Convention (MLC) amendments 2014
- muster list
- operation of survival craft and rescue boats, their launching appliances and arrangements and their equipment
- principles concerning survival, including:
  - actions to be taken when aboard a survival craft
  - actions to be taken when called to survival craft stations
  - actions to be taken when in the water
  - actions to be taken when required to abandon ship
  - main dangers to survivors
  - training, drills and operational readiness
- procedures and sequences for launching, carrying out pre-start engine checks and operating survival craft and rescue boats in a variety of sea and weather conditions
- procedures for correctly operating and using lifesaving appliances and personal safety equipment on vessels and survival craft
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation
- rescue boat outboard engine
- SOLAS regulations
- strategies, including:
  - beaching survival craft
  - deploying exposure cover on an open lifeboat
  - handling survival craft in rough weather
  - maximising detectability of survival craft
  - rationing food and water
  - using rescue boat to marshal life rafts
  - using rescue boat to retrieve survivors in the sea
- symptoms of hypothermia, its prevention and treatment
- threats to survival on abandonment of a vessel and appropriate strategies for countering these threats
- typical manoeuvring and engine characteristics for survival craft
- types of emergency situations which may occur and precautions, including:
  - adverse reaction of dangerous goods and hazardous bulk materials
  - collision
  - explosion
  - fire
  - foundering
  - shifting of cargo
  - stranding

- types of emergencies that require launching and operation of rescue boats, including:
  - abandon ship
  - man overboard
  - marshalling of survival craft
  - towing and rescue of survival craft from a shipwreck
- types of survival craft, including:
  - lifeboats
  - life rafts
  - rescue boats
- ways of maximising detectability and location of survival craft using radio lifesaving appliances, pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs).

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARF044 Prevent, control and fight fires on board a vessel (advanced firefighting)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to manage firefighting and fire prevention activities onboard a vessel (advanced firefighting).

It applies to deck and engine officers who are required to manage firefighting activities onboard a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

### **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg VI/3 and Code Section A-VI/3 (1-4), Table A-VI/3.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organisation Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal

as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

#### Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Chief Integrated Rating, Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Manage fire prevention activities**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Hazards, including dangerous goods onboard a vessel, are identified and appropriate action is implemented as determined by industry standard documentation
- 1.2** Legislative and company requirements and current industry standards relating to the maintenance and operation of fire detection, firefighting equipment and systems onboard a vessel are met and complied with
- 1.3** Inductions or other educational activities are organised to ensure awareness of causal factors of onboard fires, prevention methods and standard operating procedures (SOPs) when fire alarms are activated

- 2 Plan for fire emergencies**
- 2.1** Vessel fire control plan is consulted to review and develop appropriate response to any fire
  - 2.2** Contingencies are anticipated, planned for and practised
  - 2.3** Evacuations are prepared for and practised according to regulatory requirements
  - 2.4** Roles/functions of command and firefighting team members, as related to fire prevention and suppression, are established and reviewed according to regulatory and organisational requirements
  - 2.5** Firefighting training exercises are developed and implemented according to regulatory and organisational requirements
  - 2.6** Training exercises are prepared, practised and debriefed according to regulatory and organisational requirements, to ensure readiness for any fire emergency
- 3 Coordinate tactical firefighting activities in response to a fire emergency**
- 3.1** Gathering of full and accurate information on the nature and extent of the fire by the command team is overseen
  - 3.2** Order of priority and sequence of actions appropriate to the requirements of the incident is determined and communicated to the responding crew clearly and accurately
  - 3.3** Evacuation of personnel, if appropriate, is conducted according to regulatory requirements
  - 3.4** Search and rescue (SAR) operations are conducted using established marine firefighting best practice
  - 3.5** Controlled ventilation techniques are correctly applied during fire suppression and rescue operations
  - 3.6** Treatment of injured personnel is conducted in a timely manner and according to current best casualty management practice
  - 3.7** Operational tactics are monitored for their effectiveness and adjusted, as required, to ensure best outcomes
  - 3.8** Operational tactics are monitored to ensure vessel stability and dewatering integrity is maintained

- |          |                                    |  |
|----------|------------------------------------|--|
|          | <b>3.9</b>                         | All actions of shore-side firefighters involved in an onboard fire emergency while in port is coordinated and monitored effectively in accordance with ship and port regulations |
| <b>4</b> | <b>Manage post-fire activities</b> |  |
|          | <b>4.1</b>                         | Fire watch is coordinated to prevent re-ignition   |
|          | <b>4.2</b>                         | Fire affected area is secured prior to investigation according to regulatory and organisational requirements   |
|          | <b>4.3</b>                         | Equipment is maintained to operational condition, as applicable  |
|          | <b>4.4</b>                         | Cause of the fire is investigated and determined according to regulatory and organisational requirements   |
|          | <b>4.5</b>                         | Incident reports are completed according to regulatory and organisational requirements   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF011 Manage firefighting and fire prevention activities on board a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF044 Prevent, control and fight fires on board a vessel (advanced firefighting)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying equipment restoration techniques, including:
  - maintaining self-contained breathing apparatus (SCBA) to industry standards
  - cleaning
  - recharging extinguishers according to Australian Standards
  - re-stowing
  - servicing
- communicating effectively with crew and passengers during fire emergencies
- determining the type and extent of the fire and initiating appropriate and timely actions
- ensuring order of priority, timing and sequence of actions are appropriate to the overall requirements of the incident and minimising damage and potential damage to the vessel, injuries to personnel, and impairment of the operational effectiveness of the vessel
- evaluating effectiveness of firefighting activities and tactics during fire emergencies
- initiating appropriate action and providing solutions to problems with firefighting equipment and operations during fire emergencies
- liaising with shore-based emergency organisations during fire emergencies
- managing fire prevention and suppression activities on a vessel
- managing onboard firefighting training for shipboard firefighting teams
- managing shipboard firefighting teams and their tactical activities during fire emergencies
- managing the maintenance of firefighting equipment and systems
- providing leadership to shipboard personnel and passengers during fire emergencies
- recognising and interpreting fire alarms and initiating appropriate response
- safeguarding personal safety during fire control activities at all times
- taking actions to control fires based on a full and accurate assessment of the incident, using all available sources of information
- transmitting information promptly, accurately, completely and clearly.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- assessment of cause of incidents involving fire
- chemistry of fire and its relationship to combustible materials typically found on vessels
- composition and allocation of personnel to fire parties
- control of fuel and electrical systems
- different classes of fire and the most appropriate extinguishing agents, application equipment and methods of extinguishment for each
- dewatering
- emergency sound signals
- fire control plan, including:
  - applications of the Code of Safe Practice for Solid Bulk Cargo (BC) Code
  - applications of the International Maritime Dangerous Goods (IMDG) Code
  - communication strategy
  - contingency plans for fires involving hazardous materials
  - evacuation plan
  - handling and treatment of injured personnel
  - hazard control strategies
  - liaison with shore-based agencies (such as environmental protection agencies, fire services, medical teams, port authorities) in port and at sea
  - maritime communication techniques applicable to the management of fire prevention and firefighting activities onboard a vessel
  - preparation of contingency plans
  - search and rescue (SAR) operations
  - strategies for shipboard firefighting management, including:
    - control of fires in various parts of the ship
    - oil, chemical and gas tankers
    - ships carrying dangerous goods
    - tactical methods for fighting fires involving hazardous materials
    - tactical plan of action
- fire precautions and hazards associated with the storage and handling of materials (paints etc.)
- fire-detection systems, including:
  - fixed fire-extinguishing systems
  - portable and mobile fire-extinguishing systems, including:
    - appliances
    - pumps
    - rescue, salvage, life-support, personal protective and communication equipment
- firefighting involving dangerous goods
- firefighting procedures at sea and in port, with particular emphasis on organisation, tactics and command
- firefighting process hazards, including dry distillation, chemical reactions, boiler uptake fires

- and exhaust fires
- hazards, including:
  - contents of adjacent spaces
  - dangerous goods
  - electricity and wiring systems
  - fires in water-tube boilers
  - flammable or explosive atmospheres
  - oxygen deficiency or enrichment
  - physical obstructions
  - poor visibility
  - restricted access
  - toxic liquids, solids, gases, vapours and dusts
- importance of communication and coordination during firefighting operations
- implications of shipboard firefighting management in port and the procedures that must be followed to comply with port and state/territory regulations
- importance of maintenance of fire detection and firefighting equipment onboard vessels, including:
  - communication equipment
  - complying with statutory and classification survey requirements
  - fire and smoke alarms
  - fire and smoke detection equipment
  - fire main, hydrants, hoses, nozzles and pumps, including emergency fire pump
  - firefighter's outfits and other personal protective equipment (PPE)
  - fixed fire-extinguishing equipment
  - portable and mobile fire-extinguishing equipment, including appliances
  - rescue and life support equipment
  - salvage equipment
- life and health risks associated with fires on vessels
- management and control of injured persons
- methods for checking and replacing consumable materials in fire detection, firefighting equipment and systems onboard vessels
- muster list contents and location
- principle of operation of fixed fire suppression systems
- principles underlying the spread of fire and its extinguishment
- problems likely to be encountered during the management of a shipboard fire and related tactics and solutions that can be applied, including:
  - change in fire behaviour or extent
  - equipment failure or unavailability
  - unexpected personnel involvement
- procedure for safe activation of fixed firefighting systems
- procedures for coordination of shore-based firefighters

- relevant regulations, codes of practice, policies and procedures relating to the maintenance of fire detection, firefighting equipment and systems onboard vessels
- requirements for onboard firefighting training
- requirements for statutory and classification surveys
- safety data sheets (SDS)/material safety data sheets (MSDS) relevant to the various products and substances carried on vessels
- ship general arrangement plan
- ship stability data
- strategies and tactics for control of fires in various parts of the vessel
- strategies for rapid briefing of shore-based emergency organisations using the vessel fire control plan
- the fire control plan contents and location
- types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, the procedures for their use and remediating problems that can occur during use
- typical actions of passengers in a shipboard fire
- use of water for fire-extinguishing, the effect on ship stability, precautions and corrective procedures
- ventilation control, including smoke extraction
- work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials, personal protective equipment (PPE), fire detection equipment, firefighting equipment and systems used in industry, including:
  - fire protective clothing
  - hoses and nozzles



- portable firefighting equipment
- pumps
- SCBA.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF045 Provide leadership and managerial capability**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to maintain effective maritime resource management procedures in accordance with Australian and international regulations and guidelines.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Establish effective working systems and procedures**

- 1.1** Principles of resource management are interpreted to establish the functions and responsibilities of the crew
- 1.2** Principles of effective resource management are interpreted to establish arrangements and procedures
- 1.3** Operations are planned, and arrangements and procedures applied effectively in accordance with regulatory requirements and company procedures
- 1.4** Working systems are documented and communicated to relevant personnel
- 1.5** Schedules are developed with due consideration to crew's experience

#### **2 Assign resources and allocate duties**

- 2.1** Current competency of crew is evaluated and effective measures are taken to ensure personnel have the required level of competency
- 2.2** Clear and unambiguous roles and responsibilities of crew are determined
- 2.3** Crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned
- 2.4** Resources are allocated effectively and assigned as needed in correct priority to perform necessary tasks to obtain and maintain situational awareness

#### **3 Manage personnel effectively**

- 3.1** Crew are informed of current and predicted vessel and operational status and external environment
- 3.2** Operations are undertaken in accordance with established functions and responsibilities

- 3.3 Effective communication is maintained with crew on matters relevant to safety and integrity of vessel
- 3.4 Questionable decisions and/or actions are dealt with using an appropriate challenge and response
- 3.5 Fatigue management strategies are applied
- 3.6 Operations are monitored and effective actions are taken if found to be in breach of established arrangements, regulations and procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF045 Provide leadership and managerial capability**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying principles of resource management
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing competency and experience of vessel officers and crew, and their suitability for specific roles
- assisting team members to develop and maintain the required level of competency
- communicating effectively with others on issues, arrangements and requirements
- demonstrating effective leadership and management skills
- developing and implementing operating procedures
- establishing and maintaining effective internal and external communication systems
- establishing and managing operations on an operational commercial vessel in an appropriate range of contexts
- identifying and evaluating problems and determining appropriate courses of action
- investigating and arbitrating shipboard conflicts
- monitoring arrangements and taking appropriate action where there is an identified breach of established arrangements, regulations or procedures
- planning and effectively coordinating timelines, tasks, prioritisation and workload
- reading, interpreting and applying instructions, procedures and information relevant to procedures and responsibilities
- recognising and interpreting signs of fatigue among crew and initiating effective action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- cultural differences and how to deal with them
- documentation and procedures, including:
  - Australian Maritime Safety Authority (AMSA) Marine Orders
  - company procedures

- International Chamber of Shipping (ICS) Bridge Procedures Guide
- International Maritime Organization (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), including the Manila Amendments
- International Safety Management (ISM) Code, safety management system (SMS) plans, procedures, checklists and instructions
- navigational charts
- operational orders
- vessel log
- effective decision-making techniques
- factors taken into account when establishing watchkeeping arrangements, including:
  - attention necessary when navigating in or near traffic separation schemes or other routing measures
  - operational status of bridge/engine room instrumentation, controls and alarms
  - professional competency and experience of vessel officers and crew and their familiarity with the vessel's equipment, procedures and manoeuvring capability
  - provision of unmanned machinery space (UMS) controls, alarms and indicators
  - proximity of navigational hazards
  - size of the vessel and the field of vision available from the conning position
  - traffic density and other activities occurring in the area in which the vessel is navigating
  - unusual demands on the watch arising from operational conditions
  - use and operational condition of navigational aids
  - weather and sea conditions, visibility and whether there is daylight or darkness
  - whether the vessel is fitted with an automatic steering system
  - whether there are radio duties to be performed
- fatigue management principles, strategies and techniques, including:
  - appropriate dietary habits
  - arranging to take a break when symptoms of fatigue are identified
  - avoiding excessive consumption of alcohol prior to watchkeeping duties
  - maintaining personal fitness and health
  - recognition of symptoms of fatigue
- functions and responsibilities of shipboard personnel management and training
- importance of situation awareness to decision making
- related international maritime conventions, recommendations and national legislation
- resource management principles, including:
  - allocation, assignment and prioritisation of resources
  - assertiveness and leadership, including motivation
  - consideration of team experience, including decisions that reflect team experiences
  - effective communication onboard and ashore
  - obtaining and maintaining situational awareness
- watchkeeping principles as described in AMSA Marine Orders, including:

- assistance must be available to be summoned to the bridge or engine room if required by a change in the vessel's situation
- duties of lookout and/or helmsman must be kept separate
- lookout must give full attention to keeping a proper lookout and must not be given other duties which could interfere with the task
- necessary precautions must be taken to avoid polluting the marine environment
- proper lookout must be maintained at all times
- ways of assessing the current competency of vessel officers and crew, and their familiarity with the vessel's equipment, procedures and manoeuvring capability
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF046 Survive at sea in the event of vessel abandonment and personal survival techniques (PST)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to survive at sea using personal survival techniques (PST) in the event of vessel abandonment.

It applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating
- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Integrated Rating
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg VI/1 and Code Section A-VI/1 (2), Table A-VI/1-1.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal



as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Chief Integrated Rating, Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Integrated Rating, Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

F - Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Respond to emergency**

- 1.1** Emergency situation is correctly recognised
- 1.2** Muster and abandon vessel signals are activated according to organisational procedures
- 1.3** Prompt, accurate and clear information is given on raising alarm
- 1.4** Instructions are provided to crew and passengers to maximise chances of survival
- 1.5** Emergency position indicating radio beacon (EPIRB) and search and rescue transponders (SARTs) are operated to transmit distress signal

- |  |            |   |
|--|------------|---|
|  | <b>1.6</b> | Distress calls are made using radio equipment on distress call frequency to communicate nature of emergency   |
| <b>2 Operate survival craft and rescue boats</b>   | <b>2.1</b> | Orders are given to survivors to board the survival craft or rescue boat using appropriate means  |
|  | <b>2.2</b> | Survival craft or rescue boat is cleared of the vessel and operated according to organisational procedures and manufacturer instructions                              |
|  | <b>2.3</b> | Sea anchors and drogues are used to assist in remaining within the vicinity of the abandoned vessel and to minimise the effects of adverse weather and sea conditions |
|  | <b>2.4</b> | Exposure cover is deployed on an open lifeboat according to manufacturer instructions   |
| <b>3 Operate lifesaving and survival equipment onboard survival craft and rescue boats</b> | <b>3.1</b> | Location and accessibility of all lifesaving and survival equipment is established  |
|  | <b>3.2</b> | Survival equipment is checked and operated according to manufacturer instructions   |
|  | <b>3.3</b> | Lifesaving equipment is correctly donned and used according to manufacturer instructions  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF009 Survive at sea in the event of vessel abandonment.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF046 Survive at sea in the event of vessel abandonment and personal survival techniques (PST)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- boarding a survival craft from the ship and water while wearing a life jacket
- determining the type and extent of the emergency
- donning a life jacket
- donning and using an immersion suit
- ensuring initial actions after leaving ship, and procedures and actions in the water minimise threats to survival
- freeing a survival craft of obstructions
- identifying hypothermia and providing appropriate treatment
- keeping afloat without a life jacket
- launching survival craft
- operating location devices, including radio equipment
- operating personal lifesaving appliances
- operating radio equipment
- operating survival craft equipment
- recognising and interpreting muster signals, and taking action that is appropriate to emergency and complies with established procedures
- righting an inverted life raft
- righting an inverted life raft while wearing a life jacket
- safely jumping from a height into water
- streaming a drogue or sea anchor
- swimming while wearing a life jacket
- taking initial actions on boarding survival craft to enhance chance of survival
- timing and sequencing individual actions so they are appropriate to prevailing circumstance and conditions, and minimise potential dangers and threats to survival
- using appropriate method to board survival craft that avoids dangers to other survivors.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken in an emergency
- characteristics of survival craft
- dangers to survivors at sea and precautions, including:
  - dehydration
  - drinking seawater
  - exposure to the elements
  - fire
  - oil on water
  - sea sickness
  - sharks
- emergency muster and abandon vessel signals, including muster list
- equipment found in survival craft, its function and the procedures for correct operation
- first aid techniques
- helicopter assistance and pick-up, including:
  - communicating with helicopter
  - evacuating from ship and survival craft
  - helicopter harness
- location of personal lifesaving appliances
- location of survival equipment on vessel
- principles concerning survival, including:
  - actions to be taken when aboard a survival craft
  - actions to be taken when called to survival craft stations
  - actions to be taken when in the water
  - actions to be taken when required to abandon ship
  - main dangers to survivors
  - need to be ready for any emergency
  - personal protective equipment (PPE)
  - value of training and drills
- procedures for abandoning vessel
- relevant maritime regulations related to required survival equipment on a vessel
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- standard safety symbols
- steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- survival at sea techniques
- techniques for using survival equipment

- techniques for maintain morale of survivors
- time required to make distress calls safely
- types of emergency situations which may occur and precautions, including:
  - adverse reaction of dangerous goods and hazardous bulk materials
  - collision
  - engine room explosion
  - fire
  - foundering
  - hull failure
  - shifting of cargo
  - stranding
- types of lifesaving appliances normally carried on ships
- types of survival craft and appliances, including:
  - float-free launching
  - free-fall launching
  - immersion suit
  - inflatable appliance
  - launching appliance
  - rescue boat
  - survival craft
  - thermal protective aid and anti-exposure suits
- use of distress signals and penalty for misuse.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace

procedures and operational manuals

- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF047 Monitor compliance with legislative requirements

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to monitor and ensure compliance with legislative requirements and measures to ensure safety of life at sea, security and protection of marine environment.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Watchkeeper Deck.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).



## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Confirm legislative management responsibilities**

- 1.1** Legislative and regulatory requirements and approvals that apply to the ship are interpreted
- 1.2** Own scope of authority/responsibility for achieving specific compliance outcomes for the ship and the roles of other key personnel are clarified
- 1.3** Resources available to implement management policies and procedures for the ship are identified

**2 Develop a positive compliance reputation**

- 2.1** Stakeholders, their relationship to the ship and perceived attitudes about the ship are identified
- 2.2** Appropriate strategies are used to foster the trust and confidence of stakeholders
- 2.3** Requests for information are responded to in the appropriate format and a timely manner
- 2.4** Operations and maintenance are monitored to comply with legislative requirements
- 2.5** Requirements for renewal and extension of certifications are identified to ensure continued validity of survey items and equipment

- |          |   |  |
|----------|---|--|
|          | <b>2.6</b>  | Difficult situations are identified and solutions negotiated using a collaborative approach  |
|          | <b>2.7</b>  | Regular feedback is obtained and used to enhance positive relations  |
| <b>3</b> | <b>Provide management information and training</b>            |  |
|          | <b>3.1</b>  | Organisational management plans and recent incident reports are used to identify training needs of crew members  |
|          | <b>3.2</b>  | Information and training are developed and provided to ensure crew members are aware of their legislative obligations and responsibilities                       |
|          | <b>3.3</b>  | Crew member compliance obligations and responsibilities for work areas and activities is confirmed   |
|          | <b>3.4</b>  | Effectiveness of the information and training is monitored and additional information/training provided, as required   |
| <b>4</b> | <b>Assess compliance impacts and risks</b>                    |  |
|          | <b>4.1</b>  | Activities are reviewed to identify implications for compliance management   |
|          | <b>4.2</b>  | Potential non-compliance is identified and promptly reported in accordance with organisational procedures  |
|          | <b>4.3</b>  | Potential risks and incidents that may cause harm to persons or the ship are identified, assessed and control measures implemented                               |
|          | <b>4.4</b>  | Inspections and in situ measurements are conducted to quantify risks and impacts   |
|          | <b>4.5</b>  | Assessment of risks and impacts are reported in accordance with organisational procedures  |
| <b>5</b> | <b>Ensure monitoring and management plans are implemented</b> |  |
|          | <b>5.1</b>  | Compliance monitoring instruments are checked to ensure they are fully functioning   |
|          | <b>5.2</b>  | Specified compliance monitoring and inspections are conducted to check performance against ship operational management requirements                              |
|          | <b>5.3</b>  | Additional monitoring/inspections are conducted after atypical events or requests from authorities to assess whether organisational management plan is operating |

- |   |            |  |
|---|------------|--|
|   | <b>5.4</b> | Results for monitoring/inspections are analysed to identify significant trends, non-conformance and/or incidents                           |
| <b>6 Respond to non-conformance and incidents</b> | <b>6.1</b> | Unusual situations, unexpected risks/hazards and potential/actual compliance incidents are recognised                                      |
|   | <b>6.2</b> | Organisational procedures for responding to non-compliance and incidents are implemented to ensure prompt control and remediation          |
|   | <b>6.3</b> | Causes of non-compliance and incidents are investigated in accordance with organisational procedures                                       |
|   | <b>6.4</b> | Findings are analysed to identify opportunities to improve work practices, compliance controls, crew training and/or management procedures |
|   | <b>6.5</b> | Corrective/preventative actions are implemented to prevent recurrence of non-compliance and incidents, and to reduce risks                 |
|   | <b>6.6</b> | Reports are completed in accordance with organisational procedures   |
| <b>7 Maintain compliance records</b>              | <b>7.1</b> | Required records are prepared and maintained in accordance with regulatory and organisational requirements                                 |
|   | <b>7.2</b> | Regular reports about operational performance are provided   |
|   | <b>7.3</b> | Opportunities and recommendations for improvements are reported  |
|   | <b>7.4</b> | Advice is sought when challenges are beyond own scope of technical competence or when input from specialist may be required                |
|   | <b>7.5</b> | Records are stored to enable easy access and review by authorised personnel in accordance with regulatory and organisational requirements  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF047 Monitor compliance with legislative requirements

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

- accessing, interpreting and applying regulatory requirements
- applying organisational procedures for monitoring ship operations and ensuring compliance with legislative requirements
- completing reports, including:
  - hazard near miss report form
  - monthly compliance report
  - non-conformance report form
  - regulatory agency reports
  - ship incident investigation report
  - waste disposal logbooks
  - weekly compliance report
- explaining management concepts, principles and procedures clearly
- maintaining accurate compliance records
- maintaining actions to ensure a positive compliance reputation
- monitoring the implementation of organisational management plans, policies and procedures, and specified work methods
- preparing records, including:
  - compliance monitoring data
  - contractor and supplier information
  - digital photographs
  - records of monitoring equipment purchase, calibration, inspection, maintenance and service
  - records of non-conformance, incidents or significant impacts
  - records of training
  - records required by permit, approval or licence conditions
- regularly inspecting ship for compliance risks and impacts
- responding to complaints and requests for information from authorities and authorised personnel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- certificates and other documents required to be carried onboard ships by international conventions, including:
  - how they may be obtained
  - the period of their legal validity
- compliance protection/management terminology, concepts and principles
- importance of proactive measures to protect the marine environment
- introduction to maritime law
- Law of the Sea
- legislative/regulatory requirements, approvals and responsibilities relevant to the ship requirements, including:
  - Athens Convention relating to the Carriage of Passengers and their Luggage by Sea
  - guidelines on the Enhanced Programme of inspections during surveys of the bulk carriers and oil tankers
  - Code of Safe Working Practices for Merchant Seamen
  - industry standards
  - International Convention for the Prevention of Pollution from Ships (MARPOL) and International Maritime Organisation (IMO) circulars
  - International Convention for the Safety of Life at Sea (SOLAS), including:
    - carriage of grain
    - carriage of dangerous goods
    - fire protection, fire detection and fire extinction
    - general provisions
    - lifesaving appliances and arrangements
    - radio communications
    - subdivision and stability, machinery and electrical installation
  - International Convention on Load Lines
  - International Safety Management (ISM) Code
  - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)
  - International Convention on Tonnage Measurement of Ships
  - International Convention for the Control and Management of Ships Ballast Water and Sediments
  - International Convention on the Control of Harmful Anti-Fouling Systems on Ships
  - International Ship and Port Facility Security (ISPS) Code
  - legislation and regulations, including implementing international agreements and conventions
  - Marine Orders
  - maritime declarations of health and the requirements of the International Health

### Regulations

- methods and aids to prevent pollution of the environment by ships
- responsibilities under international instruments affecting the safety of ships, passengers, crew or cargo
- Special Trade Passenger Ships Agreement
- management and training information, including:
  - due diligence and duty to notify
  - incident management and reporting
  - introduction to ship, environmental considerations and sources of compliance information
  - legislative requirements
  - licensing/compliance requirements
  - management actions and checklists, and methods/procedures for specific activities
  - organisational compliance management policy
- organisational management plans, procedures, control measures and management actions for ship
- organisational procedures for:
  - identifying and assessing compliance risks and impacts
  - managing stakeholder relations
  - monitoring operations and maintenance to comply with legislative requirements
  - responding to complaints and other incidents
  - record management and reporting
- potential risks and incidents, including:
  - ballast water discharge
  - disposal of waste material, including sewage and garbage
  - over-side maintenance work
  - spill or release of hazardous chemicals/materials
- precautions to be taken to prevent pollution of the marine environment
- renewal and extension of certifications requirements, including continued validity of survey items and equipment
- stakeholders, including:
  - cargo owners
  - government officials
  - port authorities
- ship characteristics and compliance issues, risks and impacts
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## MARG007 Manage a small crew

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to lead and develop small crews.

It includes inducting and training crew, allocating crew workload, monitoring crew performance, addressing performance related issues, addressing issues and problems of crew and individual crew members, and building support and commitment within crew.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 35 metres in length within the exclusive economic zone (EEZ)
- Master of a vessel less than 80 meters in length in inshore waters
- Chief Mate or Deck Watchkeeper on a vessel less than 80 meters in length within the EEZ.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 35 meters Near Coastal and a Mate less than 80 metres Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

#### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

## **1 Induct and train crew**

- 1.1** Crew member is introduced to key personnel and areas on vessel
- 1.2** Performance requirements and responsibilities of the position are explained
- 1.3** Legislative requirements and organisational policies and procedures are explained
- 1.4** Initial training in relevant safety management systems (SMS), equipment and work practices is arranged and conducted
- 1.5** Training opportunities for development of the individual's job role are identified
- 1.6** Relevant documentation is completed and submitted to appropriate personnel

## **2 Allocate crew workload**

- 2.1** Current workload of crew is assessed
- 2.2** Workload is scheduled effectively to facilitate operational efficiency of vessel
- 2.3** Duties, rosters and responsibilities are assessed against and matched to crew capabilities according to legislative and organisational requirements
- 2.4** Crew are allocated a workload priority
- 2.5** Workload of crew is continuously assessed according to agreed objectives and timelines

## **3 Monitor crew performance**

- 3.1** Performance expectations are communicated clearly to crew and individual crew members
- 3.2** Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned workloads
- 3.3** Performance expectations are assessed objectively against workloads and crew and individual capabilities
- 3.4** Strategies are developed to ensure crew and individuals are actively encouraged and supported in assessing their

		own competence and identifying their learning needs
<b>4</b>	<b>Address performance-related issues</b>	<p><b>4.1</b> Systems are established to ensure efforts of crew are monitored, and formal and informal feedback is provided in a constructive manner</p> <p><b>4.2</b> Performance above expectations is identified and reinforced through recognition and continuous feedback</p> <p><b>4.3</b> Performance below expectations is identified and development plan for improved performance is negotiated, agreed on and documented according to organisational requirements</p> <p><b>4.4</b> Action plans for improving performance are established and monitored according to organisational requirements</p>
<b>5</b>	<b>Address issues and problems of crew and individual crew members</b>	<p><b>5.1</b> Potential and current issues and problems arising within crew and/or individuals are identified and acted on according to organisational and legislative requirements</p> <p><b>5.2</b> Advice, support and expertise is sought from appropriate personnel, as required, to resolve issues and problems</p> <p><b>5.3</b> Issues and problems that impact on individual crew members are followed through and resolved with concerned individuals</p>
<b>6</b>	<b>Build support and commitment within crew</b>	<p><b>6.1</b> Organisational requirements are met through personal performance, behaviour and leadership, which serves as a positive role model for other crew members</p> <p><b>6.2</b> Own performance is monitored and adjusted to ensure it aligns with key performance indicators (KPIs) and organisational goals</p> <p><b>6.3</b> Crew members are treated in a fair and equal manner and individual differences are identified and accommodated</p> <p><b>6.4</b> Effective communication is developed and maintained with crew and management</p>

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARG002 Manage a small crew.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARG007 Manage a small crew

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- building and motivating teams
- coaching and mentoring others
- communicating and negotiating effectively
- communicating effectively with other appropriate personnel, including:
  - human resources manager and personnel
  - management
  - other crew members
  - other Masters in the organisation
  - union/employee representatives or groups
- counselling others and providing feedback, as required
- developing and maintaining crew performance to enhance business operations
- developing effective planning documents
- developing individual development plans
- developing strategies, including:
  - coaching
  - counselling
  - disciplinary procedures
  - discussions and meetings to resolve performance issues
  - adjusting key performance indicators (KPIs)
  - mentoring
  - referral to more senior management/human resources support services
  - shadowing
  - training
- leading others
- managing personnel effectively
- monitoring and reviewing activities, processes, performance and plans
- planning and organising work and activities
- producing accurate and reliable documentation, including:
  - employee records

- job/position descriptions
- records of taxation and superannuation payments
- work health and safety (WHS)/occupational health and safety (OHS) records
- relating to people from a range of social, cultural and ethnic backgrounds
- resolving conflict
- setting performance expectations, including:
  - documented KPIs for:
    - individuals
    - individuals and crew
  - informal KPIs developed by Master for:
    - individuals
    - individuals and crew
- training others.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anti-discrimination
- complaint and grievance procedures
- consultation and communication techniques and strategies
- culturally appropriate entitlements
- employment conditions
- equal opportunity
- induction and training
- key result areas of crew and organisation
- organisational policies and procedures
- performance measures
- principles and techniques involved in:
  - leadership and mentoring
  - performance management systems
- processes for monitoring team and own performance
- professional development
- recruitment and selection
- relevant industry awards and enterprise agreements
- relevant international maritime conventions
- relevant legislation especially in relation WHS/OHS, environmental issues, equal opportunity, industrial relations, unfair dismissal and anti-discrimination
- safety management systems (SMS)
- staff counselling, grievance and disciplinary procedures, including:
  - appeals against formal decisions such as assessments

- bullying
- discrimination and harassment
- disputes between individuals or parties
- grievances
- injury rehabilitation
- perceived or actual responsibilities relating to:
  - work roles, job design and allocation of duties
  - work performance of self and others
- potential and current, issues and problems, including:
  - prejudice or racial vilification
  - promotions
  - stress or personal problems
- WHS/OHS requirements.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARG008 Manage a vessel and its crew**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to lead and manage the operations of a vessel and its crew.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 500 gross tonnage (GT) or Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

G – Teamwork



## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Take command

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Command is exercised according to organisational authority and guidelines
- 1.2 Command structure is established appropriate to vessel
- 1.3 Command structure is communicated to crew and external authorities who have a regulatory interest in vessel
- 1.4 Command information management system is implemented
- 1.5 Communication mechanisms and procedures are implemented between levels of command according to organisational procedures
- 1.6 Liaison is established and maintained to meet control and command requirements

#### 2 Manage operations

- 2.1 Operational plan is developed in consultation with relevant personnel
- 2.2 Key performance indicators (KPIs) are developed, detailed and included in operational plan
- 2.3 Contingency plans are developed and implemented at appropriate stages of operational planning
- 2.4 Both human and physical resource acquisition is planned and managed according to organisational procedures
- 2.5 Standard operating procedures (SOPs) are developed in an appropriate format
- 2.6 Performance systems and processes to assess progress in achieving profit and productivity plans and targets are developed, monitored and reviewed

- |          |  |  |
|----------|--|--|
|          | <b>2.7</b>   | Areas of under-performance are identified and prompt action taken to rectify the situation   |
|          | <b>2.8</b>   | Recommendations for variations to operational plans are negotiated according to organisational procedures  |
|          | <b>2.9</b>   | Systems to ensure procedures and records associated with documenting performance are managed according to organisational procedures  |
| <b>3</b> | <b>Apply task and workload management</b>                |  |
|          | <b>3.1</b>   | Workload of crew members is planned taking into account time and resource constraints and hours of work and rest requirements  |
|          | <b>3.2</b>   | Crew are assigned workload priority and performance expectations are communicated clearly  |
|          | <b>3.3</b>   | Workload of crew is coordinated according to agreed objectives and timelines   |
|          | <b>3.4</b>   | Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned tasks and workloads    |
|          | <b>3.5</b>   | Potential and current issues and problems arising in relation to task and workload management are identified and acted on according to organisational and legislative requirements |
| <b>4</b> | <b>Support and participate in development activities</b> |  |
|          | <b>4.1</b>   | Training needs of crew and individuals are identified and assessed on a regular basis according to organisational procedures   |
|          | <b>4.2</b>   | Action plan to meet crew and individual training and development needs is developed, agreed and implemented  |
|          | <b>4.3</b>   | On-the-job training is provided to meet crew needs according to the required organisational standard   |
|          | <b>4.4</b>   | Crew members are encouraged and supported to attend training and to undertake development opportunities  |
|          | <b>4.5</b>   | Coaching and mentoring are utilised as developmental tools   |
| <b>5</b> | <b>Communicate objectives and required standards</b>     |  |
|          | <b>5.1</b>   | Crew members are provided with up-to-date information concerning organisational objectives and standards   |

- |   |            |   |
|---|------------|---|
|   | <b>5.2</b> | Crew member understanding of objectives and standards is checked  |
|   | <b>5.3</b> | Organisational standards and values are modelled and promoted to crew members   |
| <b>6 Provide leadership to crew and individuals</b> | <b>6.1</b> | Link between function of crew and organisational goals is articulated and communicated to crew  |
|   | <b>6.2</b> | Participative decision making is used to develop, implement and review work of crew and to allocate responsibilities                    |
|   | <b>6.3</b> | Opportunities are given to crew and individuals to develop new and innovative work practices and strategies                             |
|   | <b>6.4</b> | Appropriate delegation to crew and individuals is made according to crew objectives and goals, and organisational policy and procedures |
|   | <b>6.5</b> | Tasks are allocated within the competence of crew members and supported with appropriate authority, autonomy and training               |
|   | <b>6.6</b> | Procedures for emergency responses are developed and communicated to crew members   |
| <b>7 Make effective decisions</b>                   | <b>7.1</b> | Team-building strategies are applied to achieve strengthened crew and individual commitment to organisational vision and goals          |
|   | <b>7.2</b> | Range of consultative methods are used to involve crew in decisions and vessel risk assessment  |
|   | <b>7.3</b> | Use of problem-solving strategies and techniques to identify and generate options is promoted   |
|   | <b>7.4</b> | Decisions and actions are evaluated for their effectiveness and positive outcomes   |
|   | <b>7.5</b> | Decisions and actions are documented and reported according to organisational procedures  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARG006 Manage a vessel and its crew.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARG008 Manage a vessel and its crew

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying decision-making techniques, including situation and risk assessment, identifying and generating options, selecting a course of action and evaluating outcome effectiveness
- applying effective resource management, including:
  - allocation, assignment and prioritisation of resources
  - applying assertiveness and leadership
  - obtaining and maintaining situational awareness
  - making decisions reflecting consideration of team experiences
  - using effective communication on board and ashore
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying task and workload management, including planning and coordination, personnel assignment, time and resource constraints, and prioritisation
- applying team-building strategies, including:
  - clarifying ground rules and behavioural expectations
  - defining and clarifying objectives and work area plans
  - encouraging input into the review of the safety management system (SMS)
  - fostering creativity
  - offering constructive feedback
  - recognising achievements
  - strengthening communications processes
- assessing current competence, capabilities and operational requirements to determine training objectives and activities
- developing, implementing and overseeing standard operating procedures (SOPs)
- giving and receiving feedback clearly and unambiguously
- informing crew of expected standards of work and behaviour in a manner appropriate to the individual concerned.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- consultative methods, including:
  - email/intranet communications, newsletters or other processes and devices that ensure all employees have the opportunity to contribute to team and individual operational plans
  - mechanisms used to provide feedback to work team in relation to outcomes of consultation
  - meetings, interviews and brainstorming sessions
- contingency plans, including:
  - allocating functions or tasks
  - recycling and re-using materials
  - risk identification, assessment and management processes
  - strategies for reducing costs, wastage, stock or consumables
- decision-making techniques
- development opportunities, including:
  - career pathways
  - coaching
  - external study
  - formal course participation
  - induction
  - in-house training programs
  - job rotation
  - mentoring
  - on-the-job training
- information management system, including:
  - data receipt
  - procedures and protocols
  - recording
  - recording and documenting incidents
  - security and authority assignment
  - storage and dispatch modes
  - types of technology – electronic data exchange devices
- key performance indicators (KPIs) as measures for monitoring or evaluating the efficiency or effectiveness of a system, which may be used to demonstrate accountability and to identify areas for improvements
- organisational SMS requirements
- performance expectations, including:
  - documented KPIs developed by Master for:
    - individuals

- individuals and crew
  - informal KPIs developed by Master for:
    - individuals
    - individuals and crew
- potential and current issues and problems, including:
  - appeals against formal decisions such as assessments
  - bullying
  - discrimination and harassment
  - disputes between individuals or parties
  - grievances
  - injury rehabilitation
  - perceived or actual issues relating to work:
    - performance of self and others
    - roles, job design and allocation of duties
  - prejudice or racial vilification
  - promotions
  - stress or personal problems
- relevant international maritime conventions and recommendations, and national legislation including:
  - International Safety Management (ISM) Code
  - Maritime Labour Convention (MLC)
  - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)
- relevant personnel, including:
  - crew supervisors
  - Masters of other vessels
  - senior crew members
  - senior management
  - union or employee representatives
  - WHS/OHS committee/s and other people with specialist responsibilities
- resource acquisition, including:
  - current and projected human, physical and financial resources
  - goods and services to be purchased and ordered
  - stock requirements and requisitions
- shipboard personnel management and training
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training

Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARG009 Manage an engine room and small engineering team in emergencies**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to lead and develop a small engineering team.

It includes organising the engine room for departure, managing the daily engine room routine, managing an engineering team, managing engineering procedures in port and managing engineering emergencies.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the Chief Engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

G – Teamwork

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Organise engine room for departure**

- 1.1** Fuels, lubricating oil, liquefied petroleum gas (LPG) and refrigeration gas required for proposed voyage are obtained
- 1.2** Flammable and explosive materials are stowed and managed according to regulatory and organisational requirements
- 1.3** Planned maintenance tasks to be completed during proposed voyage are verified
- 1.4** Spares and consumables required for proposed voyage are acquired
- 1.5** Work health and safety (WHS)/occupational health and safety (OHS) hazards in engine room are identified, risks are assessed and corrective actions are taken and recorded according to organisational practices

#### **2 Manage daily engine room routine**

- 2.1** Engine room routine is organised and duties for engineering team are defined
- 2.2** WHS/OHS roles and responsibilities of engineering team are defined
- 2.3** WHS/OHS procedures are communicated to engine room crew
- 2.4** WHS/OHS issues raised are acknowledged and resolved promptly
- 2.5** Permits for hot work, confined space entry and other high-risk activities are completed according to organisational and regulatory requirements
- 2.6** Engineering team members are allocated daily maintenance tasks according to planned maintenance

		system or breakdown maintenance
	<b>2.7</b>	Procedures for collecting and sorting engine room waste from cleaning and maintenance tasks are defined and communicated to engineering team
<b>3</b>	<b>Manage engineering team in an emergency</b>	
	<b>3.1</b>	Performance expectations in an emergency are communicated clearly to engineering team
	<b>3.2</b>	Effective communication in an emergency is developed and maintained with team and management
<b>4</b>	<b>Manage engineering procedures in port</b>	
	<b>4.1</b>	Planned and breakdown maintenance activities to be conducted in port are arranged to facilitate operational efficiency of vessel
	<b>4.2</b>	Permits for hot work, confined space entry and other high-risk activities are completed according to organisational and regulatory requirements
	<b>4.3</b>	Sound business relationships with contractors are established and maintained to ensure effective communication and early identification of potential service delivery problems
	<b>4.4</b>	Contractual disputes with contractors that arise are managed according to contractual requirements using established mediation mechanisms
	<b>4.5</b>	Removal of sludge, sewage and engine room waste is arranged
	<b>4.6</b>	Procedures for removal of sludge, sewage and engine room waste are followed according to regulatory requirements and organisational procedures
<b>5</b>	<b>Manage engineering emergencies</b>	
	<b>5.1</b>	Information is received regarding scope and severity of emergency
	<b>5.2</b>	Information is analysed to determine appropriate response
	<b>5.3</b>	WHS/OHS risks are identified and actions are taken according to organisational procedures
	<b>5.4</b>	Actions are taken to reduce effect of incident according to organisational procedures
	<b>5.5</b>	Incident is monitored for any changes and appropriate responses are taken according to organisational

procedures

- 5.6** Communications are established with support services and relevant stakeholders, where appropriate
- 5.7** Reports and debriefings are completed according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARG003 Manage an engine room and small engineering team.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARG009 Manage an engine room and small engineering team in emergencies**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing routine engine room tasks, including:
  - logbook entries
  - monitoring of equipment in engine room
  - regular inspection of engine room
  - responding to alarms
  - watchkeeping arrangements
- developing effective planning documents
- displaying sound personnel management
- leading team members in an emergency
- planning, organising and monitoring team member activity
- writing reports.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- consultation and communication techniques and strategies
- hazards associated with flammable/explosive materials
- hazards of gases, including accidental release in a confined space
- managing emergencies
- manufacturer instructions, including all work health and safety (WHS)/occupational health and safety (OHS) requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
- maritime regulations, rules and instructions
- organisational policies and procedures
- principles and techniques involved in:
  - leadership and mentoring
  - performance management systems

- regulations for stowing and managing flammable/explosive materials, including:
  - chemicals
  - diesel
  - gases
  - liquefied petroleum gas (LPG)
  - lubricants
  - petrol
- relevant legislation especially in regard to WHS/OHS and environmental issues
- requirements for confined space entry and hot work permits
- safety management systems (SMS)
- testing of gas detectors.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARG010 Supervise a crew

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to provide leadership and guidance to a vessel crew to optimise vessel performance.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Integrated Rating.

### Licensing/Regulatory Information

Legislative and regulatory requirements are not applicable to this unit.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan and implement work schedules**

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Tasks and/or jobs are identified and prioritised according to work and hours of rest schedules
- 1.2** Timelines, personnel and equipment are identified for each job and task

- 1.3** Work schedules are clearly communicated to crew and individuals
    - 1.4** Changes to work schedules are implemented through reorganisation of priorities, and reasons are clearly conveyed to crew and individuals
    - 1.5** Priority of tasks is communicated to crew and individuals
    - 1.6** Tasks and/or jobs are discussed with crew and individuals, and work schedules are adjusted, as required
    - 1.7** Risks are identified and analysed according to workplace policies and procedures
    - 1.8** Risks are monitored and reviewed and appropriate treatments are applied to eliminate or minimise risk
- 2 Monitor performance of tasks**
  - 2.1** Required standard is effectively communicated to crew and individuals to ensure understanding of allotted task
  - 2.2** Instruction or technical support to achieve required standard is provided, as required
  - 2.3** Standard of performance is monitored to ensure achievement of outcomes
  - 2.4** Feedback on performance is discussed with crew and individuals
  - 2.5** Completion times of tasks/jobs are monitored, and scheduling is adjusted as appropriate
- 3 Support development of crew or individuals**
  - 3.1** Workload is monitored and discussed with crew and individuals on a regular basis
  - 3.2** Support mechanisms are explored and implemented to address issues
  - 3.3** Crew and individuals are supported to identify and resolve work-related issues
  - 3.4** Crew and individuals are supported to establish and maintain effective relationships with colleagues according to the requirements of their work role
  - 3.5** Areas of tension or conflict in relationships are identified and steps are taken to address contributing



- factors and issues
- 3.6** Mentoring, training and assessment are provided, as required, to develop and enhance crew and individual skills and knowledge according to work role requirements
  - 3.7** Trainee crew are supported to complete relevant training record books
- 4 Assess performance of tasks**
- 4.1** Briefing is conducted to discuss and agree on the details of planned assessment against required performance standards
  - 4.2** Resources required for performance assessment are identified and arranged
  - 4.3** Required performance standard, purpose of assessment, and roles and responsibilities in the assessment process are effectively communicated to the individual
  - 4.4** Work health and safety (WHS)/occupational health and safety (OHS) risks to the individual or equipment are addressed prior to commencement of performance assessment
  - 4.5** Evidence is collected using agreed performance assessment methods and assessment instruments
  - 4.6** Performance assessment decision is made in line with agreed expected level of performance, assessment methods and available evidence
  - 4.7** Assessment outcomes are recorded promptly and accurately
  - 4.8** Feedback on their performance is provided to the individual and in a clear and constructive manner
- 5 Provide leadership to crew**
- 5.1** Crew is assisted to identify and work towards goals and objectives according to organisational values and directions
  - 5.2** Support and encouragement are provided to crew and steps are taken to maintain or improve cooperation and cohesiveness
  - 5.3** Barriers to crew effectiveness are identified and potential causes or factors contributing to these barriers

- are investigated
- 5.4** Strategies are put in place to enhance team effectiveness by addressing identified barriers
- 6 Monitor application of WHS/OHS**
- 6.1** Implementation of WHS/OHS standards is monitored to ensure safety requirements are met
- 6.2** Strategies for prevention or correction of problems are determined from monitoring process
- 6.3** Recommendations for prevention or correction of problems are made to achieve established standards
- 7 Communicate with management, crew and individuals**
- 7.1** Information affecting work is explained logically and clearly to crew and individuals verbally and/or in writing, as required
- 7.2** Effective and appropriate information provision is carried out with management
- 7.3** Concise reports are written that conform to workplace procedures
- 8 Control entry to confined spaces**
- 8.1** Requirement for confined space entry is identified
- 8.2** Confined space entry permit and any limitations are identified according to workplace procedures
- 8.3** Roles and responsibilities of crew members are confirmed according to workplace procedures
- 8.4** WHS/OHS requirements are applied throughout control of the operation
- 8.5** Entry and egress of confined space are monitored and recorded according to work permit conditions and workplace procedures
- 8.6** Communication and consultation with confined space entry team is maintained according to work permit conditions and workplace procedures
- 8.7** Documentation and reports are completed according to workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARG005 Supervise a crew.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARG010 Supervise a crew

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information about tasks and abilities of crew to effectively schedule tasks
- addressing legal, legislative and industrial requirements
- adjusting scheduling to meet contingencies
- analysing relevant workplace data to identify hazards, assess risks, and design and implement appropriate work health and safety (WHS)/occupational health and safety (OHS) control measures, including lock out and tag out procedures
- applying relevant WHS/OHS requirements and work practices
- assessing resources needed to maintain systematic approach to required tasks
- attending planning meetings
- calculating job times and manipulating scheduling to make the most efficient use of personnel and equipment
- communicating ideas and information effectively to crew
- determining job priorities
- establishing procedures that enable feedback from crew and encourage suggestions that might enhance performance
- identifying, interpreting and analysing risks relevant to work being performed
- monitoring performance of crew members
- monitoring performance of tasks and adjusting scheduling
- operating any equipment pertinent to controlling confined space entry
- planning, monitoring and reviewing individual performance
- providing instruction to achieve the required standard
- providing detailed reports
- supporting effective team processes and work functions
- using appropriate information technology and software.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- emergency response procedures
- confined spaces, including:
  - any compartment or area with limited opening for access, no escape route, and with limited natural ventilation and the capability of accumulating a toxic, flammable or explosive atmosphere, or of being flooded, such as:
    - ballast, freshwater and other tanks
    - cargo holds
    - pump rooms
  - confined space entry, including:
    - entry permits
    - entry permit procedures
- effective communication techniques required to communicate with a crew onboard a vessel
- incident and accident investigation
- legislation, workplace policies and procedures relevant to confined spaces
- organisational human resource management procedures
- workplace diversity, key principles of team dynamics, team leadership and management
- organisational values and directions, including:
  - duty of care
  - first aid
  - grievance management
  - harassment
  - person-centred approach
  - service delivery standards
  - specific values, standards and approaches relevant to work role
  - WHS/OHS
  - workplace behaviours
- relevant WHS/OHS requirements and work practices, including:
  - appropriate signage, symbols, labels and barriers
  - reporting procedures
  - risk management principles and appropriate treatments
- techniques for supporting a team to develop mutual concern and camaraderie
- techniques used to resolve conflict within a team
- techniques/methods used to identify and/or analyse risk
- work schedules, including:
  - organisational standards relating to service delivery or outcomes specific to work role
  - resources required
  - specific plans for implementing identified work arrangements
  - timeframe for achieving outcomes
  - training plans to develop required skills and knowledge

- work scheduling procedures
- workforce development, the importance of determining the skill level of workers and ways of improving these skills
- workplace employment awards or agreements and work conditions.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARG011 Work effectively as part of a crew on a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to work effectively as a general purpose hand on a vessel.

It includes performing routine workplace duties, following simple written and spoken instructions, communicating with other crew members, completing workplace forms and work tasks.

This unit applies to people working in the maritime industry in the capacity of:

- assistant to the Master or Engineer of a vessel working under their direct supervision
- worker on deck or in the engine room of a vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- worker in the engine room only for a vessel with propulsion power less than 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

G – Teamwork

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Perform routine workplace duties following simple written instructions**

- 1.1** Routine work instructions and procedures are read and interpreted correctly
- 1.2** Appropriate lines of communication with supervisors and colleagues are identified and used
- 1.3** Routine work instructions and procedures are followed in sequence
- 1.4** Clarification is sought from workplace supervisor when any instruction or procedure is not understood

#### **2 Follow simple spoken instructions**

- 2.1** Spoken instructions are interpreted correctly
- 2.2** Instructions are responded to promptly
- 2.3** Clarification is sought from workplace supervisor when any instruction is not understood

#### **3 Communicate with other crew members**

- 3.1** Constructive feedback is encouraged and acted upon
- 3.2** All crew members are treated with respect, courtesy and sensitivity
- 3.3** Cultural differences are considered and appropriate language is used in all verbal and non-verbal communication
- 3.4** Communication is used to develop and maintain positive relationships, mutual trust and confidence

#### **4 Complete workplace forms**

- 4.1** Workplace forms are completed clearly and concisely within designated timeframes
- 4.2** Assistance is sought to complete workplace forms when necessary

#### **5 Complete work tasks**

- 5.1** Tasks are completed within designated timeframes according to instructions



- 5.2** Effective questioning is used to seek assistance from other crew members when difficulties arise in achieving allocated tasks
- 5.3** Factors affecting work requirements are identified and appropriate action is taken
- 5.4** Progress with task is communicated to supervisor, as required

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARG001 Work effectively as part of a crew on a vessel up to 80 metres.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARG011 Work effectively as part of a crew on a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively in the workplace relevant to own work responsibilities
- completing relevant workplace documentation, including hazard/incident/accident report forms
- completing work tasks as directed
- requesting advice, receiving feedback and working with others
- working as part of a team.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- being aware of own specific role and responsibilities
- communication procedures relevant to the organisation and own work responsibilities
- relating appropriately to people from diverse backgrounds using culturally appropriate language
- routine work instructions and procedures
- safety management system (SMS)
- standard marine communication phrases (SMCPs)
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- workplace forms, including hazard/incident/accident report forms.

## **Assessment Conditions**

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARH018 Apply command navigation procedures on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage safe navigational watchkeeping on a commercial ocean-going vessel in compliance with Australian and international regulations and guidelines, protection of the marine environment and the safety of vessel and persons onboard.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

H – Navigation

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

### **ELEMENTS**

### **PERFORMANCE CRITERIA**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Establish safe watchkeeping procedures on vessels, potentially with limited qualified personnel**

- 1.1** Set of Master standing orders is developed to supplement vessel safety management system (SMS) noting number of watchkeeping personnel
- 1.2** Accepted principles, vessel safety management procedures and Master standing orders are conformed with in conduct, handover and relief of watch
- 1.3** Appropriate bridge team is established according to vessel SMS and bridge personnel are confirmed as fit for duty
- 1.4** Duties are assigned to members of bridge team and their performance of those duties is monitored
- 1.5** Members of bridge team are correctly briefed on their duties
- 1.6** Action is taken to ensure vessel is navigated safely using appropriate position fixing techniques to check location the vessel and to maintain movement of vessel within planned limitations
- 1.7** Action is taken to ensure progress of vessel with respect to passage plan is analysed and vessel navigation is managed appropriately to maintain a required estimated time of arrival (ETA) at a point in the plan
- 1.8** Accepted principles and procedures are conformed with in relation to frequency and extent of monitoring of traffic, vessel and environment
- 1.9** Responsibility for safety of navigation is defined according to vessel SMS
- 1.10** Safe navigational practice is achieved by implementing accepted bridge resource management principles and procedures
- 1.11** Action is taken to ensure fatigue management strategies are correctly applied by bridge management team

**2 Respond to potential collision and emergency**

- 2.1** Leadership of bridge team is taken when called to bridge in response to navigational situation

## **situations**

- 2.2** Circumstances when assistance is required when Master is performing watchkeeping duties are identified
  - 2.3** Potential collision situations are analysed and appropriate actions taken to avoid collision in ample time and in compliance with international collision regulations, resulting in a safe passing distance and following practices of good seamanship
  - 2.4** SMS procedures and compliance with standard watchkeeping principles are correctly implemented when taking over bridge watch from officer of the watch
  - 2.5** Appropriate action is taken to initiate search and rescue (SAR) procedures on receipt of a distress signal
  - 2.6** Appropriate advice is given to watchkeepers and correct actions are implemented regarding a response to navigational or operational emergency situations
- 3 Maintain watchkeeping records**
  - 3.1** Relevant information is documented in required records
  - 3.2** Action is taken to ensure deck logbook and other required records are maintained in an appropriate manner
  - 3.3** Required records are filed and stored according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH007 Apply command navigation procedures on vessels limited by tonnage or near coastal operations.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH018 Apply command navigation procedures on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying fatigue management strategies
- assessing:
  - circumstances requiring Master to call for assistance from a second qualified watchkeeper
  - necessary actions to be taken when called to bridge by officer of watch
- briefing officers of watch on passage plan and their watchkeeping duties
- communicating effectively with other personnel when managing safe navigational watchkeeping activities
- complying with mandatory rules, regulations and International Maritime Organization (IMO) conventions and codes, including relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders and ensuring codes, guidelines and standards recommended by IMO, classification societies and maritime industry organisations are taken into account
- conducting emergency procedures
- determining:
  - actions to take with respect to executing passage plan
  - most important watchkeeping task at any given time
- ensuring established passage plan is correctly carried out
- exchanging information with pilot about pilotage plan and conduct of bridge team
- managing watchkeeping arrangements while underway, when berthed or moored, when slipped or in dry dock, and during routine or unplanned events
- performing pilotage duties, where permitted
- providing leadership to bridge team
- recognising and adapting appropriately to cultural differences in the workplace, including modes of behaviour, and interactions and communication with others
- recognising situations warranting alterations to bridge team, including situations where vessel is under pilotage
- solving problems that may arise when managing bridge team
- taking prompt action to report and/or rectify watchkeeping incidents according to established procedures



- using available technology when managing navigational watchkeeping activities.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable legislation, regulations and codes of practice
- bridge watch handover procedures
- causes of groundings, collisions and casualties when onboard vessel
- documentation and records, including:
  - company safety management system (SMS)
  - established passage plan
  - instructions of relevant maritime authorities
  - Master standing and night orders
  - navigational charts
  - operational orders
  - relevant maritime regulations as they relate to watchkeeping functions and operations during a coastal voyage
  - vessel log
- emergency situations
- fatigue management principles and techniques
- International Regulations for Preventing Collisions at Sea (COLREGs)
- navigational aids, including:
  - compass and azimuth mirror
  - electronic charts
  - electronic navigation systems
  - radar
- navigational hazards during voyage and implications for watchkeeping
- precautions necessary when navigating in or near traffic separation schemes or other routing measures
- principles for maintaining a safe navigational watch on vessels with potentially limited qualified personnel
- principles of bridge team management
- range of factors that can affect watchkeeping functions on vessels under 500 gross tonnage (GT) and their implications, including:
  - attention necessary when navigating in or near traffic separation schemes or other routing measures
  - maintaining proper lookout by all available means at all times
  - need to adhere to established passage plan
  - never leaving the bridge unattended
  - operational status of bridge instrumentation, controls and alarms and failure

- provision on bridge of unmanned machinery space (UMS) controls, alarms and indicators, including loss of:
  - main engines
  - mooring lines or winches when berthing
  - watertight integrity
- proximity of navigational hazards
- rudder and propeller control and vessel manoeuvring characteristics
- size of vessel and field of vision available from conning position
- traffic density and other activities occurring in area in which vessel is navigating
- unusual demands on navigational watch arising from operational conditions
- use and operational condition of navigational aids and failure of bridge equipment, steering equipment and navigational lights
- weather and sea conditions, visibility and whether there is daylight or darkness
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- responsibility for safety of navigation, including:
  - periods under pilotage
  - periods when Master is on bridge.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARH019 Forecast weather and oceanographic conditions

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to forecast weather and oceanographic conditions during a near coastal voyage and to take appropriate actions based on predictions.

It includes interpreting weather and oceanographic information, using information to predict local weather and oceanographic conditions, and maintaining records of weather and oceanographic information.

This unit applies to people working in the maritime industry in the capacity of:

- Master on commercial vessels less than 35 metres in length within the exclusive economic zone (EEZ)
- Master on vessels less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on vessels less than 80 metres in length within the EEZ.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 35 metres Near Coastal and a Mate less than 80 metres Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## Pre-requisite Unit

Not applicable.

## Competency Field

H – Navigation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Interpret weather and oceanographic information**

**1.1** Ocean and weather conditions are observed and interpreted

**1.2** Measurements of current local, meteorological and oceanographic parameters are made and recorded using appropriate shipboard instruments

**1.3** Weather charts and satellite images are acquired and interpreted

**1.4** Weather reports are obtained and interpreted

**2 Use information to predict local weather and oceanographic conditions**

**2.1** Forecasts of local weather and oceanographic conditions are correctly made using available information

**2.2** Wave height and swell forecast is made using available information

**2.3** Effects of local topographical features on wind flow and weather conditions are estimated using available information

**2.4** Potentially dangerous conditions are identified and appropriate actions taken to secure vessel

**3 Maintain records of weather and oceanographic information and forecasts**

**3.1** Weather and oceanographic information and forecasts are recorded and filed according to organisational procedures

**3.2** Action on vessel operations initiated as a result of weather and oceanographic forecasts is documented according to organisational procedures

**3.3** Meteorological charts, publications and related documentation are updated and stored according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH006 Forecast weather and oceanographic conditions.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARH019 Forecast weather and oceanographic conditions

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

- ensuring currency of relevant reference material
- observing, interpreting and forecasting weather and oceanographic conditions
- reading, interpreting and applying weather and oceanographic information
- recognising problems that may occur when interpreting weather and oceanographic information
- selecting and using shipboard instruments to assist in forecasting weather and oceanographic conditions, including:
  - anemometers
  - barometers
  - equipment for receiving weather maps and forecasts
  - wet and dry bulb thermometers
- using tide tables to calculate height of tide.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken in potentially dangerous conditions, including:
  - avoiding extreme adverse weather conditions
  - avoiding storm centres and dangerous quadrants by adjusting course and speed
  - properly securing all vessel equipment
- basic principles for making meteorological and oceanographic measurements
- effects on navigation and vessel handling of wind, currents and bottom topography
- heat exchange process
- ocean and weather conditions, including:
  - air masses and fronts
  - cloud classifications
  - cyclones, storms and gales
  - ocean currents

- pressure systems and cold fronts
- sea state
- synoptic chart analysis
- tide prediction
- tropical meteorology
- principles and procedures of weather forecasting using information obtained from observations, charts, satellite images, reports and instruments
- sources of weather and oceanographic information, and methods for their interpretation
- topographical effects on wind flow
- typical problems in forecasting weather and oceanographic conditions
- vertical division of the atmosphere
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, Australian national tide tables, weather reports and safety management systems (SMS)
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry, including:
  - anemometers
  - barograph
  - barometers
  - equipment for receiving weather maps and forecasts
  - wet and dry bulb thermometers.



## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARH020 Forecast weather and oceanographic conditions to plan a safe passage**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to forecast weather and oceanographic conditions to plan a safe passage.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

H – Navigation

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Forecast area weather**

- 1.1** Synoptic chart is interpreted and recorded
- 1.2** Information received by weather fax is interpreted and recorded
- 1.3** Weather reports are obtained, interpreted and recorded
- 1.4** Observations of weather and cloud formations are made, interpreted and recorded
- 1.5** Statistical data and observations are used to predict likely weather conditions for a determined period

#### **2 Use information to predict oceanographic conditions**

- 2.1** Information on ocean current systems is interpreted and recorded
- 2.2** Nautical publications on tides and currents are used to calculate tidal conditions
- 2.3** Wave height and swell forecast is made using available information
- 2.4** Potentially dangerous oceanographic conditions are identified and appropriate actions are taken to maintain safety of navigation and to minimise risk to safety of vessel

#### **3 Maintain records of weather and oceanographic information and forecasts**

- 3.1** Statistical data and observations are recorded and filed according to organisational procedures
- 3.2** Actions taken to maintain safety of navigation and to minimise risk to safety of vessel as a result of weather and oceanographic forecasts, are documented according to organisational procedures
- 3.3** Meteorological and nautical publications are updated and stored according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH011 Forecast weather and oceanographic conditions to plan a safe passage.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH020 Forecast weather and oceanographic conditions to plan a safe passage**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- calculating tidal conditions
- ensuring currency of relevant reference material
- observing, interpreting and forecasting weather and oceanographic conditions
- reading, interpreting and applying weather and oceanographic information
- selecting and using shipboard instruments to assist in forecasting weather and oceanographic conditions
- supporting reasons for intended action with statistical data and observations of actual conditions
- undertaking appropriate actions
- using appropriate nautical publications on tides and currents
- using tide tables to calculate height of tide.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- air masses and fronts
- appropriate actions, including:
  - avoiding storm centres and dangerous quadrants by adjusting course and speed
  - ensuring all crew and passengers are informed
  - ensuring all vessel equipment is properly secured
  - securing cargo and stores
  - taking action to avoid extreme adverse weather conditions
- basic principles for making meteorological and oceanographic measurements
- characteristics of various weather systems, including tropical revolving storms, and avoidance of storm centres and dangerous quadrants
- cloud classifications

- cyclones, storms and gales
- dangerous oceanographic conditions, including:
  - excessively high sea state and swells
  - ice formations on ship super structure and remedies
  - tornados, tropical revolving storms, hurricanes and gales
- effects on navigation and vessel handling of wind, currents and bottom topography
- formation of sea waves and swell waves
- heat exchange process
- ocean current systems, including surface water circulation of the ocean and principal adjoining seas
- pressure systems and cold fronts
- principles and procedures of weather forecasting using information obtained from observations, charts, satellite images, email, reports and instruments
- principles relating to the safety of navigation in ice
- procedures for filing and maintaining weather and oceanographic information
- procedures to be followed during gale or icy conditions and tropical revolving storms
- sea state
- sources of weather and oceanographic information, and methods for their interpretation
- synoptic and prognostic charts
- tide prediction
- tropical revolving storms
- types of floating ice, their origins and movements
- typical problems in forecasting weather and oceanographic conditions
- use of tide tables
- vertical division of the atmosphere
- voyage planning principles incorporating weather conditions, including:
  - air masses and fronts
  - cloud classifications
  - cyclones, storms and gales
  - heat exchange process
  - ocean currents and wave height
  - pressure systems and cold fronts
  - sea state
  - tide prediction
  - tropical revolving storms
  - use of tide tables
  - vertical division of the atmosphere
  - weather data provided by shipboard instruments
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARH021 Manage the navigation of a vessel

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to manage the planning of a voyage and the navigation of a vessel, determine position and accuracy of resultant of position fix by any means, determine and allow for compass errors, and establish watchkeeping arrangements and procedures.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### Pre-requisite Unit

Not applicable.

### Competency Field

H – Navigation



## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1   Oversee development of passage plan**

- 1.1**   Requirements of passage are established
- 1.2**   Reasons for planned route are supported by facts and statistical data obtained from relevant sources and publications
- 1.3**   Positions, courses, distances and time calculations are checked for correctness within accepted accuracy standards for navigational equipment
- 1.4**   Potential navigational hazards are accurately identified

#### **2   Develop and implement watchkeeping arrangements and procedures**

- 2.1**   Watchkeeping arrangements and procedures are developed according to bridge resource management principles, and organisational and regulatory requirements
- 2.2**   Bridge resource management principles are appropriately applied in establishing watchkeeping arrangements and procedures and in developing an effective bridge working system
- 2.3**   Communications strategies are developed to link watchkeeping procedures with all aspects of vessel operations
- 2.4**   Fatigue management strategies are developed according to organisational and regulatory requirements
- 2.5**   Corrective action procedures are developed and monitored
- 2.6**   Procedures for reporting, recording and responding to emergencies and non-compliance are established

#### **3   Monitor bridge team in implementing passage**

- 3.1**   Work schedule for bridge team is detailed according to

<b>plan</b>		bridge resource management principles
	<b>3.2</b>	Risk control measures are evaluated against passage plan
	<b>3.3</b>	Navigation requirements are communicated to bridge team
	<b>3.4</b>	Individuals are fully briefed and responsibilities are coordinated
	<b>3.5</b>	Navigation tasks are carried out according to passage plan
	<b>3.6</b>	Ongoing checks and position determination are conducted according to organisational procedures
	<b>3.7</b>	Non-routine problems related to navigation of vessel are solved
	<b>3.8</b>	Navigational data is signed off according to organisational procedures
	<b>3.9</b>	Work schedule for bridge team is detailed according to bridge resource management principles
<b>4 Interpret and evaluate information from electronic navigational system</b>	<b>4.1</b>	Data from radar plotting sheet is interpreted and analysed to anticipate potential collisions
	<b>4.2</b>	Data produced by other electronic navigational aids is interpreted and used to assist navigational command decisions, taking into account known limitations and errors associated with each type of aid
	<b>4.3</b>	Information obtained through a single vessel or multiple vessel analysis of radar plots or other electronic navigational data is used to make command decisions on action needed to avoid collisions
	<b>4.4</b>	Radar data is used to obtain position fix for vessel using electronic bearing lines and variable range markers
<b>5 Navigate in complex situations</b>	<b>5.1</b>	Measurements and observations of sea and weather conditions are used to determine vessel speed and direction in complex situations
	<b>5.2</b>	Information from bridge equipment is interpreted to identify navigational hazards and to fix vessel position

- |          |  |   |
|----------|--|---|
|          | <b>5.3</b>   | Nautical publications on tides and currents are used to calculate tidal conditions  |
|          | <b>5.4</b>   | Alterations to vessel course or speed are made to meet prevailing circumstances and changing conditions   |
|          | <b>5.5</b>   | Navigational manoeuvres are conducted within safe operational limits of vessel  |
|          | <b>5.6</b>   | Details of passage are recorded in vessel log according to regulations  |
|          | <b>5.7</b>   | Variations to planned route are documented prior to archiving, on completion of voyage  |
| <b>6</b> | <b>Manage emergencies</b>                                    |   |
|          | <b>6.1</b>   | Bridge team is taken charge of when called to bridge in response to an emergency  |
|          | <b>6.2</b>   | Safety management system (SMS) procedures are implemented when taking over bridge watch from officer of the watch   |
|          | <b>6.3</b>   | Appropriate action is taken to initiate search and rescue (SAR) procedures on receipt of distress signal  |
|          | <b>6.4</b>   | Advice is provided to watchkeeper regarding response to emergency situations  |
| <b>7</b> | <b>Maintain navigational equipment</b>                       |   |
|          | <b>7.1</b>   | Navigational charts, nautical publications and related documentation are stored and maintained according to organisational procedures   |
|          | <b>7.2</b>   | Inventory of navigational charts, nautical publications and related documentation is established and kept according to organisational procedures                                  |
|          | <b>7.3</b>   | Navigational charts, nautical publications and related documentation are ordered and updated from relevant sources to ensure available data needed for voyage planning is current |
|          | <b>7.4</b>   | Performance checks and tests of navigation position fixing instruments and systems are carried out according to organisational procedures and manufacturer instructions           |
| <b>8</b> | <b>Prepare reports and documentation relevant to passage</b> |   |
|          | <b>8.1</b>   | Passage information is recorded and reported in required format, style, structure and timeframe   |

- 8.2** All information is recorded and reported according to legislative requirements
- 8.3** Technology is used to store and retrieve information

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH012 Manage the navigation of a vessel 500 gross tonnage or more.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARH021 Manage the navigation of a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing accuracy of fix properly
- calculating positions, courses, distances and time correctly within accepted accuracy standards for navigational equipment
- calculating tidal conditions to determine under keel clearances and air drafts
- choosing the most appropriate primary method for fixing vessel position given the prevailing circumstances and conditions
- conducting performance checks of navigation position fixing instruments and systems
- determining and allowing for errors of magnetic and gyrocompass
- determining position in all conditions by celestial observations and terrestrial observations, and using modern navigational aids within accepted accuracy levels
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring currency of relevant reference material
- enumerating the equipment, charts and nautical publications required for the voyage and appropriate to the safe conduct of the voyage
- establishing and maintaining watchkeeping arrangements in compliance with international regulations and guidelines so as to ensure the safety of navigation, protection of the marine environment, and the safety of the vessel and persons onboard
- identifying all potential navigational hazards accurately
- planning, navigating and monitoring a voyage for all conditions, including:
  - areas of extensive tidal effects
  - ice
  - meteorological conditions
  - restricted visibility
  - restricted waters
  - traffic separation schemes
  - vessel traffic service (VTS) areas
- recognising faulty equipment and readings, and taking appropriate action

- recognising problems that may be experienced when planning and navigating a passage, and taking appropriate action
- reporting according to General Principles for Ship Reporting Systems and VTS procedures
- supporting reasons for planned route using facts and statistical data obtained from relevant sources and publications
- undertaking routeing according to the General Provisions on Ships' Routeing
- using chart catalogues, charts, nautical publications and vessel particulars to plan and navigate a passage.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian Maritime Safety Authority (AMSA) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) including the Manila Amendments
- bridge watchkeeping equipment and systems, including:
  - Bridge Navigational Watch Alarm Systems (BNWAS)
  - voyage data and simplified data recorder
- content, application and intent of bridge resource management principles to be observed in keeping a navigational watch
- content, application and intent of the International Regulations for Preventing Collisions at Sea (COLREGs)
- emergencies, including:
  - engine failure
  - failure of navigational equipment
  - potential close quarter situations
- General Principles for Ship Reporting Systems
- General Provisions on Ships' Routeing
- heightened risk situations, including:
  - adverse weather
  - areas of extensive tidal effects
  - ice
  - restricted visibility
  - restricted waters
  - traffic separation schemes
  - VTS areas
- integrated bridge systems
- logbooks and voyage records
- method and frequency of checks for errors of magnetic and gyrocompasses to ensure accuracy of information
- methods for fixing position of a vessel

- modern electronic navigational aids, their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing
- non-routine problems, including:
  - equipment failure
  - extreme weather conditions that would impact a vessels position
  - potential collision and emergency situations
  - steaming in company
- operation and care of the main types of gyrocompass
- position determination, including:
  - azimuth mirrors
  - chronometer
  - doppler and electronic logs
  - echo sounders
  - electronic chart system (ECS) and electronic chart display and information system (ECDIS)
  - integrated navigation systems
  - magnetic and gyrocompasses and repeaters
  - radar and other electronic navigation devices
- principles of magnetic and gyrocompasses
- problems experienced when fixing vessel position and appropriate action and solutions
- procedures for filing and maintaining navigational charts, nautical publications and related documentation in serviceable condition
- procedures for swinging a vessel to determine deviation
- relevant AMSA Marine Orders
- requirements for effective passage planning, including contingency planning
- systems under control of the master gyro
- vessel reporting systems and their use in planning and conducting a voyage
- voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks
- VTS procedures
- watchkeeping arrangements include:
  - clear instruction to watchkeeping officers in the Standing Orders from the Master
  - establishing a proper lookout separate from the helmsman
  - fatigue management strategies
  - watch handover procedures
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training

Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including:
  - annual and weekly notices to mariners
  - nautical almanac
  - radio signals, light lists, sailing directions, tide tables and chart catalogues
  - ship reporting systems and requirements
  - ship's routing information
  - SMS procedures
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARH022 Plan and conduct a passage and determine position**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 6.0.

## **Application**

This unit involves the skills and knowledge required to plan and conduct a passage, determine position on a vessel using a range of bridge equipment, and evaluate meteorological information for passage planning.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency-National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

H – Navigation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan passage

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Navigational charts, nautical publications and related documentation are selected for the area of navigation and corrected according to the latest information available
- 1.2 Information from charts and publications is interpreted and applied to accurately identify potential navigational hazards relevant to the proposed voyage
- 1.3 State of the tide at specified locations is determined and findings are applied to the passage plan
- 1.4 Route for voyage is determined and critical points along the proposed route of voyage are identified and plotted
- 1.5 Accurate calculations and measurements of navigational information are made
- 1.6 Meteorological information is obtained and interpreted, and weather and sea condition hazards relevant to the proposed voyage are identified prior to departure
- 1.7 Route is modified, as required, to take into account weather and sea condition hazards
- 1.8 Planned route for voyage is recorded according to organisational and regulatory requirements

- |   |   |
|---|---|
| <b>2 Conduct passage</b>  | <ul style="list-style-type: none"><li><b>2.1</b> Mode of steering is selected appropriate for the prevailing weather, sea and traffic conditions and intended manoeuvres</li><li><b>2.2</b> Measurements and observations of sea and weather conditions are used to determine vessel speed and direction</li><li><b>2.3</b> Information from bridge equipment is interpreted to identify navigational hazards and fix vessel position</li><li><b>2.4</b> Alterations to vessel course or speed are made to meet prevailing circumstances and changing conditions</li><li><b>2.5</b> Navigational manoeuvres are conducted within safe operational limits of vessel</li><li><b>2.6</b> Details of passage are recorded in vessel log according to regulations</li><li><b>2.7</b> Variations to planned route are documented prior to archiving on completion of the voyage</li></ul>                               |
| <b>3 Fix vessel position</b>  | <ul style="list-style-type: none"><li><b>3.1</b> Primary position fixing method is selected according to prevailing circumstances and conditions</li><li><b>3.2</b> Position is fixed using selected method and information derived from relevant wheelhouse equipment</li><li><b>3.3</b> Position is determined within limits of acceptable instrument/system errors</li><li><b>3.4</b> Position is recorded on a navigational chart according to regulatory requirements</li><li><b>3.5</b> Fixes are taken at time intervals appropriate for prevailing navigational conditions</li><li><b>3.6</b> Reliability of information obtained from primary method of position fixing is checked at appropriate intervals</li><li><b>3.7</b> Performance checks of position fixing instruments and wheelhouse equipment are carried out according to organisational procedures and manufacturer instructions</li></ul> |
| <b>4 Determine appropriate action to take with respect to plotted</b> | <ul style="list-style-type: none"><li><b>4.1</b> Assessment of the set, drift and leeway being experienced by the vessel is made</li></ul>  |

## position

- |          |  |   |
|----------|--|---|
|          | <b>4.2</b>                                     | Course is adjusted to maintain or resume planned route where the position indicates a deviation has occurred  |
|          | <b>4.3</b>                                     | Dead reckoning (DR) and/or estimated position (EP) is projected along planned route according to the course made good between previously observed positions |
| <b>5</b> | <b>Analyse navigational system performance</b> |   |
|          | <b>5.1</b>                                     | Theoretical performance of navigational system is determined  |
|          | <b>5.2</b>                                     | Measurement equipment is selected, and checks and tests are conducted   |
|          | <b>5.3</b>                                     | Data is analysed and theoretical performance is checked with actual performance   |
|          | <b>5.4</b>                                     | Significance of variation between theoretical and actual performance is determined  |
|          | <b>5.5</b>                                     | Appropriate action is taken to bring performance to acceptable instrument/system errors   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARH008 Plan and conduct a passage.

## Links

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH022 Plan and conduct a passage and determine position**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accurately measuring and observing weather conditions
- accurately preparing calculations and measurements of navigational information
- adjusting steering controls for optimum performance
- calculating courses using plane, Mercator and great circle sailing (GCS) methods
- changing over from manual to automatic control and vice versa
- checking reliability of information obtained from primary method of position fixing at appropriate intervals
- correctly interpreting and applying meteorological information
- determining errors in magnetic and gyrocompasses, and correctly applying to courses and bearings
- determining errors of magnetic and gyrocompasses using celestial and terrestrial means, and allowing for such errors
- determining vessel position by use of:
  - aids to navigation, including lighthouses, beacons and buoys
  - dead reckoning (DR), taking into account winds, tides, currents and estimated speed
  - electronic navigational aids
  - landmarks
  - rising and dipping distances of lights and the use of horizontal angles
- determining vessel position within the limits of acceptable instrument/system errors
- estimating position using DR
- interpreting nautical charts and publications, including symbols and other chart information
- maintaining charts and publications by applying up-to-date corrections to both paper and electronic charts and publications
- operating echo-sounders and applying the information correctly
- producing accurate and reliable information
- reading the aneroid barometer and interpreting the information obtained
- selecting and applying primary position fixing method, including:
  - celestial observations
  - radar ranges or bearings

- radio navigation aids
- running fix
- simultaneous bearings or transits of coastal features
- soundings to determine position
- terrestrial observations
- selecting mode of steering most suitable for prevailing weather, sea and traffic conditions and intended manoeuvres, including:
  - automatic pilot
  - electric systems
  - hydraulic systems
- using and interpreting information obtained from shipborne meteorological instruments
- using celestial bodies to determine vessel position
- using navigational charts, nautical publications and related documentation, including:
  - Nautical Almanac
  - nautical tables
  - Notices to Mariners
  - paper charts
  - radio navigational warnings
  - sailing directions
  - temporary warning notices
  - tide tables
  - vessel routing information
  - weather reports and warnings.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- celestial observations and calculations, including:
  - celestial sphere and equinoctial system of co-ordinates
  - compass error using azimuth and amplitude
  - daily motion and horizontal system of co-ordinates
  - hour angle
  - latitude by meridian altitude
  - pole star observations
  - sextant and altitude corrections
  - solar system
  - time and equation of time
- characteristics of the various weather systems, reporting procedures and recording systems
- charted information, including that in the title block, zones of confidence diagrams and

datums

- compass error from transit bearings or by bearings taken from a known position
- times and heights of high and low water from Australian or local tide tables for primary and secondary ports and the relevance of chart datum
- effects of current and leeway on the course and speed of the vessel (without calculations)
- finding the variation from the chart
- fixing vessel position by:
  - radar ranges and bearings
  - simultaneous bearings, transits of coastal features, and running fix
- hazards, including:
  - restricted visibility
  - shallow water
  - traffic
  - unlit beacons
- interpreting the set and drift of the current from information available on the chart
- maintaining information in a navigational log and voyage records
- measuring distance on a chart
- meteorological instruments and their use
- meteorological terms
- nautical charts and publications
- navigation systems, performance checks and tests to comply with manufacturers' recommendations and good navigation practice
- plane, Mercator and GCS concepts and calculations
- principles of magnetic and gyrocompasses and fluxgate compass
- relationship between compass, magnetic, true and gyro-courses and bearings
- relative bearings
- selection of suitable points for bearings
- sources of weather forecasts and the interpretation of that information
- steering control systems, including operating procedures
- theory of tides
- use and limitations on the use of electronic position fixing equipment, including:
  - augmented satellite systems
  - enhance loran-C system
  - global navigation satellite system (GNSS) and Galileo
  - global navigation system (GNS) and global positioning system (GPS)
  - loran-C system
- use of a deviation card
- using a single position line to assist in clearing dangers
- using modern electronic navigational aids to determine vessel position
- using meteorological information available, including:
  - atmospheric pressure

- cloud precipitation
- recording and reporting weather observations
- structure of depressions
- tropical revolving storms and other pressure systems
- visibility
- weather services for shipping
- wind and other pressure systems over the ocean
- using soundings in determining position
- using terrestrial observations to determine vessel position individually or in combination with other methods
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations, an Australian Maritime Safety Authority (AMSA)-approved simulator or scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARH023 Use of electronic chart display and information system (ECDIS) to maintain the safety of navigation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to maintain safe navigation of a commercial vessel using an electronic chart display and information system (ECDIS).

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following Standards of Training, Certification and Watchkeeping (STCW) provisions:

- STCW Reg II/1 & II/2, Code Section A-II/1 and A-II/2, Tables A-II/1 and A-II/2.

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training

### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain AMSA certification as a Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck. and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of

## Training, Certification and Watchkeeping for Seafarers (STCW).

### Pre-requisite Unit

Not applicable.

### Competency Field

H – Navigation

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Set up an ECDIS

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** ECDIS is initialised and programmed with own vessel data

**1.2** Operational performance and accuracy of ECDIS is confirmed

**1.3** Settings and values are adjusted to suit conditions for passage planning and navigation

**1.4** Means of providing additional information is correctly interfaced with ECDIS

#### 2 Use an ECDIS for passage planning and navigation

**2.1** ECDIS is used to assist in passage planning and the conduct of navigation

**2.2** Information on ECDIS is monitored to ensure safe navigation

**2.3** Information obtained from ECDIS is interpreted and analysed taking into account limitations of equipment, all connected sensors and prevailing circumstances and conditions

- 2.4**      Position of vessel is confirmed by alternative means
  - 2.5**      Safety of navigation is maintained through adjustments made to vessel course and speed
  - 2.6**      System and position alarms are responded to, to maintain safety of navigation
  - 2.7**      Situational awareness is maintained while using ECDIS and other bridge equipment
- 3      Maintain data**
  - 3.1**      Data produced by ECDIS that should be retained to conform with organisational procedures and regulatory requirements is identified
  - 3.2**      Data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements
  - 3.3**      Security and access requirements for data are adhered to in accordance with organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARH009 Use an electronic chart display and information system to navigate safely.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH023 Use of electronic chart display and information system (ECDIS) to maintain the safety of navigation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adjusting settings and values to suit present conditions, including:
  - alarm parameters for anti-grounding
  - back-up arrangements
  - chart update status
  - completeness of chart data
  - proximity to contacts and special areas
- applying relevant legislation, regulations and guidelines
- communicating in a clear concise manner and at all times
- conducting tests for malfunctions, including functional self-testing and interpreting the test results
- confirming vessel position by alternative means
- ensuring integrity of back-up systems
- ensuring integrity of data
- maintaining situational awareness while using electronic chart display and information system (ECDIS), including:
  - chart data and scale selection
  - contact detection and management
  - integrity of sensors
  - safe water and proximity of hazards
  - set and drift
  - suitability of route
- monitoring information on ECDIS, including:
  - chart data displayed
  - contacts
  - mode and orientation
  - own position
  - radar overlay functions

- radar tracking
- route monitoring
- sea area display
- user-created information layers
- operating ECDIS when interfaced with automatic identification system (AIS) and interpreting AIS data
- planning a passage on a display using ECDIS
- safely monitoring and adjusting information
- setting up initial display and maintaining display
- setting up, operating, interpreting and analysing information, including:
  - adequate and up-to-date electronic charts
  - back-up systems
  - electronic position fixing system
  - gyro and log
  - raster charts
  - uninterruptable power supply (UPS)
  - vector electronic chart systems
  - when radar overlay is in use
- storing data electronically, including:
  - chart correction information
  - electronic navigational chart (ENC) source, date and edition
  - vessel voyage details
- using functions that are integrated with other navigation systems in various installations
- using ECDIS targets, charts and systems
- using settings efficiently to ensure conformance to operational procedures.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- AIS input
- dangers of over-reliance
- differences between ECDIS, electronic chart system (ECS) and raster chart display system (RCDS)
- differences between vector and raster charts
- elements of ECDIS, including:
  - basic navigation
  - chart data
  - chart organisation
  - chart quality and accuracy
  - correct and incorrect use

- heading and drift vectors
- position source
- purpose of ECDIS
- value to navigation
- vessel position
- workstation start, stop and layout
- ECDIS route planning and monitoring, including:
  - additional navigational information
  - checking plan for safety
  - route planning by table and chart
  - route schedule
  - track limits
  - user charts in route planning
  - vessel manoeuvring characteristics
- ECDIS targets, charts and systems, including:
  - AIS functions
  - archiving ECDIS data and data logging
  - automatic radar plotting aid (ARPA)/radar overlay
  - installing chart corrections
  - procuring and installing chart data
  - system reset and back-up
- ECDIS responsibility and assessment, including:
  - effective navigation with ECDIS
  - responsibilities under relevant legislation, regulations and guidelines
- functions of ECDIS required by performance standards in force
- principles, capability and limitations of ECDIS operations
- process used to correct and update charts by manual, semi-automatic and automatic systems
- radar/ ARPA input
- requirements for voyage recording
- significance of chart alarms and indicator warnings
- system and position alarms, including:
  - approach to waypoint, critical point, navigation danger and other ships
  - chart alarms
  - depth and contour alarms
  - mode losses
  - primary failure
- use of ECDIS in emergency situations
- watchkeeping with ECDIS, including:
  - changing the settings
  - chart information

- chart scaling
- information layers
- ports and data feeds
- sensors
- work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- simulator exercises for:
  - coastal waters
  - coastal and restricted waters
  - coastal waters and restricted waters
  - open sea
  - restricted waters
- simulator exercises for:
  - coastal waters and restricted waters (navigation alarms and route scheduling)
  - coastal waters (chart display settings)
  - coastal and restricted waters (underway ECDIS navigation assessment)
  - open sea (basic integrated navigation)
  - restricted waters (advanced integrated navigation with ECDIS)
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARH024 Use of radar and other bridge equipment to maintain safety of navigation**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to maintain safe navigation of a vessel through the use of radar, automatic radar plotting aids (ARPAs) and other bridge equipment to determine vessel position.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training

#### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

#### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain AMSA certification as a Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

H – Navigation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1. Use radar and ARPA to safely navigate**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Radar is operated according to manufacturer instructions to produce data on position of vessel, other vessels and fixed objects
- 1.2** Radar plot is constructed on radar plotting sheet and automatic plotting devices are initialised
- 1.3** Systematic radar and/or ARPA observations of vessels in the vicinity are made and risk of collision is determined
- 1.4** Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers
- 1.5** Radar bearings are corrected for vessel heading and compass error, as appropriate
- 1.6** Adjustments are made to vessel course and speed to maintain safety of navigation
- 1.7** Manoeuvring signals are made at appropriate time according to regulations
- 1.8** ARPA information is analysed and interpreted taking into account limitation of equipment and prevailing circumstances and conditions

- |  |   |
|--|---|
| <b>2 Set up bridge equipment</b>                 | <b>2.1</b> Bridge equipment is initialised and displays are set up and maintained   |
|  | <b>2.2</b> Operational performance and accuracy of bridge equipment is confirmed, and appropriate action is taken when performance is out of limits                   |
|  | <b>2.3</b> Bridge navigation watch alarm system (BNWAS) and voyage data recorder are activated according to manufacturer requirements and organisational procedures   |
|  | <b>2.4</b> Any false echoes and misrepresentations are detected, identified and rejected  |
| <b>3 Use bridge equipment to safely navigate</b> | <b>3.1</b> Bridge equipment is safely and efficiently used to conduct navigation of vessel  |
|  | <b>3.2</b> Position of vessel is monitored during voyage to ensure planned passage is followed  |
|  | <b>3.3</b> Movements of vessels in the vicinity are monitored to ensure collision situations do not occur   |
|  | <b>3.4</b> Adjustments are made to vessel course and speed to maintain safety of navigation   |
|  | <b>3.5</b> Manoeuvring signals are made at appropriate time according to regulations  |
|  | <b>3.6</b> Bridge equipment is used and maintained according to manufacturer requirements and organisational procedures   |
| <b>4 Maintain navigational records</b>           | <b>4.1</b> Navigational data produced by bridge equipment that should be retained to conform with organisational procedures and regulatory requirements is identified |
|  | <b>4.2</b> Navigational data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements                            |
|  | <b>4.3</b> Security and access requirements for data are adhered to according to organisational procedures  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH010 Use bridge equipment to determine vessel position.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH024 Use of radar and other bridge equipment to maintain safety of navigation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating clearly and concisely at all times
- correctly interpreting and analysing information obtained from radar and automatic radar plotting aids (ARPAs) taking into account the limitations of equipment and prevailing circumstances and conditions
- correctly interpreting information received from other bridge equipment and applying appropriate corrections
- determining latitude by meridian altitude
- making adjustments to vessel course and speed to maintain safety of navigation
- making decisions to amend course or speed in a timely manner according to accepted navigation practice
- making manoeuvring signals at the appropriate time according to International Regulations for Preventing Collisions at Sea (COLREGs)
- planning and conducting celestial observations using a sextant and plotting a position
- taking action to avoid close encounter or collision according to COLREGs
- using navigational information to aid in command decisions.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- ARPA system performance and accuracy, tracking capabilities, limitations and processing delays
- blind pilotage planning
- bridge navigational watch alarm systems (BNWAS), including:
  - alarms
  - carriage requirements
  - design
  - operational sequences
  - purpose

- course and speed of other vessels
- critical echoes, exclusion areas and trial manoeuvres
- detecting course and speed changes of other vessels
- detection of misrepresentation of information, false echoes, sea and rain clutter, racons and search and rescue transponders (SARTs)
- effect of changes in own vessel course and speed or both
- errors of magnetic compass and their function
- factors affecting performance and accuracy of radar and other navigational equipment
- fundamentals of radar and ARPA's
- ground and sea stabilisation and their effects on ARPA data
- identification of critical echoes
- COLREGs
- magnetic and gyrocompasses, including rate of turn gyro
- meeting overtaking vessels
- methods of position fixing using celestial observations with a sextant
- methods of target acquisition and their limitations
- misrepresentation. including:
  - compass errors
  - false echoes
  - incorrect radar settings for heading marker and range marker
  - incorrect setting up of electronic chart system (ECS) or electronic chart display and information system (ECDIS)
  - incorrect setting up of satellite navigation systems
  - satellite and differential satellite navigation system errors
  - sea and rain clutter returns
- navigational data, including:
  - navigation safety warning
  - recording of courses steered
  - weather and oceanographic reports
- parallel indexing
- plotting techniques and relative and true-motion concepts
- principal types of ARPA's, their display characteristics, performance standards and the consequences of over reliance on ARPA's
- principles of the magnetic compass and their correction
- range and bearing by radar
- sea and ground stabilisation and their effect on ARPA data
- setting up and maintaining displays on radar
- time, distance and bearing of closest point of approach of a closing vessel
- true and relative vectors, graphic representation of target information and danger areas
- use of operational warnings and system tests
- voyage data recorder and simplified voyage data recorder, including:
  - authorised access to data by personnel for investigations

- carriage requirements
- data items recorded
- data output interface
- data security and software
- design and operation
- purpose
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARJ008 Ensure compliance with pollution prevention requirements

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to monitor and ensure compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) and environmental management legislation.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Watchkeeper Deck.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organisation Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal or Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited), Master on a commercial



vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

J - Environment

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Confirm environmental management responsibilities**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Legislative and regulatory requirements, and approvals that apply to the vessel are interpreted

**1.2** Own scope of authority/responsibility for achieving specific environmental outcomes for the vessel and the roles of other key personnel is clarified

**1.3** Resources available to implement environmental management policies for the vessel are identified

#### **2 Develop a positive environmental reputation**

**2.1** Stakeholders, their relationship to the vessel and perceived attitudes about the vessel are identified

**2.2** Appropriate strategies are used to foster the trust and confidence of stakeholders

**2.3** Requests for information are responded to in the appropriate format and a timely manner

- |          |   |   |
|----------|---|---|
|          | <b>2.4</b>  | Difficult situations are identified and solutions are negotiated using a collaborative approach   |
|          | <b>2.5</b>  | Regular feedback is obtained and used to enhance positive relationships   |
| <b>3</b> | <b>Provide environmental management information and training</b>            |   |
|          | <b>3.1</b>  | Environmental management plans and recent incident reports are used to identify training needs of crew members  |
|          | <b>3.2</b>  | Information and training are developed and provided to ensure all crew members understand their environmental obligations/responsibilities                      |
|          | <b>3.3</b>  | Crew member understanding of environmental obligations/responsibilities for work areas and activities is confirmed  |
|          | <b>3.4</b>  | Effectiveness of the information and training is monitored and additional information/training is provided, as required   |
| <b>4</b> | <b>Assess environmental impacts and risks</b>                               |   |
|          | <b>4.1</b>  | Activities are reviewed to identify implications for environmental management   |
|          | <b>4.2</b>  | Potential risks and incidents that may cause harm to the environment are identified   |
|          | <b>4.3</b>  | Inspections and in situ measurements are conducted to quantify risks and impacts  |
|          | <b>4.4</b>  | Assessment of risks and impacts are reported according to organisational procedures   |
| <b>5</b> | <b>Ensure environmental monitoring and management plans are implemented</b> |   |
|          | <b>5.1</b>  | Environmental monitoring instruments are checked to ensure they are fully functioning   |
|          | <b>5.2</b>  | Specified environmental monitoring and inspections are conducted to check performance against environmental management requirements                             |
|          | <b>5.3</b>  | Additional monitoring/inspections are conducted after atypical events or requests from authorities to assess whether environmental management plan is operating |
|          | <b>5.4</b>  | Results for monitoring/inspections are analysed to identify significant trends, non-conformance and/or  |

		incidents
<b>6 Respond to environmental non-conformance and incidents</b>	<b>6.1</b>	Unusual situations, unexpected risks/hazards and potential/actual environmental incidents are recognised
	<b>6.2</b>	Organisational procedures for responding to environmental non-compliance and incidents are implemented to ensure prompt control and remediation
	<b>6.3</b>	Causes of non-compliance and incidents are investigated according to organisational procedures
	<b>6.4</b>	Findings are analysed to identify opportunities to improve work practices, environmental controls, crew training and/or management procedures
	<b>6.5</b>	Corrective/preventative actions are implemented to prevent recurrence of non-compliance and incidents, and to reduce risks
	<b>6.6</b>	Reports are completed according to organisational procedures
<b>7 Keep the Master informed about environmental performance</b>	<b>7.1</b>	Regular reports about environmental performance are provided
	<b>7.2</b>	Opportunities and recommendations for improvements are reported
	<b>7.3</b>	Master's advice is sought when challenges are beyond own scope of technical competence or when input from environmental specialist may be required
<b>8 Maintain environmental records</b>	<b>8.1</b>	Required records are prepared and maintained according to regulatory and organisational requirements
	<b>8.2</b>	Records are stored to enable easy access and review by authorised personnel according to regulatory and organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARJ003 Ensure compliance with environmental management legislation.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARJ008 Ensure compliance with pollution prevention requirements

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing, interpreting and applying regulatory requirements
- applying procedures for monitoring vessel operations and ensuring compliance with International Convention for the Prevention of Pollution from Ships (MARPOL) requirements are fully observed
- clearly explaining environmental management concepts, principles and procedures to others
- completing reports, including:
  - hazard near miss report form
  - monthly environmental report
  - non-conformance report form
  - regulatory agency reports
  - vessel incident investigation report
  - waste disposal logbooks
  - weekly environmental report
- maintaining accurate environmental records
- maintaining actions to ensure a positive environmental reputation
- monitoring the implementation of environmental management plans, policies and procedures, and specified work methods
- preparing records, including:
  - contractor and supplier information
  - digital photographs
  - environmental monitoring data
  - records of environmental non-conformance, incidents or significant impacts
  - records of monitoring equipment purchase, calibration, inspection, maintenance and service
  - records of training
  - records required by permit, approval or licence conditions
- regularly inspecting vessel for environmental risks and impacts
- responding to complaints and requests for information from authorities and authorised

personnel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anti-fouling systems
- anti-pollution procedures and all associated equipment
- ballast water management and their discharge criteria
- controlled discharge of oil
- environmental legislative/regulatory requirements and responsibilities relevant to the vessel
- environmental management and training information, including:
  - due diligence and duty to notify
  - environmental management actions and checklists, and methods/procedures for specific activities
  - incident management and reporting
  - introduction to vessel, environmental considerations and sources of environmental information
  - legislative requirements
  - licensing/compliance requirements
  - organisational environmental management policy
- environmental protection/management terminology, concepts and principles
- garbage management systems and anti-fouling systems
- garbage record book
- importance of proactive measures to protect the marine environment, including:
  - conventions and legislation adopted by various countries
  - MARPOL, all relevant Annexes and International Maritime Organization (IMO) circulars
- organisational environmental management plans, procedures, control measures and management actions for vessel
- organisational procedures for:
  - identifying and assessing environmental risks and impacts
  - managing stakeholder relations
  - responding to complaints and other environmental incidents
  - record management and reporting, including oil record book
- anti-pollution equipment, sewage plant, incinerator, comminutor and ballast water treatment plan
- precautions to be taken to prevent pollution of the marine environment, including:
  - Annexure I - oil
  - Annexure II - noxious liquid substances (NLS) in bulk
  - Annexure III - harmful substances carried by sea in packaged forms or in freight containers, portable tanks or road and rail tank wagons

- Annexure IV - sewage
- Annexure V - garbage
- Annexure VI - air pollution
- potential risks and incidents, including:
  - ballast water discharge
  - disposal of waste material, including sewage and garbage
  - over-side maintenance work
  - spill or release of hazardous chemicals/materials
- shipboard oil pollution emergency plan (SOPEP)
- shipboard marine pollution emergency plan
- stakeholders, including:
  - cargo owners
  - government officials
  - port authorities
- vessel characteristics and environmental issues, risks and impacts
- vessel response plan
- volatile organic compound (VOC) management plan
- work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARK009 Manoeuvre a vessel up to 80 metres**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to manoeuvre a vessel less than 80 metres.

This includes manoeuvring vessel in normal conditions, manoeuvring vessel in adverse weather conditions, manoeuvring vessel in emergencies, and towing and being towed.

This unit applies to people working in the maritime industry in the capacity of Master on a range of vessels less than 80 metres.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 35 metres in length within the exclusive economic zone (EEZ)
- Master of a vessel less than 80 metres in length in inshore waters
- Chief Mate or deck watchkeeper on a vessel less than 80 metres in length within the EEZ.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 80 metres in length as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

K – Manoeuvring Vessels

### **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Manoeuvre vessel in normal conditions

- 1.1 Features of vessel that relate to its handling characteristics are recognised
- 1.2 Adequate resources are organised prior to and during operations
- 1.3 Details of manoeuvres are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
- 1.4 Situational awareness is maintained to ensure safe manoeuvres
- 1.5 Manoeuvres are completed in relevant conditions of tide and wind to meet passage requirements
- 1.6 Propulsion equipment is used and monitored to assist in completing manoeuvres safely
- 1.7 Appropriate alterations to vessel heading and power are made in response to operational environment
- 1.8 Safe operating limits of propulsion and steering systems are not exceeded

#### 2 Manoeuvre vessel in adverse weather conditions

- 2.1 Nature of adverse weather conditions is identified and implications for vessel operations are evaluated
- 2.2 Preparations are made and required precautions are taken to minimise risk and damage to vessel, personnel and time loss on passage
- 2.3 Manoeuvres are adjusted to allow for weather and sea conditions, and to keep vessel in safe water
- 2.4 Propulsion equipment is used and monitored to assist in completing actions safely
- 2.5 Heading is maintained within acceptable limits
- 2.6 Appropriate allowance is made for effects of deadweight, draft, trim, speed and underwater keel

- clearances during turning circles and stopping distance
- 2.7** Safe operating limits of propulsion and steering equipment are not exceeded
- 2.8** Situational awareness is maintained at all times to review actions and ensure safety of vessel
- 3 Manoeuvre vessel in emergencies**
- 3.1** Nature of emergency is established and required action is determined
- 3.2** Risks to vessel and safety of persons onboard are assessed and safety of required action is confirmed
- 3.3** Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
- 3.4** Appropriate manoeuvres are made during emergency to maintain safety of vessel and those onboard, and any other vessels or persons involved
- 3.5** Propulsion equipment is used and monitored to assist in completing actions safely
- 3.6** Safe operating limits of propulsion and steering equipment are not exceeded
- 3.7** Special handling techniques are correctly applied during launching of boats or life rafts and rescues of persons overboard
- 4 Tow and be towed**
- 4.1** Preparations for towing are safely made according to established nautical practice
- 4.2** Correct towing procedures and precautions are applied when towing and being towed

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARK003 Manoeuvre a vessel up to 80 metres.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARK009 Manoeuvre a vessel up to 80 metres

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchoring a vessel
- determining required action for a range of emergency situations
- handling a disabled or partially disabled vessel
- issuing helm and engine orders
- maintaining situational awareness
- manoeuvring a vessel in normal and emergency situations
- manoeuvring a vessel through:
  - anchor work
  - astern movements
  - berthing and leaving a berth
  - coming to and leaving a mooring
  - person overboard
  - positioning vessel to safely launch boats or life rafts in bad weather
  - steering astern through an 's' configuration
  - turn short around
  - turning a vessel across the tide across the wind
- manoeuvring a vessel to embark or disembark a pilot
- manoeuvring in shallow water
- preparing for towing, including:
  - ensuring appropriate lights and shapes for the tow are available and in working order
  - ensuring means of communication between the two vessels is available
  - ensuring tow line is of sufficient length
  - ensuring tow ropes are in good condition and of adequate strength for proposed tow
  - making appropriate reports to authorities
  - making provision for rapid slipping of tow in emergency situations
  - making tow fast to towing vessel to ensure steerage is maintained
  - preparing messenger ropes for passing tow lines.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- effects of displacement and planning hulls
- effects of inboard propulsion units
- effects of rudders and propellers
- effects of deadweight, draught, trim, speed, under keel clearance, tide and current on vessel's stopping distance and rate of turn
- factors that could adversely affect vessel safety during operations
- features of a vessel that relate to its handling characteristics
- interaction with passing vessels, squat, shallow water and banks effect
- launching boats or life rafts
- lessening drift and use of oil
- manoeuvres assisting a vessel or aircraft in distress
- manoeuvres to:
  - beach and re-float the vessel
  - berth in a pen
  - crossing a bar
  - embarking and disembarking a pilot
  - means of keeping a vessel out of a trough
  - take on board survivors from lifeboats and life rafts
- nature of emergencies, including:
  - collision
  - damage to vessel
  - disabled or partially disabled vessel
  - fire
  - grounding
  - loss of steering gear
  - person overboard
- precautions in manoeuvring or launching boats or life rafts in bad weather
- procedures for towing and being towed
- radio communications
- requirements for entering, departing and crossing a traffic separation scheme
- use of a sea anchor
- vessel in adverse weather conditions, including:
  - bad weather
  - fog and restricted visibility
  - following and quartering seas
  - heavy swell and surf
  - wind and sea conditions that may affect safety of vessel

- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARK010 Manoeuvre and handle a ship in all conditions**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to issue orders to manoeuvre and handle and command navigation of a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- 

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Master of a commercial vessel less than 500 gross tonnage (GT) or Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

K – Manoeuvring Vessels

## **Unit Sector**

Not applicable.



## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |   |
|---|---|
| <b>1 Provide commands to bridge and engine room to effect manoeuvres</b>          | <b>1.1</b> Situational awareness is maintained to determine progress of vessel<br><br><b>1.2</b> Situation is assessed to determine manoeuvres required<br><br><b>1.3</b> Appropriate orders are issued to ensure vessel is manoeuvred safely in all conditions   |
| <b>2 Order adjustments to vessel course and speed to maintain safe navigation</b> | <b>2.1</b> Effects of the operational environment on vessel performance are evaluated at regular intervals<br><br><b>2.2</b> Implications of the changed operational environment on vessel handling are assessed<br><br><b>2.3</b> Appropriate alterations are made and orders issued in response to assessment of the operational environment                                  |
| <b>3 Command vessel during emergencies</b>  | <b>3.1</b> Nature of emergency is established and initial action taken<br><br><b>3.2</b> Risks to the vessel and the safety of persons onboard are assessed<br><br><b>3.3</b> Appropriate manoeuvres are made to maintain vessel and personnel safety   |
| <b>4 Work with pilot to ensure safe passage to berth or anchorage</b>             | <b>4.1</b> Vessel is manoeuvred to ensure safe transfer of pilot<br><br><b>4.2</b> Pilot is provided access to vessel resources<br><br><b>4.3</b> Pilot is provided with information on vessel handling characteristics<br><br><b>4.4</b> Proposed berthing/anchoring plan is discussed with pilot<br><br><b>4.5</b> Pilot activities are monitored to ensure safe operation of |

vessel according to agreed berthing/anchoring plan

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARK006 Manoeuvre a vessel 500 gross tonnage or more.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARK010 Manoeuvre and handle a ship in all conditions**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying constant-rate-of-turn techniques
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- basing all decisions concerning berthing and anchoring on a proper assessment of vessel manoeuvring and engine characteristics and the forces to be expected while berthed alongside or lying at anchor
- berthing and unberthing under various conditions of wind, tide and current with and without tugs
- determining the manoeuvring and propulsion characteristics of common types of vessels, with special references to stopping distances and turning circles at various draughts and speeds
- handling vessels in rivers, estuaries and restricted waters having due regard to the effects of current, wind and restricted water on helm response
- issuing helm and engine orders
- maintaining situation awareness
- making a full assessment of possible effects of shallow and restricted waters, ice, banks, tidal conditions, passing vessels and own vessel bow and stern wave while under way so that the vessel can be safely manoeuvred under various conditions of loading and weather
- managing and handling vessels in heavy weather, including assisting a vessel or aircraft in distress, towing operations, keeping unmanageable vessel out of trough of the sea, lessening drift and using oil
- manoeuvring in shallow water, including the reduction in under-keel clearance caused by squat, rolling and pitching
- using propulsion and manoeuvring systems
- using remote controls of propulsion plant and auxiliary machinery.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alterations, including:
  - alterations of course
  - reduction in speed
- effects of current, wind and restricted water on helm response
- features of a vessel that relate to its handling characteristics
- importance of navigating at reduced speed to avoid damage caused by own vessel bow wave and stern wave
- manoeuvres, including:
  - application of constant-rate-of-turn techniques
  - berthing and unberthing under various conditions of wind, tide and current with and without tugs
  - choice of anchorage: anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
  - determining the manoeuvring and propulsion characteristics of common types of vessels, with special references to stopping distances and turning circles at various draughts and speeds
  - dragging anchor and clearing fouled anchors
  - dry-docking, both with and without damage
  - handling vessel in rivers, estuaries and restricted waters with due regard to the effects of current, wind and restricted water on helm response
  - importance of navigating at reduced speed to avoid damage caused by own vessel bow wave and stern wave
  - interaction between passing vessel and own vessel and nearby banks
  - managing and handling vessels in heavy weather, including assisting a vessel or aircraft in distress, towing operations, means of keeping unmanageable vessel out of trough of the sea, lessening drift and use of oil
  - manoeuvres when approaching pilot stations and embarking and disembarking pilots with due regard to weather, tide, head reach and stopping distances
  - manoeuvring in shallow water, including the reduction in under-keel clearance caused by squat, rolling and pitching
  - methods of taking on board survivors from rescue boats and survival craft
  - practical measures to be taken when navigating in or near ice or in conditions of ice accumulated on board
  - precautions in manoeuvring to launch rescue boats or survival craft in bad weather
  - procedures for and anchoring in deep and shallow water
  - turning a vessel on a reciprocal track to rescue a person overboard
  - using propulsion and manoeuvring systems, including various types of rudder
  - vessel and tug interaction
- manoeuvres when towing or under tow
- manoeuvring and propulsion characteristics of common types of vessels
- means of keeping an unmanageable vessel out of trough of the sea, lessening drift and use of oil

- nature of emergencies, including:
  - beaching
  - cargo shift
  - collision
  - damage to the vessel
  - disabled or partially disabled vessel
  - fire
  - grounding
  - loss of steering gear, including rudder
  - person overboard
- operational environment, including:
  - bank effect
  - conditions of loading
  - marine park areas
  - passing vessels
  - shallow and restricted waters
- orders, including:
  - communications with shore
  - embarking or disembarking a pilot
  - engine
  - helm
  - preparation for being towed or towing another vessel
  - preparation for taking tug lines
  - running mooring lines
- procedures for entering and leaving traffic separation zones
- reduction in under-keel clearance caused by squat, rolling and pitching
- situational awareness, including:
  - berthing and unberthing with tugs
  - choice of anchorage
  - dry-docking
  - effects of current, wind and restricted waters on helm response
  - head reach
  - in or near ice or ice accumulation on board
  - launching lifeboats or survival craft
  - load conditions
  - own vessel bow wave and stern wave
  - pilot boarding grounds
  - requirements of the manoeuvre
  - rivers, estuaries and restricted waters
  - safe water

- shallow water
- stopping distances and turning circles
- taking onboard survivors from lifeboats or survival craft
- tide
- traffic operation schemes
- weather conditions
- use of propulsion and manoeuvring systems
- use of, and manoeuvring in or near, traffic separation schemes (TSS) and in vessel traffic service (VTS) areas
- vessel and tug interaction
- vessel handling characteristics, including:
  - effects of single or twin screw
  - effects when moving astern
  - stopping ability
  - use of controllable pitch propeller (CPP)
- vessel resources, including:
  - bow and stern thrusters
  - communications equipment
  - engine control systems
  - helm and rate of turn indicators
  - personnel
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals

- tools, equipment and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARK011 Manoeuvre the ship

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to perform manoeuvres on a ship in all operating conditions and in emergencies.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial ship less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT) in any operating area
- Watchkeeper Deck.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.



## Competency Field

K – Manoeuvring Ships

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Manoeuvre ship in normal operations**

- 1.1** Ship heading is maintained within acceptable limits to meet the requirements of the operating situation
- 1.2** Alterations of heading and power are smooth and controlled
- 1.3** Suitable mode of steering is selected for the manoeuvre to meet the requirements of the operating situation
- 1.4** Constant rate of turn techniques are used to achieve constant radius turns during manoeuvres
- 1.5** Safe operating limits of ship propulsion, steering and power systems are not exceeded in normal manoeuvres

#### **2 Make adjustments to ship course and speed to maintain safe navigation**

- 2.1** Effects of operational environment on ship performance are evaluated at regular intervals
- 2.2** Implications of the changed operational environment on ship handling are assessed
- 2.3** Appropriate alterations to ship heading and power are made in response to the assessment of the operational environment

#### **3 Manoeuvre ship during adverse weather**

- 3.1** Impending adverse weather conditions are identified and implications for ship operations are evaluated
- 3.2** Preparations are made to minimise risk and damage to ship and personnel

- |          |                                      |   |
|----------|--------------------------------------|---|
|          | <b>3.3</b>                           | Communications are made with engine room to ensure main engines are readied for manoeuvring |
|          | <b>3.4</b>                           | Ship heading and power is maintained in response to adverse weather and sea conditions      |
| <b>4</b> | <b>Manoeuvre ship in emergencies</b> |   |
|          | <b>4.1</b>                           | Nature of emergency is established and initial action is taken                              |
|          | <b>4.2</b>                           | Risk to the ship and the safety of persons onboard is assessed                              |
|          | <b>4.3</b>                           | Appropriate manoeuvres are made during the emergency to maintain the safety of the ship     |
|          | <b>4.4</b>                           | Propulsion equipment is used and monitored to assist in completing actions safely           |
|          | <b>4.5</b>                           | Safe operating limits of propulsion and steering equipment are not exceeded                 |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARK004 Perform basic vessel manoeuvres.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARK011 Manoeuvre the ship

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- manoeuvring a ship:
  - in bad weather
  - in heavy swell
  - for the rescue of person overboard
  - in shallow water
  - recognising emergency situations
  - through coming to and leaving a mooring
  - to and from anchor
- operations, including the following:
  - handling a disabled or partially disabled ship
  - implementing anchoring and berthing procedures
  - issuing helm and engine orders
  - maintaining situational awareness
- selecting suitable mode of steering, including:
  - automatic pilot
  - emergency steering
  - manual steering.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- communication techniques with the following:
  - bridge personnel and berthing stations
  - engine room
  - helmsman
  - tugs and pilot
  - vessel traffic services (VTS)

- effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances
- effects on ship handling of wind, currents and bottom topography
- features of a ship that relate to its handling characteristics
- manoeuvring and engine characteristics for various ships
- manoeuvring problems for ships and appropriate actions and solutions
- manoeuvring procedures in and near traffic separation schemes and ship traffic service areas
- methods for controlling ship speed and direction
- operational environment, including:
  - designated anchorages
  - designated shipping areas
  - head reach
  - heavy traffic areas
  - ice
  - marine park areas
  - safe water
  - shallow and restricted waters
  - stopping distances
  - tide
  - traffic separation zones
  - weather
- procedures and manoeuvres for the rescue of person overboard
- procedures for turning a ship in various situations
- proper procedures for anchoring and mooring
- safe operating limits of propulsion and power systems, and steering equipment
- squat, shallow water, interaction and similar effects on ship handling
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or

may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARK012 Steer a vessel under direction of the Master**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to steer a vessel under the direction of the Master, complying with helm orders.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Deck on a range of vessels
- Integrated Rating
- Navigational Watch - Deck/Engine.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Deck, Integrated Rating or Navigational Watch - Deck/Engine and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers. (STCW)
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

K – Manoeuvring Vessels

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Steer a steady course within acceptable limits in normal conditions under the direction of the Master**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Features of vessel that relate to its handling characteristics are recognised

**1.2** Navigational equipment is used to steer a steady course

**1.3** Situational awareness is maintained to ensure safety of vessel

**1.4** Propulsion equipment is used and monitored to assist in steering a steady course within acceptable limits, having regard to the area of navigation and prevailing state of sea

**1.5** Safe operating limits of propulsion and steering equipment are not exceeded

**1.6** Automatic pilot and hand steering are used to steer a steady course, and course is altered smoothly and in a controlled way

**1.7** Helm orders are followed and effective communication maintained with the Master on matters relevant to the safety and integrity of the vessel

#### **2 Steer a vessel in adverse weather conditions under the direction of the Master**

**2.1** Nature of adverse weather conditions is identified and potential impact on the manoeuvrability of the vessel is determined and confirmed with the Master

**2.2** Propulsion equipment is used and monitored to assist in steering a steady course within acceptable limits, having regard to the area of navigation and prevailing state of sea

**2.3** Safe operating limits of propulsion and steering equipment are not exceeded

**2.4** Situational awareness is maintained at all times to

- review actions and ensure the safety of the vessel
- 2.5 Automatic pilot and hand steering are used to steer a steady course, and course is altered smoothly and in a controlled way
  - 2.6 Helm orders are followed and effective communication maintained with the Master on matters relevant to the safety and integrity of the vessel
- 3 Steer a vessel in emergencies under the direction of the Master**
- 3.1 Nature of the emergency is established and required action is determined and confirmed with the Master
  - 3.2 Helm orders are followed and effective communication maintained with the Master on matters relevant to the safety and integrity of the vessel
  - 3.3 Vessel is steered during the emergency to maintain the safety of the vessel and those onboard, and any other vessels or persons involved in the emergency
  - 3.4 Propulsion equipment is used under the direction of the Master and is monitored to assist in completing steering safely
  - 3.5 Safe operating limits of propulsion and steering equipment are not exceeded
- 4 Steer a vessel while towing and being towed under the direction of the Master**
- 4.1 Correct towing procedures and precautions are applied when towing and being towed in relation to helm orders
  - 4.2 Helm orders are followed and effective communication maintained with the Master on matters relevant to the safety and integrity of the vessel

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.



## Unit Mapping Information

This unit replaces and is equivalent to MARK005 Steer a vessel under direction of the Master.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARK012 Steer a vessel under direction of the Master**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- changing from automatic pilot to hand steering and changing from hand steering to automatic pilot
- ensuring working behaviour reflects relevant current legislative and regulatory requirements
- maintaining situational awareness at all times
- steering a vessel:
  - coming to and leaving a mooring
  - in bad weather
  - in fog and restricted visibility
  - in heavy swell and surf
  - in the vicinity of large vessels
  - in wind and sea conditions that may affect the safety of the vessel
  - when approaching and departing in anchorage
  - while towing and being towed.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate use and selection of personal protective equipment (PPE)
- effects on the overall operation of the vessel and on the steering characteristics of a vessel, including:
  - displacement and planning hulls
  - outboard and inboard propulsion units
  - rudders and propellers
  - trim and displacement
- features of a vessel that relate to its handling and steering characteristics, including:

- affect manoeuvrability
- effects of single or twin screw
- effects when moving astern
- rate of turn
- stopping ability
- use of controllable pitch propeller
- use of helm and rudder indicators
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- use of magnetic and gyrocompasses as applied to the steering of a vessel.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL038 Apply advanced principles of marine electrotechnology**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to apply advanced marine electrotechnology principles and to perform advanced electrical calculations.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

- 1 Analyse circuits incorporating resistance, inductance and capacitive elements in alternating current (AC) and direct current (DC) circuits**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Mathematical problems involving resistor inductor (RL) and resistor capacitor (RC) combinations in DC circuits are solved
- 1.2** Mathematical problems involving resistive, inductive and capacitive reactance and overall circuit impedance in AC circuits are solved
- 1.3** Reasons why large power factors are desirable in AC circuits are explained
- 1.4** Mathematical problems related to power factor correction mechanisms are solved
- 1.5** Conditions for resonance in series and parallel RLC circuit combinations are analysed
- 1.6** Mathematical problems involving resonance in series and parallel RLC circuit combinations are solved
- 1.7** Calculations are performed to solve problems related to solve resistance, voltage drop, current and power in series and parallel circuits
- 1.8** Calculations are performed to solve problems related to temperature coefficient of resistance and change of resistance of a conductor with a

		change of temperature
2	<b>Apply complex number theory to analyse AC circuit performance</b>	<ul style="list-style-type: none"><li>2.1 J operator is explained</li><li>2.2 Rectangular notation of j operator is related to comparable trigonometric and polar notations</li><li>2.3 J operator is used in the addition and subtraction of phasors, applying the most appropriate notation to the solution of phasor problems involving current, voltage and impedance</li><li>2.4 Conductance, admittance and susceptance are distinguished from each other in terms of resistance, impedance and the j operator</li><li>2.5 Problems involving RL and RC elements in different circuit combinations using j operator theory are solved</li><li>2.6 Power in AC circuit applications using j operator theory is calculated</li></ul>
3	<b>Analyse operating principles of electrical instrumentation</b>	<ul style="list-style-type: none"><li>3.1 Mathematical calculations are performed to demonstrate how moving coil and moving iron instruments may have their ranges changed</li><li>3.2 Mathematical calculations are performed to demonstrate how dynamometer type wattmeters may have their measuring ranges extended</li><li>3.3 Construction, operating principles and functions of electrical meters are outlined</li><li>3.4 Principal methods and instruments used in resistance measurement are detailed</li><li>3.5 Resistance measurements are conducted and verified using</li></ul>

- appropriate electrical instrumentation
- 4 Analyse operating principles of DC generators**
- 4.1** Electromotive force (EMF) equation is applied to solve problems related to DC generators
  - 4.2** Losses that may occur in DC generators are analysed
  - 4.3** Appropriate parametric relationships for DC generator losses, together with expressions for output power and efficiency, are derived and associated numerical problems are solved
  - 4.4** Basic principles of DC armature winding techniques are explained
  - 4.5** Generator armature reaction is explained
  - 4.6** Expression for armature EMF is derived and applied to solve problems related to DC generators
  - 4.7** Commutator arcing and how this might be minimised or eliminated is explained
  - 4.8** Open circuit and load characteristic curves for separately excited, shunt and compound wound DC generators are derived
  - 4.9** Faraday's and Lenz's Laws are applied to solve problems relating to the electromagnetic induction of EMF and current
  - 4.10** Generation of EMF is illustrated by a simple, single loop conductor rotating in a uniform magnetic field and how this EMF may be tapped to an external circuit as either AC or DC is explained
- 5 Analyse operating principles of DC motors**
- 5.1** DC torque equation is applied to solve problems related to DC motors
  - 5.2** Losses that may occur in DC motors

are analysed

- 5.3 Appropriate parametric relationships for DC motor losses, together with expressions for output power and efficiency. are derived and associated numerical problems are solved
- 5.4 Speed equation for a DC motor is derived and corresponding characteristics for different winding configurations are sketched
- 5.5 Speed equation and characteristics of different DC motor configurations are applied to explain how DC motor speed may be controlled
- 5.6 Reasons for armature reaction and methods of compensating for its effects are identified
- 5.7 Reasons why DC motors need variable starting resistors are explained
- 5.8 Schematic circuits are prepared for separately excited, series, shunt and compound connected generators and motors to illustrate wiring arrangements used with DC machines

## **6 Compare operation of synchronous motors and generators**

- 6.1 Marine applications of synchronous motors and generators are identified
- 6.2 Mathematical expression for the magnitude and rotational speed of the magnetic field produced by a three phase supply is derived
- 6.3 Operating principles of synchronous motors are explained
- 6.4 Operation of synchronous motors and generators are compared and contrasted
- 6.5 Problems using phasor diagrams and mathematical expressions involving the effects of loads and excitation on



synchronous motors are solved

- 6.6** Advantages and disadvantages of AC synchronous motors and generators are analysed
- 6.7** How alternating electrical quantities may be represented by rotating phasors is illustrated and explained
- 6.8** Relationships between instantaneous, maximum, average and root mean square (RMS) values of sinusoidally alternating electrical quantities is derived
- 6.9** Mathematical problems are solved by applying relationships between instantaneous, maximum, average and RMS values of sinusoidally alternating electrical quantities
- 6.10** Construction features of the AC induction motor are explained
- 6.11** Expression for slip of an induction motor rotor is derived and applied to frequency of its rotor EMF and current
- 6.12** Expression for magnitude of rotor EMF and current is derived, taking into account distribution and pitch factors
- 6.13** Relationships between rotor torque, rotor losses and slip indicating factors that affect torque are outlined
- 6.14** Significance of torque/slip curves for an induction motor is explained
- 6.15** Relationship between starting torque and applied voltage is established and consequences of this upon starting methods are outlined

## 7

### Analyse operation of single and three phase transformers

- 7.1** Basic transformation ratio and EMF equation for an ideal transformer is derived

		<p><b>7.2</b> No load and on load phasor diagrams for an ideal transformer are constructed, with negligible voltage drop through its windings</p> <p><b>7.3</b> Causes of actual transformer losses are explained and relationships associated with the transformer equivalent circuit are derived</p> <p><b>7.4</b> Open circuit and short circuit tests are applied to calculate transformer efficiency and voltage regulation</p> <p><b>7.5</b> Problems related to the operation of autotransformers are solved</p>
<b>8</b>	<b>Analyse requirements for parallel operation of AC and DC generators</b>	<p><b>8.1</b> Conditions required for shunt, series and compound wound DC generators to operate in parallel are identified</p> <p><b>8.2</b> Numerical problems related to parallel operation of shunt, series and compound wound DC generators are solved</p> <p><b>8.3</b> Conditions required for AC generators to operate in parallel are identified</p> <p><b>8.4</b> Numerical problems related to parallel operation of AC generators are solved</p> <p><b>8.5</b> EMF equation for an AC generator is derived, taking into account distribution and pitch factors</p> <p><b>8.6</b> Voltage regulation for synchronous generator is defined</p> <p><b>8.7</b> Effect of power factor on load characteristic of an AC generator is illustrated</p>
<b>9</b>	<b>Explain how principles of electrolytic action apply to electrical cells and batteries</b>	<p><b>9.1</b> Kirchhoff's circuit laws are explained</p> <p><b>9.2</b> Calculations to solve problems involving currents, voltage drop and</p>

terminal potential difference for cells connected to form batteries in series and in parallel are performed

**9.3** Calculations to solve secondary cell charging and discharging problems are performed

**9.4** Calculations to solve problems related to the efficiency of cells are performed

## **10 Analyse a magnetic circuit**

**10.1** Key parameters of magnetic circuits are identified

**10.2** Formula for calculating the amount of flux generated by a multi-turn solenoid coil carrying a current to give the B/H relationship is applied

**10.3** Significance of the varying slopes in the B/H curves for a solenoid coil with air, cast iron, cast steel and mild steel cores is explained

**10.4** How a magnetic circuit may be created by using a toroidal core within the solenoid coil is demonstrated

**10.5** Calculations to solve problems relating to magnetic circuits using different materials in different parts of their cores, including air gaps, are performed

**10.6** Effect on flux density of applying an alternating magnetising force to an iron core is shown diagrammatically

## **11 Analyse operation of polyphase AC circuits**

**11.1** How three phase AC may be developed out of simple single phase AC is explained

**11.2** Voltage and current relationships between line and phase in both Star and Delta three phase connections are derived

**11.3** Standard Star-to-Delta and Delta-to-Star conversion relationships

for current and voltage are derived

**11.4** Numeric problems involving both balanced and unbalanced circuit loads are solved

**11.5** Relationships between kilowatt (kW), kilovolt-ampere (kVA) and kilovolt-ampere reactive (kVAr) for three phase AC circuits are derived

**11.6** Calculations are performed using the relationship between kW, kVA and kVAr to solve problems in three phase AC circuits

**12**                    **Analyse circuits that incorporate combinations of resistive, inductive and capacitive elements**

**12.1** Time constant for different circuit combinations subjected to DC EMFs is defined

**12.2** Calculations are performed to solve problems involving time constants in DC circuits with changing rates of current in resistive/inductive elements and changing voltages through resistive/capacitive circuit elements

**12.3** Differentiation is made between inductive reactance, capacitive reactance and impedance as applied to AC circuits

**12.4** Effects of inductive and capacitive reactance upon phasor relationships between applied AC voltage and current are shown

**12.5** Concept of total impedance is applied to solution of problems involving single phase AC quantities in the presence of both resistive/inductive and resistive/capacitive circuit elements, arranged in either series or parallel

**12.6** Power factor is defined and concepts of real and reactive power usage are applied to solution of problems

		involving RL and RC elements
<b>13</b>	<b>Describe basic operating principles of shipboard DC machinery</b>	<p><b>13.1</b> EMF equation for a DC generator to solve shipboard problems is applied</p> <p><b>13.2</b> Torque equation for a DC motor to solve shipboard problems is applied</p> <p><b>13.3</b> Expression linking back EMF parameters for a DC motor is derived and used to solve shipboard problems</p> <p><b>13.4</b> Various losses that can occur in DC motors and generators are calculated</p>
<b>14</b>	<b>Explain operating principles of basic electrical instrumentation</b>	<p><b>14.1</b> Schematic circuit diagrams are prepared that illustrate the main features and applications of moving coil and moving iron voltmeters and ammeters</p> <p><b>14.2</b> Schematic circuit diagrams are prepared that illustrate the main features and applications of air and iron cored dynamometer type wattmeters</p> <p><b>14.3</b> Dangers associated with current and voltage transformers on high current and voltage systems are identified</p>

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit supersedes and is not equivalent to MARL014 Apply intermediate principles of marine electrotechnology.

This unit replaces and is equivalent to MARL018 Apply advanced principles of marine electrotechnology.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL038 Apply advanced principles of marine electrotechnology**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 6.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve complex problems related to marine electrotechnology
- identifying and interpreting numerical and graphical information, and performing mathematical calculations to perform tasks, such as using phasor diagrams and mathematical expressions to explain the effects of loads and excitation on synchronous motors
- identifying, collating and processing information required to perform complex calculations related to marine electrotechnology
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform complex electrical calculations
- solving problems using appropriate laws and principles
- using calculators to perform complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alternating current (AC) commutator motors
- AC induction motors
- AC principles
- AC single phase motors
- advanced principles of marine electrotechnology
- asynchronous machines
- batteries
- circuits:
  - capacitance
  - inductance

- resistance
- circuit diagrams
- circuit combinations, including:
  - resistive/capacitive
  - resistive/inductive
- complex number theory
- direct current (DC) generators and motors
- difference between AC and DC
- electrical:
  - circuits
  - current
  - power
  - safety
  - units of measurement
- electromagnetic:
  - force
  - induction
- electrical meters:
  - energy meters
  - frequency meters
  - induction disc watt meters
  - power factor meters
- Faraday's and Lenz's Laws of electromagnetic induction
- Flemings rule
- Fourier series for non-sinusoidal voltage and current representation
- intermediate electrical circuits
- intermediate principles of marine electrotechnology
- Kirchhoff's circuit laws
- losses, including:
  - copper losses
  - iron losses or magnetic losses
  - mechanical losses
- magnetic circuits and key parameters, including:
  - current
  - flux
  - flux density
  - magnetising force
  - magneto motive force
- national and international maritime regulations, International Maritime Organization (IMO) conventions and codes applicable to the operation of electrical and electronic control



- equipment on vessels of typically unlimited propulsion power
- Ohm's Law
- operating principles of:
  - DC generators
  - DC motors
  - electrical instrumentation
  - parallel circuits
- parallel operation of AC and DC generators
- polyphase AC circuits
- power factor
- power factor correction mechanisms
- principles and procedures for electrical and electronic measurement
- problems, including:
  - tapping point
  - turns
  - voltages
- principles of:
  - electrical safety
  - electrolytic action
  - electromagnetism
- reluctance and permanent magnet machines
- resistance
- series circuits
- shipboard DC machinery, including
  - electrical safety
  - electrolytic action
  - electromagnetism
- single and three phase transformers
- synchronous motors and generators
- Thevenin's theorem
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and

numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic industry approved marine operations site or simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, personnel and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL039 Apply advanced principles of marine engineering thermodynamics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to apply advanced principles of engineering thermodynamics to perform calculations and to explain the operation of marine machinery, including internal combustion and gas turbine engines, air compressors, steam condensers and refrigeration units.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Calculate heat mixtures involving water equivalent, change of phase and feed heating**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Key terms associated with heat transmission are explained

**1.2** Heat transfer is calculated between liquids and solids using water equivalent

**1.3** Flow is differentiated from non-flow heating and cooling processes

**1.4** Effects of superheating and sub-cooling on steam plant efficiency are outlined

**1.5** Enthalpy is applied to heat mixture calculations with or without phase change

**1.6** Enthalpy is applied to calculate resultant conditions of hot wells involving multiple returns

**1.7** Steam conditions in a system when using throttling devices and separators are calculated

**1.8** Entropy is distinguished from enthalpy

**1.9** Entropy values are determined from standard tables

**1.10** Mass balance throughout a steam plant cycle is constructed and effects of pressure and temperature on cycle efficiency are analysed

#### **2 Determine fluid properties of steam**

**2.1** Relationship between saturated and superheated steam, including dryness fraction, is explained

		<b>2.2</b>	Tables and/or diagrams are used to find enthalpy and entropy values for liquid, part liquid-part vapour and vapour states
		<b>2.3</b>	Carnot cycle is outlined
		<b>2.4</b>	Rankine cycle is outlined
		<b>2.5</b>	Isentropic efficiency is explained
		<b>2.6</b>	Problems are solved involving the efficiency of steam turbines operating in the Rankine cycle
<b>3</b>	<b>Calculate boiler efficiency and boiler water density</b>	<b>3.1</b>	Concept of parts per million for density of boiler water is explained
		<b>3.2</b>	Changes in boiler water density due to contaminated feed are calculated
		<b>3.3</b>	How acceptable dissolved solids and water levels may be maintained in a boiler is shown
<b>4</b>	<b>Apply Dalton's Law of partial pressures to steam condensers</b>	<b>4.1</b>	Dalton's Law is applied to calculate air and condensate extraction from condensers
		<b>4.2</b>	Problems are solved involving cooling water mass flow and cooling water pump work
<b>5</b>	<b>Apply chemical equations for complete and incomplete combustion</b>	<b>5.1</b>	Atomic and molecular weights and kilogram-mole (kg-mol) are explained
		<b>5.2</b>	Elements and compounds present in fuel and the products of combustion are evaluated
		<b>5.3</b>	Calorific value of a fuel is calculated by chemical formula
		<b>5.4</b>	Mass of air required for stoichiometric combustion is calculated by gravimetric and volumetric analysis
		<b>5.5</b>	Chemical equations for combustion elements and compounds are developed and elements of combustion are analysed
		<b>5.6</b>	Air/fuel ratio, gravimetric and volumetric analysis are explained

- |   |            |  |
|---|------------|--|
|   | <b>5.7</b> | Air/fuel ratio is determined when supplied with composition of fuel and exhaust gas analysis                             |
|   | <b>5.8</b> | Bomb calorimeter is used to find calorific value of a fuel   |
| <b>6. Calculate thermal expansion</b>   | <b>6.1</b> | Coefficient of linear expansion and its significance to different materials is explained                                 |
|   | <b>6.2</b> | Clearances and shrunk fit allowances are calculated  |
|   | <b>6.3</b> | Stresses generated with restricted expansion are calculated  |
|   | <b>6.4</b> | Volumetric expansion of solid and liquids, and allowance required for fluid expansion in tanks and systems is calculated |
| <b>7 Calculate gas conditions, work and thermal efficiency of internal combustion engines</b> | <b>7.1</b> | Compression and pressure ratio is explained and related to combined gas law equation                                     |
|   | <b>7.2</b> | Combined gas law equation is applied to constant volume and constant pressure processes                                  |
|   | <b>7.3</b> | Specific gas constant of a gas or mixture of gases is calculated   |
|   | <b>7.4</b> | Universal gas constant from Avogadro's hypothesis is determined  |
|   | <b>7.5</b> | Differentiation is made between specific heat of gases, ratio of specific heats, work and change in internal energy      |
|   | <b>7.6</b> | Changes in internal energy associated with specific heat of gases, ratio of specific heats and work are calculated       |
|   | <b>7.7</b> | First law of thermodynamics is applied to thermodynamic processes in a closed system                                     |
|   | <b>7.8</b> | Second law of thermodynamics is applied to find thermal efficiency of Carnot cycle                                       |
|   | <b>7.9</b> | Mathematical formula is applied to solve problems related to ideal constant volume air standard cycle                    |

- |          |   |   |
|----------|---|---|
|          | <b>7.10</b>   | Mathematical formula is applied to solve problems related to diesel and dual cycles                                   |
| <b>8</b> | <b>Calculate performance of internal combustion and gas turbine engines</b> | <b>8.1</b> Processes associated with expansion and compression of gases are explained                                 |
|          | <b>8.2</b>  | Gas conditions and index of compression at end of each process are determined   |
|          | <b>8.3</b>  | Work formula is derived for each process and derived formula is applied to calculate work and power per cycle         |
|          | <b>8.4</b>  | Air standard cycle is applied to determine amount of fuel consumed and work produced by an internal combustion engine |
|          | <b>8.5</b>  | Differentiation is made between air standard efficiency and thermal efficiency  |
|          | <b>8.6</b>  | Pressure/volume (P/V) and out-of-phase engine indicator diagrams are analysed   |
|          | <b>8.7</b>  | Work, power, mean effective pressure and thermal efficiency of internal combustion engine cycles are calculated       |
|          | <b>8.8</b>  | Heat transfer to jacket cooling systems is calculated   |
|          | <b>8.9</b>  | Open and closed systems for gas turbines are outlined   |
|          | <b>8.10</b>   | Temperature/entropy diagrams are applied to illustrate gas turbine cycles   |
|          | <b>8.11</b>   | Power, isentropic efficiencies, thermal efficiency, work and fuel consumption for gas turbine cycles are calculated   |
|          | <b>8.12</b>   | Methods to increase efficiency of gas turbines are specified  |
|          | <b>8.13</b>   | Reheaters and intercoolers and how they improve efficiency is explained   |
| <b>9</b> | <b>Analyse air compressor performance</b>                                   | <b>9.1</b> Compressor types are classified  |

	<b>9.2</b>	P/V diagram is applied to describe operating cycle of reciprocating compressors
	<b>9.3</b>	Work done by constant pressure, isothermal processes and polytropic processes in reciprocating compressors is calculated
	<b>9.4</b>	Effect of clearance volume on efficiency of reciprocating compressors is explained
	<b>9.5</b>	Volumetric efficiency at free air conditions is explained
	<b>9.6</b>	Volume, mass flow and temperature are calculated at completion of each process in reciprocating compressors
	<b>9.7</b>	Intercooling and after-cooling effects on overall efficiency of reciprocating compressors is explained
	<b>9.8</b>	Heat transfer to air or cooling water from an air compressor is calculated
	<b>9.9</b>	Work is calculated for isothermal and adiabatic compression, and effect of clearance for reciprocating compressor
	<b>9.10</b>	Formula to calculate work and efficiency of centrifugal compressors is derived
	<b>9.11</b>	Pressure ratio for compressor types is analysed
	<b>10.1</b>	Design parameters for a vapour compression cycle are explained
<b>10</b>	<b>Analyse vapour compression refrigeration cycles</b>	
	<b>10.2</b>	Pressure/enthalpy diagram is prepared for a refrigeration cycle
	<b>10.3</b>	Heat rejected, work done and coefficient of performance (COP) for a basic cycle is calculated
	<b>10.4</b>	Effect of subcooling and superheating is shown on a temperature/entropy diagram
	<b>10.5</b>	COP is calculated with evaporators operating at two different pressures



<b>11</b>	<b>Apply psychrometric principles to solve air conditioning problems</b>	<b>10.6</b>	Properties and hazards of refrigerants used in refrigeration and air conditioning (RAC) systems are identified
		<b>10.7</b>	Basic air conditioning cycles are explained
		<b>11.1</b>	Comfort conditions for air conditioning systems are defined
		<b>11.2</b>	Key parameters used in defining air condition are illustrated on a psychrometric chart
		<b>11.3</b>	Cooling loads are calculated
<b>12</b>	<b>Analyse different methods of heat transfer</b>	<b>11.4</b>	Problems associated with air delivering and distribution methods are analysed
		<b>11.5</b>	Methods of controlling noise and vibration in air conditioning systems are analysed
		<b>12.1</b>	Different forms of heat transfer are identified
		<b>12.2</b>	Heat flow through composite divisions is calculated
		<b>12.3</b>	Insulation dimensions and interface temperatures are determined
		<b>12.4</b>	Problems relating to radiated energy are solved by applying Stefan-Boltzmann Law
		<b>12.5</b>	Relative efficiency of contra-flow heat exchange is determined
<b>13</b>	<b>Perform calculations related to engine power and heat balances</b>	<b>12.6</b>	Problems in heat exchangers are solved by applying log mean temperature difference
		<b>12.7</b>	Radial conduction of heat through a thin cylinder is calculated
		<b>13.1</b>	Formula is applied to solve problems related to indicated power of internal combustion engines
		<b>13.2</b>	Formula is applied to solve problems related to brake power of internal combustion engines

- 13.3 Morse test is applied to determine the indicated power of internal combustion engines
      - 13.4 Tabular and graphical heat balance diagrams are applied to calculate mechanical, thermal and overall efficiencies of internal combustion engines
- 14 Determine steam velocity
  - 14.1 Principles and differences between pressure and velocity changes in reaction and impulse steam turbines are explained
  - 14.2 Velocity diagrams to calculate steam velocity at exit of nozzles and blades are applied
  - 14.3 Graphical and mathematical methods to determine blade angle, steam velocity, thrust, power, and efficiency of single stage impulse and reaction steam turbines are applied
- 15 Use nozzles
  - 15.1 Convergent nozzles are compared to convergent-divergent nozzles
  - 15.2 Steady flow equation is used to determine nozzle exit speed in terms of enthalpy
  - 15.3 Conditions for maximum mass flow through a nozzle are established

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is not equivalent to MARL015 Apply intermediate principles of marine engineering thermodynamics.

This unit replaces and is equivalent to MARL019 Apply advanced principles of marine engineering thermodynamics.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL039 Apply advanced principles of marine engineering thermodynamics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- communicating knowledge and ideas through verbal, written and visual means
- explaining advanced principles of engineering thermodynamics
- identifying and applying relevant mathematical formulas and techniques to solve advanced problems related to engineering thermodynamics
- identifying and interpreting numerical and graphical information, and performing advanced mathematical calculations related to engineering thermodynamics, such as calculation of power, isentropic efficiencies, thermal efficiency, and work and fuel consumption for gas turbine cycles
- identifying, collating and processing information required to perform advanced calculations related to engineering thermodynamics
- reading and interpreting written information needed to perform complex calculations related to engineering thermodynamics
- solving problems using appropriate laws and principles
- using calculators to perform accurate, reliable and complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- air compressors, including:
  - components
  - faults and hazards
  - first law of thermodynamics
  - operating cycle of reciprocating air compressors
  - performance characteristics
  - property diagrams
  - types

- uses
- working principles of reciprocating compressors
- atomic and molecular weights and the kilogram-mole (kg-mol)
- basic gas expansion and contraction, heat transfer
- basic principles of engineering thermodynamics
- Daltons Law of partial pressures
- enthalpy
- expansion and compression of gases
- fluid properties, including:
  - density
  - dryness fraction
  - enthalpy of water
  - pressure
  - saturated steam
  - specific volume
  - superheated steam
  - temperature
- gas laws
- gas turbines
- heat cycles, including:
  - marine diesel engine
  - marine steam boiler and steam turbine
  - marine gas turbine
- heat transfer, including:
  - forms:
    - conduction
    - convection
    - radiation
  - methods
  - principles
- internal combustion engines, including:
  - heat engine cycles
  - improvements
  - operating principles of two-stroke and four-stroke internal combustion engines
  - performance characteristics
  - second law of thermodynamics
- internal combustion engine cycles
- key terms, including:
  - enthalpy of fusion
  - evaporation

- sensible heat
- transfer of heat energy
- laws of thermodynamics
- methods, including:
  - duct attenuators
  - duct lining
  - lined duct splitters
  - lined plenums
  - natural attenuation
  - sound absorbing materials/placement
  - vibration isolators
  - white noise
- noise and vibration control, including:
  - fundamentals of sound
  - noise and vibration problems
  - methods of control
  - operating cycle of reciprocating air compressors
- operating principles of two-stroke and four-stroke internal combustion engines
- parameters, including:
  - adiabatic saturation or constant enthalpy
  - humidifying or dehumidifying
  - latent heat
  - sensible heat
- principles of refrigeration, including:
  - processes:
    - adiabatic
    - isothermal
    - polytropic
- Rankine cycle
- refrigeration and air conditioning (RAC) cycles and systems
- steam plants
- International System of Units (SI)
- tables and/or diagrams, including:
  - pressure-enthalpy
  - pressure-specific volume
  - specific enthalpy-specific entropy
  - temperature-pressure
  - temperature-specific enthalpy
  - temperature-specific entropy
- thermodynamic and heat transmission, including:

- air conditioning combustion
- gas cycles/engine analysis
- heat transfer
- properties and vapours
- refrigeration
- steam cycles
- thermodynamic principles
- thermodynamic processes, including:
  - adiabatic
  - isobaric
  - isochoric
  - isothermal
  - polytropic
- thermal efficiency calculations
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARL040 Apply advanced principles of marine mechanics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to apply advanced principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organisation Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

<b>1 Apply principle of statics to determine forces in structures, connections, support systems, and trusses in two and three dimensions</b>	<b>1.1</b>	Bows notation is applied to solve problems related to trusses
	<b>1.2</b>	Individual loads are computed using method of sections
	<b>1.3</b>	Forces in three-dimensional structures are calculated
	<b>1.4</b>	Principle of moments is applied to solve moments of any quantity
	<b>1.5</b>	Resultant of a system of co-planer forces is calculated
	<b>1.6</b>	Twisting moment due to engine crank mechanisms is calculated
	<b>1.7</b>	Moments of areas and solids are calculated
	<b>1.8</b>	Equilibrium of solids is explained
<b>2 Calculate friction torque in plate and cone clutches</b>	<b>2.1</b>	Laws of friction are applied to develop formulae, using uniform wear, to find the torque in a plate, centrifugal and cone clutch
	<b>2.2</b>	Laws of friction are applied to develop formulae, using uniform pressure, to find the torque in plate and cone clutches
	<b>2.3</b>	Power to overcome friction in plate and cone clutches using uniform wear and uniform pressure formulae is computed
	<b>2.4</b>	Laws of friction are applied to solve problems involving friction in inclined planes, including angle of repose
	<b>2.5</b>	Friction theory is applied to solve problems involving screw threads

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| <b>3 Calculate displacement, velocity and acceleration in cams, engine mechanisms and gear systems</b> | <b>3.1</b> | Output of epicyclic gears is calculated by applying relative velocity and acceleration theory   |
|  | <b>3.2</b> | Problems of linear and angular motion involving uniform acceleration and deceleration are solved  |
|  | <b>3.3</b> | Velocity and acceleration diagrams are applied to illustrate relative velocity and acceleration   |
|  | <b>3.4</b> | Inertia loads are calculated using piston velocity and acceleration equations   |
|  | <b>3.5</b> | Problems involving free falling bodies are solved   |
| <b>4 Analyse forces and couples to balance reciprocating machinery</b>                                 | <b>4.1</b> | How primary force balance is obtained is graphically illustrated  |
|  | <b>4.2</b> | Relationship between complete balance and dynamic balance is explained  |
|  | <b>4.3</b> | Reciprocating piston acceleration formula is applied to differentiate between primary and secondary forces                                      |
|  | <b>4.4</b> | Complete balance for a multicylinder reciprocating engine or machine is illustrated graphically using vector diagrams and computed analytically |
|  | <b>4.5</b> | Relationship between momentum and impulse is explained  |
|  | <b>4.6</b> | Conservation of energy theory is applied to problems involving collision of perfectly elastic bodies  |
| <b>5 Apply simple harmonic motion (SHM) principles to solve problems in free and forced vibration</b>  | <b>5.1</b> | Differences in the terms amplitude, frequency and period are explained  |

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|   | <b>5.2</b> | SHM equations are derived from the scotch yoke mechanism   |
|   | <b>5.3</b> | Equations for displacement, velocity, acceleration and frequency in SHM are developed  |
|   | <b>5.4</b> | Displacement, velocity, acceleration and frequency in SHM in a vibrating spring-mass system are determined                       |
|   | <b>5.5</b> | Spring constant (k) for springs in series and parallel is calculated   |
|   | <b>5.6</b> | Forced vibration caused by an out-of-balance rotating mass is analysed to derive an expression for amplitude of forced vibration |
|   | <b>5.7</b> | Dangers of resonance are explained   |
| <b>6 Calculate stresses in components</b>   | <b>6.1</b> | How rotational stress is generated by centrifugal force is explained   |
|   | <b>6.2</b> | Formula for hoop stress in a rotating ring is applied to calculate hoop stress and/or limiting speed of rotation                 |
|   | <b>6.3</b> | Stresses in compound bars subject to axial loads and/or temperature change are determined  |
|   | <b>6.4</b> | Reduction in area and percentage elongation of tensile test specimens is calculated  |
|   | <b>6.5</b> | Stresses in composite bodies of dissimilar dimensions and dissimilar materials are calculated                                    |
|   | <b>6.6</b> | Problems involving thermal stress on components due to temperature change with free and restricted expansion are solved          |
| <b>7 Apply strain energy and resilience theory to determine stresses caused by impact or suddenly applied loads</b> | <b>7.1</b> | Equation is derived to calculate strain energy in a deformed material  |
|   | <b>7.2</b> | Stress in a material due to impact or dynamic loads is determined using energy equation  |

	<b>7.3</b>	Equation to calculate stress caused by suddenly applied loads is derived
<b>8 Apply beam theory to solve problems</b>	<b>8.1</b>	Reactions of a loaded beam are calculated
	<b>8.2</b>	Shear force and bending moment diagrams are constructed for simply supported and cantilever beams
	<b>8.3</b>	Shear force and bending moment diagrams for beams with concentrated and uniformly distributed loads are calculated
	<b>8.4</b>	Beam equation is applied to derive stresses in beams loaded with concentrated and uniformly distributed loads
	<b>8.5</b>	Beam equation is applied to calculate bending stresses
	<b>8.6</b>	Macaulay's method is applied to calculate beam deflection
	<b>8.7</b>	Deflection of cantilever and simply supported beams is calculated using standard deflection formulae for different loads
<b>9 Apply Euler's formula to find buckling load of a column</b>	<b>9.1</b>	Effective length of a column with various end restraints is determined
	<b>9.2</b>	Slenderness ratio is applied to determine the strength of columns
	<b>9.3</b>	Relationship between slenderness ratio and buckling is explained

	<b>9.4</b>	How buckling load for a slender column is applied, including a factor of safety
<b>10 Calculate stresses</b>	<b>10.1</b>	How to combine stress formula and calculate stress with combined loading is explained
	<b>10.2</b>	Superposition is used to describe stress due to combined axial and bending stress
	<b>10.3</b>	Mohr's Circle is employed to illustrate normal and shear stress
	<b>10.4</b>	Principal stress formulae are applied to explain how maximum combined normal and shear stress can be obtained
<b>11 Apply thick and thin shell formulae</b>	<b>11.1</b>	Tangential stress distribution caused by internal and external pressure is analysed
	<b>11.2</b>	Lame's theorem is applied to describe stress in thick cylinders due to internal and external pressure
	<b>11.3</b>	Stress on thin-shelled pressure vessels due to internal pressure is calculated
	<b>11.4</b>	Formula for calculating stress on thin-shelled pressure vessels to incorporate special conditions is modified
<b>12 Apply continuity equation to determine changes in fluid velocity</b>	<b>12.1</b>	Conservation of energy theory is applied to calculate pressure, head and velocity of fluids flowing through orifices
	<b>12.2</b>	Volumetric and mass flow through a venturi meter is calculated

	<b>12.3</b>	Forces exerted by flowing fluids either free (jet) or contained are determined, including coefficients of velocity, contraction of area and discharge
<b>13 Determine changes in fluid flows through pipe systems and centrifugal pumps</b>	<b>13.1</b>	Variation of fluid pressure with depth is calculated
	<b>13.2</b>	Bernoulli's Theorem is used to solve problems of velocity, pressure and head in pipes and ducted systems
	<b>13.3</b>	Archimedes' Principle is used to solve problems related to floating vessels using real and apparent weight
	<b>13.4</b>	Difference between steady and unsteady flow is clarified
	<b>13.5</b>	Viscosity of fluids is analysed and difference between dynamic and kinematic viscosity is explained
	<b>13.6</b>	Significance of Reynolds number in fluid mechanics is explained
	<b>13.7</b>	Importance of critical Reynolds number is explained
	<b>13.8</b>	Flow losses in pipes and fittings are calculated
	<b>13.9</b>	Changes of velocity of liquids in a centrifugal pump are analysed and entry and exit vane angles are determined
<b>14 Apply torsion theory to calculate stress</b>	<b>14.1</b>	Twisting moment due to engine crank mechanisms is calculated

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|   | <b>14.2</b> | Torsion equation is applied to solve problems involving solid and hollow shafts                           |
|   | <b>14.3</b> | Power transmitted in shafts and coupling bolts is calculated  |
|   | <b>14.4</b> | Torsion equation is applied to calculate stress and deflection in a close-coiled helical spring           |
|   | <b>14.5</b> | Power transmitted by shafts and couplings is calculated   |
| <b>15 Solve problems using principles of dynamics</b> | <b>15.1</b> | Centripetal force is distinguished from centrifugal force   |
|   | <b>15.2</b> | Relationship between centripetal and centrifugal force and mass, angular velocity and radius is clarified |
|   | <b>15.3</b> | Problems are solved involving centripetal and centrifugal forces  |
|   | <b>15.4</b> | Centripetal acceleration is distinguished from centrifugal force  |
|   | <b>15.5</b> | Out-of-balance forces on co-planer systems are calculated   |
|   | <b>15.6</b> | Bearing reactions in rotating shafts are determined   |
|   | <b>15.7</b> | Radius of gyration and moment of inertia when applied to rotating bodies is explained                     |



**15.8** Centrifugal forces in governors are calculated

**15.9** Principles of dynamics are applied to solve problems involving rotating bodies, accelerating shafts, motors and flywheels

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is not equivalent to MARL016 Apply intermediate principles of marine mechanics.

This unit replaces and is equivalent to MARL020 Apply advanced principles of marine mechanics.

## **Links**

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL040 Apply advanced principles of marine mechanics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve advanced problems related to marine mechanics
- identifying and interpreting numerical and graphical information, performing complex mathematical calculations, such as determining hoop stresses in rotating rings and stresses in compound bars and solving problems related to fluids
- identifying, collating and processing information required to perform complex calculations related to marine mechanics
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform complex calculations in marine mechanics
- solving problems using appropriate laws and principles
- using calculators to perform accurate, reliable and complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- advanced principles of marine mechanics
- angular and linear motion
- beam theory
- Bows notation
- centre of gravity (CG)
- centrifugal governors
- conservation of energy theorem
- machine dangers, including:
  - catastrophic failure due to physical limitations of machines being exceeded as determined by their susceptibility and resistance to vibrations

- violent swaying motions
- different loads, including:
  - combined
  - concentrated
  - distributed
- factor of safety
- fluids
- force and forces, including:
  - balanced and unbalanced forces
  - conditions for equilibrium
  - definitions of matter, mass, weight, force, density and relative density
  - moments of couples
  - parallelogram and triangle of forces
- inertia force
- joint efficiency factor
- laws of motion
- mechanics and hydromechanics, including:
  - balancing
  - combined stress
  - fluid mechanics
  - simple harmonic motion
  - stress and strain
  - torsion
- momentum
- motion, including:
  - action and reaction
  - force, velocity and acceleration
  - linear and angular motion
  - Newton's laws of motion
- nature and laws of friction
- physical and chemical properties of fuel and lubricants, including:
  - shore side and shipboard sampling and testing
  - interpretation of test results
  - contaminants, including microbiological infection
  - treatment of fuel and lubricants, including storage, centrifuging, blending, pre-treatment and handling
- polygon of forces
- pressure vessels
- principle of moments
- principles of dynamics

- reactions
- relationship between torque and power
- simple harmonic motion (SHM)
- stress and strain, including:
  - direct stress and strain
  - Hooke's Law
  - load extension graphs
  - modulus of elasticity
  - shear stress and strain
- technology of material, including:
  - destructive and non-destructive testing of material
  - engineering processes used in construction and repair
- thin cylinder theory
- turning moment
- vector diagrams
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL041 Apply advanced principles of trim, stability and stress**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to perform complex naval architectural calculations related to the seaworthiness of commercial vessels, including those dealing with vessel stability, trim, fuel consumption, buoyancy, power and symmetrical flooding vessel strength and vibration.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |          |  |   |
|----------|--|---|
| <b>1</b> | <b>Apply Simpson's First and Second Rules to calculate areas, volumes and displacement of ship shapes using tonnes per centimetre (TPC) values</b> | <b>1.1</b> Simpson's (Mid-Ordinate) First Rule and Second Rule, with typical applications, using half and full ordinates is explained and applied to find typical and non-conforming shipboard areas<br><br><b>1.2</b> Areas of water planes, transverse sectional areas to determine underwater volumes, bulkheads and elemental areas are calculated<br><br><b>1.3</b> Problems of immersed hull volume, appendage volumes and non-standard tank volumes are solved<br><br><b>1.4</b> Archimedes principles of buoyancy are explained<br><br><b>1.5</b> TPC with application of Simpson's Rules to find displacement is explained<br><br><b>1.6</b> Change in draught with mass addition and removal using TPC to give parallel sinkage or rise is explained<br><br><b>1.7</b> Problems of vessel displacement given water plane areas or TPC values are solved<br><br><b>1.8</b> TPC curves and displacement curves for given values are constructed |
| <b>2</b> | <b>Apply ship form coefficients and changes in draught associated with fluid density</b>   | <b>2.1</b> Ship form coefficients and their uses are defined  |

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|          |  | <b>2.2</b> | Coefficients are calculated given underwater form particulars   |
|          |  | <b>2.3</b> | Problems of ship form coefficients following change in length and draught are solved                                    |
| <b>3</b> | <b>Calculate changes in draft due to fluid density</b> | <b>3.1</b> | Load line freeboard measurement and markings required for change in fluid density are explained                         |
|          |  | <b>3.2</b> | Formula for change in mean draft due to change in density is derived  |
|          |  | <b>3.3</b> | Change in draft between fluids of two densities are calculated  |
|          |  | <b>3.4</b> | Formula to derive freshwater allowance is applied   |
|          |  | <b>3.5</b> | Changes in mean draft due to changes in density and loading are calculated  |
|          |  | <b>3.6</b> | Density correction formula is defined   |
| <b>4</b> | <b>Solve stability problems</b>                        | <b>4.1</b> | Calculations are performed to solve problems associated with adding, removing and transferring masses on ships          |
|          |  | <b>4.2</b> | Centre of gravity of a suspended mass is explained  |
|          |  | <b>4.3</b> | Calculations are performed to solve problems associated with suspended masses   |
|          |  | <b>4.4</b> | How centre of gravity (CG) and linear congruent generator (LCG) can be obtained from stability information is explained |



- 4.5 Creation of overturning moments by mass addition, removal or transfer transversely, including cargo shift or loss, is explained
  - 4.6 Calculations are performed to solve problems of small angle transverse stability
  - 4.7 Purpose of inclining experiments, weighing tests and roll period tests to determine stability characteristics are explained
  - 4.8 Calculations are performed to solve problems associated with inclining experiments and roll period tests
- 5 **Calculate loss of transverse stability due to fluid free surface**
  - 5.1 Principles of free surface loss of metacentric height (GM) are explained
  - 5.2 Principles of metacentric data height are explained
  - 5.3 Application of the second moment of area using parallel axis theorem to obtain free surface moment of inertia and use of density correction between vessel and free surface fluids is explained
  - 5.4 Calculations are performed to solve problems of liquid free surface for simple compartments, including correction for free surface on GM and fluid mass on CG
  - 5.5 CG solid is differentiated from CG fluid
  - 5.6 Second moment of area is applied to obtain free surface moment of inertia and is related to stability criteria for standard conditions

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|   |  | <ul style="list-style-type: none"><li>5.7 Problems of liquid free surface for simple and complex geometry compartments, including variation in filling rates, are solved</li><li>5.8 Wall-sided formula and factors that lead to negative GM creating an angle of loll are explained</li><li>5.9 Problems involving correction of loll angle are solved</li></ul>  |
| 6 | <b>Calculate large angle transverse static and dynamical stability</b> | <ul style="list-style-type: none"><li>6.1 How GZ and KN righting levers are obtained from cross curves of stability is explained</li><li>6.2 KN values are converted to GZ</li><li>6.3 Dynamical stability is explained</li><li>6.4 IMO requirements for intact and damaged stability cases as well as different vessel types, using typical values from stability files are applied</li><li>6.5 Problems of large angle transverse stability, including changes due to redistribution of mass onboard, are solved and results against IMO requirements are evaluated</li><li>6.6 Graphical solutions to large angle transverse stability problems identifying key points are prepared</li></ul> |
| 7 | <b>Solve problems of hydrostatics</b>                                  | <ul style="list-style-type: none"><li>7.1 Importance of area and volume centroids is explained</li><li>7.2 Methods of determining centre of buoyancy (CB), longitudinal centre of buoyancy (LCB), longitudinal centre of flotation (LCF) and bulkhead area centroids are explained</li></ul>   |

- 7.3 Calculations are performed to determine centroids of shipboard areas and volumes
  - 7.4 Impact of hydrostatic pressure and load on vertical and horizontal surfaces is explained
  - 7.5 Methods of calculating pressure, load, shear force and bending moment diagrams for typical tank structures are applied
  - 7.6 Problems are solved in hydrostatics relating to pressure and loads on ship structures, including graphical solution of shear force diagrams of rectangular bulkheads and their elemental stiffeners
  - 7.7 Effective weld area of bulkhead attachment is calculated
- 8 **Perform trim and draft calculations**
  - 8.1 Meaning of trim and how trim occurs is explained
  - 8.2 Standard trimming moments resulting from mass addition, removal, transfer, flooding or combinations of these factors are explained
  - 8.3 Change of trim is calculated using moment to change trim 1 cm (MCT1cm), longitudinal metacentre height (GML) and longitudinal metacentre radius (BML)
  - 8.4 Problems of applied trimming moments to determine final vessel draughts are solved
  - 8.5 True mean draft is differentiated from apparent mean draft by applying correction for layer

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|           |   | <b>8.6</b> Calculations are performed to solve problems associated with true mean draft  |
|           |   | <b>8.7</b> Problems of combined trim and transverse stability from typical fluid transfer in both a longitudinal and transverse direction are solved   |
| <b>9</b>  | <b>Calculate voyage and daily fuel consumption</b>  | <b>9.1</b> Problems of fuel consumption are solved using the admiralty coefficient for various speed indexes   |
|           |   | <b>9.2</b> Optimum vessel speed for combined propulsive and auxiliary fuel consumptions is determined  |
|           |   | <b>9.3</b> Calculations are performed to show relationships between fuel consumption and displacement  |
|           |   | <b>9.4</b> Calculations are performed to show relationships between daily fuel consumption and speed   |
|           |   | <b>9.5</b> Calculations are performed to show relationships between voyage consumption, speed and distance travelled   |
| <b>10</b> | <b>Apply principles of loading to ship structures to determine strength characteristics</b> | <b>10.1</b> Distribution of concentrated and point masses, buoyancy, load, shear force and bending moments are explained using simple loaded beam principles   |
|           |   | <b>10.2</b> Calculations and diagrams are used to solve problems involving loaded conditions of simple box-shaped vessels, identifying location and value of maximum shear force and bending moments |
|           |   | <b>10.3</b> Empirical formula is applied to solve problems involving bending and direct stress in beams  |

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| <b>11</b> | <b>Apply empirical formula to solve vibration problems</b>                  | <b>11.1</b> Causes and adverse effects of ship vibration are explained   |
|           |   | <b>11.2</b> Natural hull vibration is explained  |
|           |   | <b>11.3</b> Schlick formula is applied to determine natural frequency of ship hull vibrations  |
|           |   | <b>11.4</b> Ways of preventing or reducing local vibration are identified  |
| <b>12</b> | <b>Solve buoyancy problems and problems related to symmetrical flooding</b> | <b>12.1</b> Calculations are performed to solve problems of lost buoyancy and sinkage into homogeneous mud due to tide fall with insufficient under keel clearance                           |
|           |   | <b>12.2</b> Calculations are performed to solve problems of simple box-shaped and standard hull forms involving change in trim due to flooding end compartments                              |
|           |   | <b>12.3</b> Volume lost-volume gained relationship for flooded compartments is explained   |
|           |   | <b>12.4</b> Modified volume lost by compartment subdivision is explained using horizontal flat   |
|           |   | <b>12.5</b> Modified volume lost by compartment permeability is explained, including consideration of cargo stowage factor and relative density details                                      |
|           |   | <b>12.6</b> Problems of symmetrical flooding of simple box-shaped and standard hull forms involving flooding above and below horizontal subdivisions and different permeabilities are solved |

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| <b>13</b> | <b>Perform rudder structural calculations</b>           | <p><b>13.1</b> Types of rudders in use on ships are outlined</p> <p><b>13.2</b> Reasons for using balanced rudders are identified</p> <p><b>13.3</b> Application of force acting normal to a rudder surface (<math>F_n</math>), its components and the influence of propeller race effect is explained</p> <p><b>13.4</b> Rudder centre of effort for ahead and astern conditions is obtained to determine torque on rudder stock for conventional rudders or equivalent twisting moment (ETM) for spade rudders</p> <p><b>13.5</b> Calculations are performed involving simple and complex rudder shapes to calculate speed limitations ahead and astern for stated safety factor and material properties</p> <p><b>13.6</b> Calculations are performed involving simple and complex rudder shapes to determine rudder stock and coupling bolt diameters</p> |
| <b>14</b> | <b>Perform rudder resistance and power calculations</b> | <p><b>14.1</b> Frictional resistance to motion of a vessel given the empirical formulae for frictional coefficient 'f' of the form is determined</p> <p><b>14.2</b> Froudes laws of comparison are explained</p> <p><b>14.3</b> Meaning of the term 'corresponding speed' is explained</p> <p><b>14.4</b> Law of comparison is applied to determine residuary resistance of a ship if residuary resistance of a scale model of vessel is known or can be determined</p>   |

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|           |  | <p><b>14.5</b> Differentiation is made between effective power (naked), effective power and ship correlation factor</p> <p><b>14.6</b> Effective power requirements of a full-sized ship given total resistance to motion measured on a scale model of vessel towed at corresponding speed are calculated</p> <p><b>14.7</b> Problems of resistance and powering for full size vessels and models are solved</p>   |
| <b>15</b> | <b>Solve propeller and powering problems</b> | <p><b>15.1</b> Factors that influence the speed of advance are explained</p> <p><b>15.2</b> Calculations are performed to solve problems of single screw vessels</p> <p><b>15.3</b> Relationships between propulsive coefficient, quasi-propulsive coefficient and related powers together with typical values of losses for transmission, hull and propeller are explained</p> <p><b>15.4</b> Components of hull resistance are explained</p> <p><b>15.5</b> Calculations are performed to show impact of resistance augmentation and thrust deduction factors on powering of full-size vessels</p> <p><b>15.6</b> Causes, effects and methods of reducing cavitation are explained</p> |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

## Unit Mapping Information

This unit replaces and is not equivalent to MARL017 Apply intermediate principles of naval architecture.

This unit replaces and is equivalent to MARL021 Apply advanced principles of naval architecture.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL041 Apply advanced principles of trim, stability and stress**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve complex problems related to speed, fuel consumption and stability of commercial vessels
- identifying and interpreting numerical and graphical information, and performing mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity (CG), vessel speed, fuel consumption and hydrostatic pressure
- identifying, collating and processing information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform calculations related to seaworthiness of commercial vessels
- solving problems using appropriate laws and principles
- using calculators to perform accurate, reliable and complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and include knowledge of:

- admiralty and fuel coefficients
- advanced principles of naval architecture
- adverse effects, including:
  - discomfort to passengers and crew
  - failure of equipment
  - structural failure
- buoyancy
- causes of ship vibration, including:

- action of the sea
- fluctuating forces on propeller
- operation of deck machinery
- out-of-balance forces in main or auxiliary machinery
- propeller-hull interaction
- CG, vertical centre of gravity (VCG) and linear congruent generator (LCG)
- CG calculations
- density correction formula
- displacement
- draught alterations
- dynamical stability
- fuel consumption calculations
- hydrostatic pressure
- hull resistance:
  - frictional
  - residuary
  - total
- key points, including:
  - maximum GZ value and angle of occurrence
  - points of vanishing stability
  - range of positive stability
- metacentre
- principle of displacement
- principle structural members of a ship and the proper names of the various parts
- propellers and powering
- propulsive characteristics, including:
  - propeller and load diagrams
  - propulsive characteristics diesel
  - propulsive characteristics gas turbines
  - propulsive characteristics steam plant
  - propulsive characteristics steam plant
  - resistance and fuel consumption
- rudders
- ship:
  - displacement
  - measurements
  - resistance
  - stability
  - stability calculations
- shipboard:

- areas, including bulkheads, elemental areas and water plans
- volumes
- ship form coefficients, including:
  - block coefficient
  - midship section area coefficient
  - prismatic coefficient
  - waterplane area coefficient
- Simpson's Rules
- speed of advance, including:
  - apparent and true slips
  - Taylor wake fraction
  - theoretical, apparent and true speeds
  - wake speed
- stability, including:
  - approximate calculation of area and volume
  - approximate metacentric height (GM) by means of rolling period test
  - dry-docking and grounding
  - dynamical stability
  - intact stability code
  - rolling of ship
  - shear force, bending moments and torsional stress
  - simplified stability data
  - stability at moderate and large angles of heel
  - trim and list
- structural members of a ship and proper names of various parts
- tonnes per centimetre immersion (TPC)
- traverse stability
- trim and stress tables, diagrams and stress calculating equipment
- vessel speed calculations
- vibration
- watertight integrity
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic industry approved marine operations site or simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry
- vessel diagrams, specifications and other information required for mathematical calculations.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL042 Apply basic principles of marine electrotechnology

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to explain basic marine electrotechnology principles and to perform basic electrical calculations.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

- Legislative and regulatory requirements are applicable to this unit.
- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organisation Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Explain how material properties affect resistance of electrical conductors**

- 1.1** Terms and symbols used in the formula for resistivity are used correctly
- 1.2** How resistance varies with changes in conductor length and cross-sectional area is outlined
- 1.3** How resistance varies with temperature is outlined
- 1.4** Calculations are performed that illustrate how material properties affect resistance of electrical conductors

**2 Apply Ohm's Law to electrical circuits**

- 2.1** Main sources of electromagnetic field (EMF) are identified
- 2.2** Terms and symbols used in Ohm's Law are used correctly
- 2.3** Calculations are performed using Ohm's Law to solve problems involving internal, external and variable resistances in both series and parallel circuits
- 2.4** Calculations are performed to determine power required and/or energy expended by electrical devices
- 2.5** Circuits for a Wheatstone bridge and a slide wire bridge are sketched and their application on a ship is outlined
- 2.6** Calculations are performed dealing with resistances, currents and voltage drops in bridge circuits under null or balanced conditions

**3 Apply principles of electrolytic action to electrical cells**

- 3.1** How the theory of electrolytic disassociation when applied to common electrolytic solutions and electrode materials explains the generation of EMF from chemical sources, is outlined
- 3.2** Primary cells are distinguished from secondary cells
- 3.3** Calculations are performed to solve problems involving currents, voltage drops and terminal potential difference of cells connected to form batteries in series and in

- parallel
- 3.4** How capacity of a battery is measured is explained
- 3.5** Construction of typical batteries used in marine environments is outlined
- 4 Apply principles of electromagnetism to EMF generation**
- 4.1** Form and properties of the magnetic fields surrounding single conductor and multi-turn solenoid coils when carrying an electrical current are compared and contrasted
- 4.2** Terms and symbols used in Faraday's and Lenz's laws of electromagnetic induction are used correctly
- 4.3** Calculations are performed using Faraday's and Lenz's laws of electromagnetic induction to solve problems related to electromagnetism and EMF generation
- 4.4** Fleming's Right Hand Rule is outlined
- 5 Explain operation of direct current (DC) rotating machinery**
- 5.1** Construction and methods of maintaining and repairing typical DC machines are illustrated
- 5.2** Principle wiring arrangements used with DC machines are outlined
- 5.3** Action of the commutator in DC generators is outlined
- 5.4** Significance of Back EMF ( $E_b$ ) in the operation of DC motors is outlined
- 5.5** Mathematical formulae are applied to show relationships between operational parameters of DC motors
- 5.6** Calculations are performed to solve simple problems relating to power output and efficiency in DC. motors
- 6 Explain operation of alternating current (AC) rotating machinery**
- 6.1** How three phase AC may be developed out of simple single phase AC is explained
- 6.2** Difference between Star and Delta connections is outlined
- 6.3** How a three phase supply can generate a rotating magnetic field is explained
- 6.4** Construction of an AC synchronous generator is

	outlined
	<b>6.5</b> Construction of an AC induction motor is outlined
	<b>6.6</b> Calculations are performed to show how driving torque is produced in an induction motor
<b>7 Explain parallel operation and load sharing of generator</b>	<b>7.1</b> Load/voltage curves of AC and DC generators are compared
	<b>7.2</b> Main requirements for satisfactory power sharing between both AC and DC generators are outlined
	<b>7.3</b> Sequences that occur when load changes on two DC generators working in parallel without an equaliser connection are outlined
	<b>7.4</b> Effect of varying power factors on the load/voltage curve of an AC generator is outlined
<b>8 Explain coupling and breaking connections between switchboard and distribution panels</b>	<b>8.1</b> Construction, equipment and service of main switchboard and emergency switchboard and distribution panel are outlined
	<b>8.2</b> Construction and operation principle of measuring instruments in main and emergency switchboards and distribution panels are outlined
	<b>8.3</b> Construction and operation principle of circuit breakers and their tripping devices are outlined
	<b>8.4</b> Procedures for restarting ship equipment after power supply failure are outlined
	<b>8.5</b> Connection between main and emergency switchboards and necessary safeguards are outlined
	<b>8.6</b> Procedures for changeover to shore-connection supply are outlined

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL010 Apply basic principles of marine electrotechnology.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARL042 Apply basic principles of marine electrotechnology

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to marine electrotechnology
- identifying and interpreting numerical and graphical information, and performing mathematical calculations, such as resistance of electrical conductors, power output and efficiency in direct current (DC) motors, and driving torque in induction motors
- identifying, collating and processing information required to perform basic calculations related to marine electrotechnology
- performing accurate and reliable calculations
- reading and interpreting written information needed to perform basic electrical calculations
- solving problems using appropriate laws and principles.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of marine electrotechnology
- batteries
- cables
- circuit breakers
- coupling, load sharing and changing over generators, including:
  - conditions for automatic start of emergency generator and starting methods
  - control systems for distribution for active and reactive power
  - excitation systems of generators
  - methods of synchronisation
  - power factor
  - principles of power management, including:
    - control of start-release of big consumers directly supplied from main switchboard

- automatic three-step disconnection of non-essential power consumers
- load depending start and stop of generator and automatic load sharing
- protections for generators and diesel engines, including:
  - asymmetrical voltage and current
  - frequency and voltage stabilisation of shaft generators
  - open circuit, wire fault and earth-fault monitoring
  - overload
  - reverse power
  - short circuit
  - under and overvoltage
  - under and over frequency
- safety systems of generators
- voltage and frequency control systems
- DC motors and rotating machinery
- difference between alternating current (AC) and DC
- distribution panels
- electrical:
  - current
  - power
  - safety
  - units of measurement
- electromagnetic:
  - force
  - induction
- effective verbal, written and visual communication techniques
- electrical theory, including:
  - electrical circuits
  - impedance and inductance
  - Kirchhoff's Law
  - Ohm's Law
- electrical motors including:
  - AC motor
  - DC motor
- electrical motor starting methodologies
- emergency switchboard
- fundamentals of AC, including:
  - principles
  - rotating machinery
- high voltage (HV)
- lighting

- main switchboard
- measuring instruments for switchboards
- operational parameters of DC motors, including:
  - current
  - flux density
  - torque
  - voltage
- parallel circuits
- power distribution systems, including:
  - distribution
  - insulation
  - transformers
- principles of electromagnetism and electrolytic action
- resistance
- series circuits
- shore connection
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic industry approved marine operations site or simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL043 Apply basic principles of marine engineering thermodynamics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to apply basic principles of engineering thermodynamics to perform calculations and to explain the operation of marine machinery, including engines, compressors, steam plants, and refrigeration and air conditioning (RAC) units.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Explain common thermodynamic principles

1.1 Desired International System of Units (SI) applicable to thermodynamic calculations are developed

1.2 Basic properties of fluids are outlined

1.3 Gauge pressure is distinguished from absolute pressure

1.4 Temperature is defined and temperature scales are outlined

1.5 Calculations are performed by applying formulae for work, power and efficiency

#### 2 Calculate properties of gas during expansion and compression

2.1 Calculations are performed by applying Boyle's, Charles's and combined gas laws

2.2 Gas equation is derived and applied to gas process calculations

2.3 Specific heat of gases and the relationship between constant pressure ( $C_p$ ), constant volume ( $C_v$ ), gas constant ( $R$ ) and Gamma ( $\gamma$ ) are defined

2.4 Heat transfer is calculated for  $C_p$  and  $C_v$  processes

2.5 Isothermal, adiabatic and polytropic processes are outlined and properties of gases after expansion and compression, including the effects of turbocharging, are calculated

2.6 Work required to compress gases is illustrated and calculated

#### 3 Explain methods of heat transfer

3.1 Different forms of heat transfer and their application to marine systems are explained

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|   | <b>3.2</b> | Heat transfer through flat layers is calculated  |
|   | <b>3.3</b> | Purpose of insulation is explained   |
| <b>4 Explain enthalpy and apply to mixture calculations</b>     | <b>4.1</b> | Heat energy is defined   |
|   | <b>4.2</b> | Fundamental formula for heat energy transfer is developed  |
|   | <b>4.3</b> | Specific heat and its application are identified   |
|   | <b>4.4</b> | Enthalpy and change of phase are outlined  |
|   | <b>4.5</b> | Heat mixture problems involving water equivalent, ice, water and steam are solved                                |
|   | <b>4.6</b> | Specific heat of materials are calculated  |
|   | <b>4.7</b> | Latent heat and dryness fraction are identified  |
|   | <b>4.8</b> | Steam tables are used to find values of enthalpy for water, saturated and superheated steam and dryness fraction |
|   | <b>4.9</b> | Temperature/enthalpy diagram is constructed from steam table data  |
| <b>5 Explain steam plants and calculate thermal efficiency</b>  | <b>5.1</b> | Basic steam plant cycles are sketched and function of each component is outlined                                 |
|   | <b>5.2</b> | Steam cycles on a temperature/enthalpy diagram are illustrated   |
|   | <b>5.3</b> | Effects of superheating and under-cooling are clarified  |
|   | <b>5.4</b> | Calculations are performed for heat supplied, rejected, work and thermal efficiency of a steam plant             |
|   | <b>5.5</b> | Methods of improving cycle efficiency are outlined   |
| <b>6 Explain operation of internal combustion engine cycles</b> | <b>6.1</b> | Operating principles of two-stroke and four-stroke internal combustion engines are outlined                      |
|   | <b>6.2</b> | Differentiation is made, by use of a pressure/volume diagram, between Otto, diesel and dual combustion cycles    |



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|          | <b>6.3</b>   | Mean effective pressure is calculated from an indicator diagram   |
|          | <b>6.4</b>   | Indicated power formula is developed and related calculations are solved                                      |
|          | <b>6.5</b>   | Specific fuel consumption is defined and calculated   |
|          | <b>6.6</b>   | Ideal cycle and air standard efficiency is defined  |
| <b>7</b> | <b>Explain operating cycle of reciprocating air compressors</b>  |   |
|          | <b>7.1</b>   | Pressure/volume diagram is used to describe operating cycle of single stage reciprocating air compressors     |
|          | <b>7.2</b>   | Mass of air delivered by single stage reciprocating air compressors is calculated                             |
|          | <b>7.3</b>   | Clearance volume and its effect on volumetric efficiency is outlined, and volumetric efficiency is calculated |
|          | <b>7.4</b>   | Work per cycle for isothermal and polytropic processes is calculated  |
| <b>8</b> | <b>Explain operating cycle of RAC plant</b>  |   |
|          | <b>8.1</b>   | Principle of refrigeration is outlined  |
|          | <b>8.2</b>   | Temperature/enthalpy and pressure/enthalpy diagrams are compared  |
|          | <b>8.3</b>   | Refrigerants used in RAC machines are identified  |
|          | <b>8.4</b>   | Refrigeration effect and plant capacity are defined   |
|          | <b>8.5</b>   | Refrigeration tables are used to calculate refrigeration effect and condition of vapour after expansion       |
|          | <b>8.6</b>   | Operating cycle of self-contained and centralised air conditioning systems are outlined and compared          |
|          | <b>8.7</b>   | Relative humidity is defined and key features of a psychrometric chart are outlined                           |
| <b>9</b> | <b>Apply linear, superficial and volumetric expansion equations to calculate expansion of liquids and metals</b> |   |
|          | <b>9.1</b>   | Expansion processes for metals is defined   |
|          | <b>9.2</b>   | Coefficient of linear expansion is outlined   |

- 9.3** Linear expansion is applied to calculate machinery clearances and to shrink fit allowances
- 9.4** Superficial and volumetric expansion of solids is calculated and recorded
- 9.5** Apparent expansion of liquids in tanks is calculated and recorded

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARL011 Apply basic principles of marine engineering thermodynamics.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL043 Apply basic principles of marine engineering thermodynamics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to engineering thermodynamics
- identifying and interpreting numerical and graphical information, and performing basic mathematical calculations related to engineering thermodynamics, such as gas expansion and contraction, heat transfer, thermal efficiency, and the expansion of liquids and solids
- identifying, collating and processing information required to perform basic calculations related to engineering thermodynamics
- maintaining knowledge of current codes, standards, regulations and industry practices
- performing accurate and reliable mathematical calculations using a calculator
- reading and interpreting written information needed to perform basic calculations related to engineering thermodynamics
- solving problems using appropriate laws and principles.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of engineering thermodynamics
- enthalpy
- expansion processes for metals (conduction, convection and radiation)
- forms of heat transfer (conduction, convection and radiation)
- gas laws
- heat, including relationship between temperature, heat energy and heat transfer
- internal combustion engine cycles
- methods of heat transfer
- operating cycle of reciprocating air compressors
- operating principles of two-stroke and four-stroke internal combustion engines
- principles of refrigeration
- properties of fluids (density, mass, pressure, specific volume, temperature)

- relationships between forms of energy, work and power
- International System of Units (SI)
- steam plants
- thermodynamics, including:
  - energy change
  - heat transfer
  - ideal gases
  - thermodynamic energy
  - thermodynamic principles
  - thermodynamic processes
  - thermodynamic properties
  - thermodynamic systems
  - vapours
  - work transfer
- thermal efficiency calculations.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- diagrams, specifications and other information required for performing basic calculations related to engineering thermodynamics
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL044 Apply basic principles of marine mechanics

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to apply the basic principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Use vector diagrams to calculate the resultant and equilibrant of up to four coplanar forces**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Meaning of force as a vector, moment of a force, resultant and equilibrant are explained

**1.2** Forces using the triangle and polygon of forces are determined

**1.3** Moments and couples applied to beams and levers are explained

**1.4** Centroid of an area is calculated

**1.5** Centre of gravity (CG) of regular geometrical shapes is calculated

**1.6** Resultant and equilibrant of a system of concurrent coplanar-planer forces are calculated

#### **2 Solve problems involving friction**

**2.1** Nature of friction and the laws of dry sliding friction are explained

**2.2** Influence of lubrication on bearings and plain surfaces is outlined

**2.3** Coefficient of friction is derived

**2.4** Laws of friction are applied to movement in a horizontal plane and the force to overcome friction on horizontal surfaces

**2.5** Effect of lubricating two surfaces in contact with each other is outlined

#### **3 Apply laws of motion**

**3.1** Laws of motion are explained

**3.2** Velocity/time and acceleration/displacement graphs are sketched and adapted to derive the standard velocity formula for both linear and angular motion

- |          |  |   |
|----------|--|---|
|          | <b>3.3</b>   | Formula and/or graphs are applied to solve problems of linear and angular velocity  |
|          | <b>3.4</b>   | Linear motion is converted to angular motion and revolutions to radians   |
| <b>4</b> | <b>Solve problems in dynamics related to marine machinery</b>                |   |
|          | <b>4.1</b>   | Relationship between torque, work, energy and power in marine engines and compressors is explained                            |
|          | <b>4.2</b>   | Conservation of energy theorem is used to calculate energy and power during linear and angular motion                         |
|          | <b>4.3</b>   | Meaning of momentum is explained  |
|          | <b>4.4</b>   | Calculations are performed associated with the collision of rigid bodies  |
|          | <b>4.5</b>   | Centrifugal force is distinguished from centripetal force   |
|          | <b>4.6</b>   | Centrifugal and centripetal force in relation to marine machinery is calculated   |
| <b>5</b> | <b>Determine efficiency of lifting and geared marine machinery</b>           |   |
|          | <b>5.1</b>   | Velocity ratio, mechanical advantage and efficiency of simple machines is calculated  |
|          | <b>5.2</b>   | Calculations are performed to solve problems related to the operation of simple machines                                      |
| <b>6</b> | <b>Calculate stress and strain due to axial loads</b>                        |   |
|          | <b>6.1</b>   | Normal stress is distinguished from strain  |
|          | <b>6.2</b>   | Hooke's Law for stress and strain is explained  |
|          | <b>6.3</b>   | Meaning of elastic limit, ultimate tensile strength, yield stress, limit of proportionality and factor of safety is explained |
|          | <b>6.4</b>   | Normal stress and strain caused by axial loads is calculated  |
| <b>7</b> | <b>Determine shear stress and strain in coupling bolts and simple bolted</b> |   |
|          | <b>7.1</b>   | Shear stress in simple bolted connections is determined   |



## connections

- |   |            |   |
|---|------------|---|
|   | <b>7.2</b> | Torque theory is applied to calculate shear stress in coupling bolts            |
| <b>8 Determine stresses in thin walled pressure vessels</b> | <b>8.1</b> | Factor of safety and joint efficiency factor for pressure vessels is calculated |
|   | <b>8.2</b> | Hoop and longitudinal stress in thin walled pressure vessels is calculated      |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL012 Apply basic principles of marine mechanics

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL044 Apply basic principles of marine mechanics**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to marine mechanics
- identifying and interpreting numerical and graphical information, and performing mathematical calculations to determine resultant and equilibrant of coplanar forces, linear and angular velocity, and hoop and longitudinal stress in thin walled pressure vessels
- identifying, collating and processing information required to perform basic calculations related to marine mechanics
- performing accurate and reliable mathematical calculations using a calculator
- reading and interpreting written information needed to perform basic calculations in marine mechanics
- solving problems using appropriate laws and principles.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- centre of gravity (CG)
- conservation of energy theorem
- dynamics, including:
  - relationship between speed, acceleration, mass, force and resistance
  - velocity and the effect of change of direction
- effective verbal, written and visual communication strategies
- factor of safety
- fluids, including effects of pressure and its relationship to depth of liquid and force
- force
- hydraulics
- hydrostatics

- joint efficiency factor
- laws of motion
- mass and volume
- momentum
- nature and laws of friction
- pressure vessels, including:
  - deformation of flat surfaces
  - strengths of dished or spherical end-plates in comparison to flat end-plates
- principles of marine mechanics
- reasons for:
  - using dished or spherical end-plates to give a higher strength than flat end-plates of similar thickness
  - using stays on flat surfaces
- simple machines, including:
  - hydraulic jack
  - pulley blocks
  - reduction gears
  - screw jack
  - single and double purchase crab winches
  - warwick screw
  - wheel and axle
  - worm driven chain blocks
- statics
- stress and strain
- thin cylinder theory
- types and uses of simple machines
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic industry approved marine operations site or simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or

may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- diagrams, specifications and other information required for performing basic calculations related to marine mechanics
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL045 Apply basic principles of naval architecture

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to perform basic calculations related to the seaworthiness of commercial vessels, including those dealing with watertight integrity and vessel stability.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Calculate shipboard areas and volumes**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Basic principal structural members of ship and proper names of various parts are detailed
- 1.2** Simpson's Rules are applied to calculate shipboard areas
- 1.3** Simpson's Rules are applied to calculate shipboard volumes
- 2 Calculate vessel displacement**
  - 2.1** Tonnes per centimetre (TPC) values and Simpson's Rules are applied to calculate vessel displacement
  - 2.2** Calculations are performed using TPC values and Simpson's Rules to solve problems related to vessel displacement
- 3 Calculate ship dimensions**
  - 3.1** Ship form dimensions are calculated using coefficients for areas
  - 3.2** Ship form coefficients for underwater volumes are calculated
  - 3.3** Influence of common hull modifications on hull form coefficients is explained
  - 3.4** Calculations are performed to solve problems of ship form coefficients following change to vessel length resulting from mid-body insertion or removal

- |  |            |   |
|--|------------|---|
| <b>4 Explain position of centre of gravity (CG) of vessel in relation to its keel and midships</b> | <b>4.1</b> | CG calculations for a vessel are performed  |
|  | <b>4.2</b> | How CG changes with redistribution, addition and/or removal of mass is explained  |
|  | <b>4.3</b> | How addition, removal or transfer of mass may cause overturning moments is identified   |
|  | <b>4.4</b> | Problems are solved involving addition, removal and vertical movement of mass by performing CG calculations for typical vessel loaded conditions                              |
|  | <b>4.5</b> | Calculations are performed using results from inclining experiments to obtain initial stability characteristics   |
| <b>5 Explain effects of water density and flooding of mid-length compartment on vessel draft</b>   | <b>5.1</b> | Relationship between changes in underwater volume and changes in water density is outlined  |
|  | <b>5.2</b> | Freshwater allowance of a vessel is determined  |
|  | <b>5.3</b> | Change in mean draft for vessel movement between waters of different densities is calculated  |
|  | <b>5.4</b> | Volume lost-volume gained relationship for flooded compartments is explained  |
|  | <b>5.5</b> | Calculations are performed to solve problems of mid-length compartment flooding in simple box-shaped hull forms   |
|  | <b>5.6</b> | Fundamental actions to be taken in the event of partial loss of intact buoyancy are identified  |
| <b>6 Perform calculations related to propellers and vessel speed</b>                               | <b>6.1</b> | Relationship between propellers and vessel speed is explained   |
|  | <b>6.2</b> | Problems related to vessel speed and propellers are solved by calculating theoretical, apparent and true speeds, apparent and true slips, wake speed and Taylor wake fraction |
|  | <b>6.3</b> | Impact of fouling on vessel hull and propeller is outlined  |

- |  |   |
|--|---|
| <b>7 Calculate voyage and daily fuel consumptions</b>                  | <b>7.1</b> Fuel consumption is determined by applying admiralty coefficient for fuel consumption taking account of ship speed, shaft power and displacement |
|  | <b>7.2</b> Calculations are performed to solve problems of vessel fuel consumption taking account of ship speed, shaft power and displacement               |
|  | <b>7.3</b> Impact of fouling on vessel fuel consumption is explained  |
| <b>8 Calculate pressures and loads on surfaces due to hydrostatics</b> | <b>8.1</b> Standard formula for hydrostatic pressure is defined   |
|  | <b>8.2</b> Hydrostatic load on vertical and horizontal surfaces is calculated   |
|  | <b>8.3</b> Method of calculating loads on typical tank structures for different filling rates is explained  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL002 Apply basic principles of naval architecture.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL045 Apply basic principles of naval architecture**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- drawing load line mark and the load lines for a ship of a given summer moulded draught, displacement and tonnes per centimetre (TPC) immersion in saltwater
- explaining basic principles of naval architecture
- identifying actions to be taken in the event of partial loss of intake buoyancy
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to speed, fuel consumption and stability of commercial vessels
- identifying and interpreting numerical and graphical information, and performing mathematical calculations related to shipboard areas and volumes, vessel displacement, angle of loll, ship dimensions, centre of gravity (CG), vessel speed, fuel consumption and hydrostatic pressure
- identifying, collating and processing information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- performing accurate and reliable calculations
- reading and interpreting written information needed to perform calculations related to the seaworthiness of commercial vessels
- solving problems using appropriate laws and principles
- using calculators to perform mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic structural members of a ship and the proper names of the various parts
- buoyancy
- calculations
- CG, longitudinal centre of gravity (LCG) and vertical centre of gravity (VCG)
- coefficients for areas, including:

- midships (CM)
- waterplane (CW)
- coefficients for underwater volumes, including:
  - block (Cb)
  - prismatic (Cp)
- curves of statistical stability
- density correction formula
- effects of slack tanks
- filling rates, including:
  - accidental flooding
  - tank testing
- fuel consumption calculations
- hydrostatic pressure
- movement of CG
- principle of displacement
- problems related to vessel displacement, including:
  - addition of mass
  - removal of mass
- ship:
  - displacement
  - measurements
  - stability calculations
  - stability including statistical and initial
  - types, including:
    - bulk carriers
    - combination carriers
    - container
    - general cargo
    - oil, chemical and gas tankers
    - passenger
    - roll-on and roll-off (ro-ro)
- ship construction, including:
  - bow and stern regions
  - fitting
  - hull structure
  - load line and draught marks, including:
    - chart of zones, areas and seasonal periods used to find the applicable load line
    - definition of 'freeboard'
    - definition of 'assigned summer freeboard'
    - freeboard, measured from the upper edge of the deck line to the water on each side,

- including checks that the ship is within its permitted limits of loading
- height of sill varies between different types of ships based on load line rules
- how to read draughts
- items in the conditions of assignment of freeboard
- load line mark and the load lines for a ship of a given summer moulded draught, displacement and TPC immersion in saltwater
- where the deck line is marked
- rudders and propellers
- ship dimensions and form
- ship stresses, including:
  - calculations for pressure at any depth below the liquid surface, given the density of the liquid
  - causes of corrosion onboard
  - 'hogging' and 'sagging' and distinguishing between them
  - hogging and sagging stresses caused by sea state
  - hogging and sagging stresses resulting in tensile or compressive forces in the deck and bottom structure
  - liquid pressure loading on the ship's hull
  - loading conditions which give rise to hogging and sagging stresses
  - methods that are being used to minimise the effects of corrosion
  - 'pounding' or 'slamming' and which part of the ship is affected
  - stress set up by liquid sloshing in a partly filled tank
  - racking stress and it causes
  - shear force and bending moments
  - stresses caused by localised loading
  - water pressure loads on ship's hull
- shipboard:
  - areas, including:
    - bulkheads/elemental areas
    - water planes
  - mass, including:
    - ballast
    - cargo
    - fuel
    - passengers
  - volumes, including:
    - transverse sectional areas
    - water plane areas
- Simpson's Rules
- TPC immersion

- trim and stress tables, diagrams and stress calculating equipment
- vessel speed calculations
- watertight integrity.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARL046 Carry out engineering calculations

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to carry out calculations related to fuel consumption, fuel storage and engine performance that conform to accepted engineering tolerances.

It includes calculating fuel consumption and storage and completing calculations related to engine performance.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Engineer on vessels with inboard engines less than 1500 kW within the exclusive economic zone (EEZ)
- Second Engineer on vessels with inboard engines less than 3000 kW within the EEZ
- Chief or Second Engineer on vessels with outboard engines with unlimited propulsion power within the EEZ
- assistant under the direct supervision of the chief engineer
- worker in the engine room of a vessel less than 80 metres in length with propulsion power less than 3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### Pre-requisite Unit

Not applicable.

### Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Calculate fuel consumption and storage

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Information required for calculations related to fuel consumption and storage is obtained from relevant sources

**1.2** Calculations are completed to accepted working tolerances

**1.3** Results of calculations are verified

**1.4** Results of calculations are applied to managing fuel, as required

#### 2 Complete calculations related to engine performance

**2.1** Information required for calculations related to engine performance is obtained from relevant sources

**2.2** Calculations are completed to accepted working tolerances

**2.3** Results of calculations are verified

**2.4** Results of calculations are applied to managing engine performance, as required

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL001 Carry out engineering calculations.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARL046 Carry out engineering calculations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- calculating:
  - area and circumference of a circle
  - consumption of fuel and lubricating oil for a particular voyage, using quantity in litres and mass in tonnes and specified regular shaped tanks
  - distances covered
  - hourly fuel and lubricating oil consumption
  - mechanical advantage, load, force and moments
  - remaining steaming times and engine performance
  - specific fuel consumption, power, speed and range
  - stress, strain and safe working load (SWL)
  - tank capacities and pumping capacities for tank filling and emptying
  - velocity ratio and efficiency of simple machines
  - volume and capacity of regular shaped tanks
- calculations fuel consumption and storage:
  - using calibration tables to measure quantities in tanks
  - using relative density/specific gravity to convert quantity in litres and volume to mass
- converting:
  - fractions to decimals
  - units to multiples of base units.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- area and circumference of a circle
- calibration tables
- common International System of Units (SI), such as kilogram, tonne, Newton, Newton metre, Pascal, joule, watt and metre



- relationship between theoretical vessel speed, propeller pitch and revolutions per minute (r.p.m.)
- terminology of:
  - material technology
  - simple levers
- volumes of regular shaped tanks
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL047 Demonstrate advanced knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel. It includes evaluating steam plant efficiency, interpreting steam plant cycles, evaluating repairs required for boilers and steam plants, outlining survey procedures, and explaining operating steam plant under different conditions.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Outline responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel</b> | <b>1.1</b> Commonwealth, state/territory and local legislation and regulations that relate to marine boilers and steam plant in terms of safety, repairs and pollution, including implementation, is identified |
|  | <b>1.2</b> Safe operating practices for all steam plant are examined and standing orders as to their operation are prepared or modified   |
|  | <b>1.3</b> Procedures for establishing engine room staff who are fully conversant with safe practices for boiler operation are outlined   |
| <b>2 Evaluate design and construction of marine auxiliary boilers</b>  | <b>2.1</b> Typical boiler types illustrating cross-section, attachments and location of all fittings, mountings, scantlings and method of achieving circulation are examined                                    |
|  | <b>2.2</b> Material requirements for boiler components are identified   |
|  | <b>2.3</b> Construction of different types of boilers is analysed and difference recorded   |
| <b>3 Evaluate boiler and steam plant repairs</b>   | <b>3.1</b> Types and properties of materials used in boilers and steam plant are identified   |
|  | <b>3.2</b> Common component failures in boilers and steam plant are explained and reported  |
|  | <b>3.3</b> Appropriate repairs for failed components in boilers and steam plant are determined  |
|  | <b>3.4</b> Constraints on engineering staff engaged in repairing boilers and steam plant are explained  |

	<b>3.5</b>	Requirements to report defects in pressurised components of boilers are identified
<b>4 Evaluate design and operation of thermal fluid heating plants</b>	<b>4.1</b>	Different gauge glass types are compared
	<b>4.2</b>	Typical thermal fluid heating plant is explained and advantages and limitations of the system are identified
	<b>4.3</b>	Locations and functions of all fittings and safety devices in a typical thermal fluid system are explained
	<b>4.4</b>	Properties of thermal fluid, effects of contamination and methods of testing fluid are analysed
	<b>4.5</b>	Hazards associated with heat transfer oil systems are analysed
	<b>4.6</b>	Routine maintenance procedures associated with heat transfer oil systems are outlined
<b>5 Evaluate layout and design of marine steam systems and components</b>	<b>5.1</b>	Thermal fluid heating is compared to conventional steam plant
	<b>5.2</b>	Typical steam system layout showing location of all components on feed and heating side is detailed
	<b>5.3</b>	Material requirements for steam system components are identified
	<b>5.4</b>	Reasons for operating plant and systems at nominated temperatures and pressures, and effects of departing from these parameters, are explained
<b>6 Interpret complex steam plant cycles</b>	<b>6.1</b>	Operation, function and efficiency of dual pressure cycles and steam/steam generators are compared and contrasted
	<b>6.2</b>	Operation of dual pressure and pass in/out turbines is explained
<b>7 Evaluate steam plant efficiency</b>	<b>7.1</b>	Combustion efficiency from flue gas constituents is assessed
	<b>7.2</b>	Steam and fuel consumption to obtain heating efficiency is analysed

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|---|-------------|--|
|   | <b>7.3</b>  | Causes of loss of steam plant efficiency are evaluated and recorded  |
|   | <b>7.4</b>  | Requirements of inert gas generation of boiler plant are determined  |
| <b>8 Explain methods of auxiliary steam plant operation and control under variable conditions</b> | <b>8.1</b>  | Methods of steam pressure control while manoeuvring and possible adverse impacts are analysed  |
|   | <b>8.2</b>  | How dew point can be reached when operating at reduced power is examined   |
|   | <b>8.3</b>  | How low powers can limit steam production by exceeding pinch point is explained  |
| <b>9 Outline procedures for inspecting marine auxiliary boilers and associated plant</b>          | <b>9.1</b>  | Symptoms of faults in steam traps, hot wells, de-aerators, condensers, evaporators and requirements for contamination prevention between systems, are analysed |
|   | <b>9.2</b>  | Procedures for shutting down, isolating and opening up a boiler for inspection or during an emergency are clarified  |
|   | <b>9.3</b>  | Possible defects that may occur in a boiler, fire and water side, their location and effects are analysed  |
|   | <b>9.4</b>  | Repair procedures commonly employed for damaged boilers are examined and limitations of such repairs are explained   |
|   | <b>9.5</b>  | Procedures for leak detecting in boilers and steam equipment are clarified and remedial actions are explained  |
|   | <b>9.6</b>  | Mechanism of economiser fires are analysed   |
| <b>10 Outline procedures for surveying boilers</b>  | <b>10.1</b> | Procedures for preparing a boiler for survey are documented and explained  |
|   | <b>10.2</b> | Boiler inspection procedures that would cover all possible problem areas are planned   |
|   | <b>10.3</b> | Purpose and procedures for carrying out hydrostatic/hydraulic pressure tests and non-destructive tests on auxiliary boilers are explained                      |

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|--|---|
| <b>11 Analyse procedures for protecting steam plant during off-load conditions</b> | <b>11.1</b> Procedures for decommissioning and laying up a boiler for short and long intervals are compared   |
|  | <b>11.2</b> Processes for cleaning boilers are evaluated  |
|  | <b>11.3</b> Procedures for re-commissioning steam plant are explained   |
|  | <b>11.4</b> Chief Engineer responsibilities for setting lifting pressure of safety valves are outlined  |
| <b>12 Differentiate between safety valves types</b>                                | <b>12.1</b> Common types of boiler safety valves are analysed and sketched, and how they are classified in terms of valve lift is explained                     |
|  | <b>12.2</b> Materials used in safety valves are identified and operational problems that can occur are analysed   |
|  | <b>12.3</b> Defects that may be found when dismantling a safety valve for survey are analysed   |
|  | <b>12.4</b> Procedures for setting valve lift pressure are established and precautions necessary when testing valve on fired and non-fired boilers are examined |
|  | <b>12.5</b> Chief Engineer responsibilities for setting lifting pressure of safety valves are outlined  |
| <b>13 Evaluate problems associated with feed and boiler water</b>                  | <b>13.1</b> Causes of scaling and corrosion of water side of a boiler and how these can be minimised are analysed   |
|  | <b>13.2</b> Acceptable operational range and effects of contamination on boiler chemical reserves are identified  |
|  | <b>13.3</b> Reliability of boiler water test results are analysed in relation to sampling procedure, testing equipment and shelving of test chemicals           |
|  | <b>13.4</b> Different tests carried out on boiler water are explained and implications of out-of-range results are interpreted                                  |
|  | <b>13.5</b> Use of different chemicals to treat and condition boiler water is assessed  |
| <b>14 Assess hazards of operating steam plant under adverse or faulty</b>          | <b>14.1</b> Potential hazards of boiler operation with contaminated feed water are assessed   |

## operating conditions

- |           |             |   |
|-----------|-------------|---|
|           | <b>14.2</b> | Procedure for continuing boiler operation when contamination has exceeded acceptable limits is explained                                      |
|           | <b>14.3</b> | Effects of operating boiler with insufficient water level are explained and actions to be taken under loss of water conditions are identified |
|           | <b>14.4</b> | Causes, consequences and relevant preventative measures associated with furnace explosions are analysed                                       |
|           | <b>14.5</b> | Operating conditions that can lead to an economiser fire and actions that can be taken to prevent and control such fires are evaluated        |
|           | <b>14.6</b> | Alternative methods for maintaining heating if a boiler or economiser has to be shut down are determined                                      |
| <b>15</b> |             | <b>Evaluate marine fuel systems</b>   |
|           | <b>15.1</b> | Procedure to be adopted when boiler is severely contaminated from different sources is outlined   |
|           | <b>15.2</b> | Boiler fuel system, its components and maintenance procedure are detailed   |
|           | <b>15.3</b> | Combustion process, its monitoring system and requirements for good combustion are analysed   |
|           | <b>15.4</b> | Different types of burners are compared and contrasted and how atomisation is achieved is explained   |
|           | <b>15.5</b> | Operation of a burner management system that incorporates pressure and level control is explained   |
| <b>16</b> |             | <b>Evaluate marine boiler auxiliaries</b>   |
|           | <b>16.1</b> | Construction, operating principles and maintenance requirements of a regenerative condenser are explained                                     |
|           | <b>16.2</b> | Causes of loss of vacuum are identified and test procedure to identify leaks in a condenser is created  |
|           | <b>16.3</b> | Construction and operation of air ejectors, drain coolers, vacuum pumps and extraction pumps are explained                                    |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is not equivalent to MARL024 Demonstrate intermediate knowledge of marine auxiliary boilers.

This unit replaces and is equivalent to MARL030 Demonstrate advanced knowledge of marine auxiliary boilers.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL047 Demonstrate advanced knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance on at least one occasion and include:

- accessing information related to marine auxiliary boilers
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions for addressing complex problems associated with marine auxiliary boilers, such as maintaining the operation of marine auxiliary boilers under adverse conditions
- identifying and interpreting diagnostic information and performing complex mathematical calculations related to operating, repairing and maintaining marine auxiliary boilers
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine auxiliary boilers.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of operation of boilers and steam systems
- boilers and steam plant, including:
  - condensers
  - economiser
  - feed pumps
  - fired
  - high pressure
  - low pressure

- medium pressure
- steam generators
- unfired
- boiler and steam plant repairs/defects
- boiler water levels
- boiler water testing
- boiler water treatment
- combustion efficiency
- combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- common boiler defects and repair procedures
- constraints, including:
  - class requirements
  - location
  - reliability
  - time
  - type of materials
- design features and operative mechanism of marine steam boiler and associated auxiliary, including:
  - material selection and design features of marine steam boiler
  - material selection and design features of marine steam boiler feed water systems
- failures, including:
  - acid dew point corrosion
  - caustic gouging
  - corrosion cracking
  - corrosion fatigue
  - distortion
  - erosion
  - fatigue
  - hydrogen damage
  - maintenance damage
  - material flaws
  - over temperature
  - pitting
  - rupture
  - stress:
    - thermal fatigue
    - vibration
- fittings mounted on boilers
- fuel oil system for an auxiliary boiler

- hazards:
  - associated with running boilers and steam plant
  - of operating steam plant under adverse or faulty operating conditions
- heat transfer oil systems
- intermediate operation of marine auxiliary boilers
- marine boilers and steam, including:
  - condensers
  - economiser
  - fired feed pumps
  - high pressure
  - low pressure
  - medium pressure
  - steam – steam generators
  - unfired
- marine boiler inspection procedures
- methods of auxiliary steam plant operation and control under variable conditions
- operating principles relating to steam generation in fired and unfired boilers
- operation of marine auxiliary boilers
- principles of boiler operation in normal and emergency situations
- procedures for:
  - maintaining water level in boilers
  - protecting steam plant during off-load conditions
  - surveying boilers
- purpose of alarms and shutdowns in marine boilers
- safety valves, including:
  - boiler drum
  - economiser
  - superheater
  - WHU
- steam plant:
  - cycles
  - efficiency and causes of loss of steam, including:
    - combustion
    - conduction-heat loss (such as fouled tubes)
    - controls/instrumentation
    - high flue-gas temperature
    - low combustion air supply temperature
    - low feed water supply temperature
    - low quality fuel
    - operation at low or cyclic loads

- poor radiant-heat loss
- too much excess air (i.e. high oxygen [O<sub>2</sub>])
- water treatment
- treatment, sampling and testing of feed and boiler water
- types of auxiliary boilers and typical operating pressures and temperatures
- typical feed systems for marine boilers
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- diagrams, specifications and other information required for performing advanced calculations related to marine auxiliary boilers
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL048 Demonstrate advanced knowledge of marine auxiliary machinery and systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems onboard a commercial vessel. This includes evaluating ship systems, assessing lubricants and lubricant contamination, and analysing the operation of major items of marine auxiliary machinery.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |          |                                 |  |
|----------|---------------------------------|--|
| <b>1</b> | <b>Evaluate ship systems</b>    | <b>1.1</b> Conventional systems are analysed from ship layout drawings and performance data<br><br><b>1.2</b> Viability and potential problems of new systems and advanced specialist vessels are evaluated<br><br><b>1.3</b> Performance of different pumps and heat exchangers is assessed, and their applications are compared for different purposes<br><br><b>1.4</b> Performance of shipboard pollution control equipment is evaluated   |
| <b>2</b> | <b>Assess materials failure</b> | <b>2.1</b> Type of materials failure that impact on marine auxiliary components is analysed, including metallic and non-metallic<br><br><b>2.2</b> Ideal properties of materials required for components of auxiliary machinery are analysed<br><br><b>2.3</b> Repair methods used for auxiliary machines and constraints on engineering staff engaged in repairing auxiliary machinery are analysed<br><br><b>2.4</b> Type and purpose of destructive and non-destructive testing of materials are compared |
| <b>3</b> | <b>Analyse lubrication</b>      | <b>3.1</b> Mechanism of lubrication between two surfaces is explained<br><br><b>3.2</b> Factors influencing good lubrication are identified and evaluated  |

		<p><b>3.3</b> Different types of lubrication applied to marine machinery are compared and contrasted</p> <p><b>3.4</b> Relative advantages of synthetic lubricants and mineral oils are assessed</p> <p><b>3.5</b> Methods of assuring quality of lubrication are identified</p> <p><b>3.6</b> Procedures for onboard testing for fuels and lubricants are clarified</p> <p><b>3.7</b> Laboratory tests that may be conducted on fuels and lubricants and how results can be interpreted and utilised as part of a maintenance program are detailed</p>
<b>4</b>	<b>Analyse fuel and lubricating oil contaminants</b>	<p><b>4.1</b> Symptoms, effects and possible remedial actions for different types of contaminants in fuel are evaluated</p> <p><b>4.2</b> Types of contaminants that affect lubricants and remedial actions required for different forms of contamination are identified, including bacterial infections</p> <p><b>4.3</b> Methods used to counter poor quality fuels and to improve properties of lubricating oils are assessed</p> <p><b>4.4</b> Safety measures to be applied when fuels are found to be outside class requirements are identified</p> <p><b>4.5</b> Operation of centrifugal separators is outlined and factors that affect optimum separation are analysed</p> <p><b>4.6</b> Procedures for dealing with contamination of oils by water, fuel or solid debris, including recognition of dangerous levels and possible consequences, are determined</p>
<b>5</b>	<b>Analyse shafting systems, bearings, couplings, clutches and shaft seals that form transmission system</b>	<p><b>5.1</b> Different types and methods of checking alignment and wear of shafting, shaft bearings and thrust blocks are identified</p>

- |          |  |  |
|----------|--|--|
|          |  | <p><b>5.2</b> Assembly and dismantling procedures for muff and flange type couplings are compared and contrasted</p> <p><b>5.3</b> Different types, methods of operation and maintenance requirements of clutches are compared</p> <p><b>5.4</b> Different types, maintenance requirements and operation of stern tubes, tail shaft seals and stern bearing lubrication systems under adverse conditions are evaluated</p> <p><b>5.5</b> Mounting and unmounting propeller to tail shaft is clarified</p>  |
| <b>6</b> | <b>Analyse steering gears and controllable pitch propeller (CPP) systems</b> | <p><b>6.1</b> Regulatory requirements for steering gears of different types of vessels are identified</p> <p><b>6.2</b> Operation of various types of steering gear arrangements are analysed</p> <p><b>6.3</b> Operation and performance of CPP and fixed pitch systems are compared and contrasted</p> <p><b>6.4</b> Modes of operation of CPP systems are explained</p> <p><b>6.5</b> Effects and countermeasures, in the event of failure in the control system or seals of a CPP system, are identified</p> <p><b>6.6</b> Construction, installation and operation of hydraulic gear, stabilisers and bow thrusters are identified</p> <p><b>6.7</b> Normal alarms and safety devices fitted to steering gears for all classes of vessels are identified, including analysis of auto and manual changeover procedures</p> <p><b>6.8</b> Construction, installation and operation of hydraulic steering gear is explained</p> <p><b>6.9</b> Construction and operation of stabilisers is explained</p> |



		<b>6.10</b>	Construction and operation of bow thrusters is explained
<b>7</b>	<b>Analyse marine transmission systems</b>	<b>7.1</b>	Operation and performance of different marine transmission systems are compared and contrasted
		<b>7.2</b>	Procedure for inspecting a set of reduction gears from a propulsion system is analysed
		<b>7.3</b>	Types and locations of faults that may occur in gearing systems and repair options available are analysed
<b>8</b>	<b>Analyse marine air compressors</b>	<b>8.1</b>	Procedures for assessing performance of reciprocating and rotary compressors by output and condition monitoring techniques are explained
		<b>8.2</b>	Effects of multi-staging, inter-cooling and clearance volume are explained
		<b>8.3</b>	Importance of all fittings and safety devices in compressed air system is explained
		<b>8.4</b>	Full automatic operation of starting air compressors is explained
		<b>8.5</b>	Air receivers are inspected and maintained
<b>9</b>	<b>Evaluate shipboard refrigeration and air conditioning (RAC) systems</b>	<b>9.1</b>	Principle of air conditioning systems is explained and how ideal conditions are achieved in air conditioned space is analysed
		<b>9.2</b>	Automatic operation of a typical marine provision fridge plant capable of maintaining different temperatures in different cold rooms is analysed
		<b>9.3</b>	Hazards associated with chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), and regulations controlling their production and usage are analysed

		<p><b>9.4</b> Procedures for evacuation and recovery of refrigerants from the system are outlined</p> <p><b>9.5</b> Symptoms, effects and remedial action for common faults in RAC systems are assessed</p>
<b>10</b>	<b>Evaluate operation of inert gas systems on crude oil tankers</b>	<p><b>10.1</b> Location and functions of all components, fittings and safety devices in an inert gas system are identified</p> <p><b>10.2</b> Operation of a typical inert gas system found on crude oil tankers is analysed</p> <p><b>10.3</b> Operation and maintenance requirements of inert gas systems are explained</p>
<b>11</b>	<b>Evaluate plant efficiency and relate problems in a turbo alternator</b>	<p><b>11.1</b> Operating parameters and associated protections for turbo alternator systems are analysed</p> <p><b>11.2</b> Procedure for assessing efficiency of auxiliary steam turbines is explained by analysing measured parameters</p> <p><b>11.3</b> Methods of steam and air leak detection in turbo alternator systems are compared</p> <p><b>11.4</b> Effects of fouling of condenser and changes in sea water temperature in turbo alternator systems are analysed</p> <p><b>11.5</b> Process of warming-through and shutting down turbine plant is explained</p> <p><b>11.6</b> Maintenance requirements for achieving optimum performance of an auxiliary steam turbine plant are outlined</p>
<b>12</b>	<b>Assess operational problems with pumps and pumping systems handling sea water</b>	<p><b>12.1</b> Procedure for evaluating pump or pumping system, including heat exchangers and methods of locating cause of problems that affect output and performance, is clarified</p> <p><b>12.2</b> Operation of a self-priming system used on bilge, ballast or cargo pumping</p>

- arrangements is explained
- 12.3** Different types of distillation plants used on ships are compared and contrasted taking into account operation, performance, problems and applications
- 12.4** Main reasons for corrosion in seawater systems and regions most affected are explained
- 12.5** Operation of corrosion prevention systems fitted to pumping systems is assessed
- 13** **Outline pollution prevention regulations and operation of equipment**
- 13.1** International Convention for the Prevention of Pollution from Ships (MARPOL) regulations are identified and their implications for Engineers and ship operators are explained
- 13.2** Operation of modern oily water separators, oil content monitors and how they comply with MARPOL regulations are explained
- 13.3** Operation of typical sewage plants and regulations controlling their usage are explained
- 13.4** Operation of incinerators, material that may legally be burned and monitoring devices is explained
- 14** **Explain basic operation of marine gas turbines**
- 14.1** Basic flow of air and gas through a simple cycle marine gas turbine is outlined
- 14.2** Materials and construction of compressor, combustion system and turbine in a single and two-shaft design turbine are outlined
- 14.3** Basic controls required for control and protection of plant are outlined
- 14.4** Accessories necessary for safe operation are identified

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is not equivalent to MARL025 Demonstrate intermediate knowledge of marine auxiliary machinery and systems.

This unit replaces and is equivalent to MARL031 Demonstrate advanced knowledge of marine auxiliary machinery and systems.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL048 Demonstrate advanced knowledge of marine auxiliary machinery and systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information and sketch diagrams to interpret and explain testing requirements related to the operation of marine auxiliary machines
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining principles of marine auxiliary machines
- identifying and interpreting complex numerical and graphical information related to operating, maintaining and repairing marine auxiliary machines on commercial vessels
- identifying and rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting complex written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- auxiliary machinery, including:
  - boiler
  - compressors
  - deck machinery
  - diesel generator
  - evaporators

- pumps
- refrigerating installation
- separators
- turbo alternators
- components of refrigeration and air conditioning (RAC), including:
  - all fittings
  - safety devices
- constraints, including:
  - class requirements
  - location
  - reliability
  - time
- corrosion prevention systems, including:
  - anodes
  - chemical injection
  - impressed current
  - marine growth inhibiting systems
  - special coatings
- design features and operative mechanism of marine gas turbine and associated auxiliaries, including:
  - material selection and design features of gas turbines
- factors influencing good lubrication, including:
  - alignment
  - condition of bearing surfaces
  - flow rate
  - load
  - purity of lubricant
  - running clearances
  - speed
  - temperature
  - viscosity
- fuel testing, including:
  - density
  - fuel in lubricating oil
  - pour point
  - viscosity
  - water contamination
- fuel and lubricating oil contaminants, including:
  - air entrainment
  - incompatible fluids

- moisture
- particulate
- fuels and principles of fuel systems
- inert gas systems
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- lube oil, including:
  - coolers
  - filter
  - pump
- marine air compressors and compressed air systems
- marine transmission systems
- materials failure, including non-destructive testing procedures and standards
- nature and causes of typical start-up and shutdown malfunctions of main and auxiliary machinery and associated systems, and available methods for their detection and rectification
- operational characteristics and performance specifications for the different types of auxiliary machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators
- plant efficiency
- principles and procedures of machinery lubrication
- procedures for carrying out start-up and shutdown of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- properties of metallic and non-metallic materials
- protections, including:
  - axial displacement
  - condenser condition
  - electrical
  - expansion
  - high air temperature
  - high oil temperature
  - loss of vacuum
  - low oil pressure
  - mechanical
  - overspeed:
    - pressure
    - steam
    - steam condition
    - temperature
    - vibration
- purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- safety, environmental and hazard control precautions and procedures relevant to start-up and

- shutdown of marine auxiliary machinery and associated systems
- shafting systems, bearings, couplings, clutches and shaft seals and stern tubes that form the transmission system
- ship systems
- shipboard RAC systems
- steering gears and controllable pitch propeller (CPP) systems
- turbo alternators
- types of auxiliary machinery and components
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standard for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, personnel and personal protective equipment (PPE) that replicate and are currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARL049 Demonstrate advanced knowledge of marine control systems and automation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate control systems onboard a commercial vessel. It includes advanced knowledge of control theory and knowledge required to analyse the operation and performance of signal transmissions systems, electronic transmitters, final control element arrangements, electronic temperature sensors and transmitters, governors, proportional-integral-derivative (PID) electronic controllers, machinery space monitoring alarm and control systems.

It also includes knowledge of fault-finding techniques for control systems, measurement and test equipment used for fault finding electronic apparatus, operational applications of analogue and digital programmable logic controllers (PLCs), and procedures for programming, operating, and maintaining PLC controlled systems.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Explain control theory**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Open loop systems are distinguished from closed loop systems

**1.2** Time lag is distinguished from time constant

**1.3** Closed loop manual, time-based automatic open loop and feed forward open loop are explained

**1.4** Effect resistance and capacitance has on process system response is demonstrated

**1.5** Transfer function is established and defined

**1.6** Effect of variations in undamped natural frequency on control systems is illustrated

#### **2 Analyse signal transmissions systems used for monitoring, controlling and shutting down machinery**

**2.1** Methods and limitations of different signal transmissions systems are compared

**2.2** Standard pneumatic system and standard analogue 4-20 Milliampere (mA) system of signal transmission are compared and contrasted

- 2.3 Operation of a nozzle flapper and pneumatic amplifier unit is analysed and applied to transmitters, basic controllers and valve positioners
  - 2.4 Control air supply system is defined
  - 2.5 Principle of operation of direct and reverse acting pneumatic relays and application is clarified
  - 2.6 System of a communications bus using digital signal transmission with optical and electronic systems is explained
  - 2.7 Limitations and advantages of a communications bus system are analysed
- 3 **Analyse electronic and pneumatic transmitters**
  - 3.1 Principles of operation of a typical 4-20 mA transmitter are explained
  - 3.2 Application of strain gauges and changes in capacitance as sensors for pressure and differential pressure transmitters are outlined
  - 3.3 Methods of testing transmitter outputs are explained
  - 3.4 Application of differential pressure transmitters to liquid level sensing in both open and closed tanks is analysed
  - 3.5 Pneumatic temperature transmitter is defined
  - 3.6 Effect of changes in ambient temperature on thermocouples and resistance temperature detectors (RTD) is explained
  - 3.7 Testing procedures and methods of simulation for both RTDs and thermocouples are explained
  - 3.8 Characteristics and application of thermistors are outlined
  - 3.9 Use of a differential pressure transmitter to measure flow is analysed and compared with non-restrictive electronic systems
- 4 **Evaluate final control element arrangements**
  - 4.1 Pneumatic, electric and hydraulic actuation are compared and contrasted
  - 4.2 Arrangements for locking pneumatic control valves in

their last position on air failure are outlined

**4.3** Operating principle of pneumatic valve positioners is explained

**4.4** Control valve trim characteristics are explained

**4.5** Control valve selection for machinery space duties are analysed

**4.6** Arrangements to provide fail safe requirements are outlined

**5 Evaluate electronic temperature sensors and transmitters**

**5.1** Colour coding of tails and compensating cables for thermo couple types are identified

**5.2** Temperature/millivolt (mV) outputs and application of common thermo couple types are illustrated

**5.3** Relationship between resistance and temperature for PT100 resistance temperature device and method of testing three wire arrangements is explained

**5.4** Arrangements of interfacing thermo couples and RTDs with 4-20 mA systems and 1-5 volt (V) interface cards are analysed

**5.5** Effect of changes in ambient temperature on thermocouples and RTD is explained

**6 Analyse PID electronic controllers**

**6.1** Common controller actions and applications are outlined

**6.2** Principle of operation of an electronic analogue 3-term controller and how adjustments are made is explained

**6.3** Typical controller settings for a PID controller are detailed

**6.4** Open loop response and PID controller testing and calibration are demonstrated

**6.5** Application of modern single loop digital controller is explained

**6.6** Programming requirements for manual and auto-tuning when adjusting digital controllers are demonstrated

<b>7 Explain procedure for transmitter calibration</b>	<b>7.1</b>	Procedure for transmitter calibration for both pneumatic and electronic transmitters is applied
	<b>7.2</b>	Test equipment is used for transmitter calibration
	<b>7.3</b>	Relationship between process variables and output signals is demonstrated in a graph
	<b>7.4</b>	Effects of transmitter dead band are defined
<b>8 Explain operation of pneumatic 3-term controller and controller adjustment procedures</b>	<b>8.1</b>	Operating principle of pneumatic 3-term controllers is outlined
	<b>8.2</b>	Procedure for adjusting 3-term pneumatic controllers is applied and effects if incorrectly adjustment are explained
	<b>8.3</b>	Integrated hand/auto station and 3-term controller are outlined and bumpless transfer is demonstrated
<b>9 Explain engine room monitoring systems</b>	<b>9.1</b>	Application of different speed sensing systems is analysed
	<b>9.2</b>	Operating principles of torque monitoring systems applied to propeller shafting are explained
	<b>9.3</b>	Arrangements of shaft power and indicated power monitoring are compared
	<b>9.4</b>	Capacitance sensing and float level monitoring systems are compared
	<b>9.5</b>	Operating principle of oil-water interface sensor is explained
	<b>9.6</b>	Methods of bearing temperature monitoring applied to diesel engine rotating parts are outlined
	<b>9.7</b>	Machinery space monitoring and alarm system from a central control room are outlined
<b>10 Evaluate performance of machinery space monitoring alarm and control systems</b>	<b>10.1</b>	Single, two and three element boiler water level control systems involving feedwater and cascade systems are analysed

- 10.2 Requirements and systems to provide advanced combustion control systems and sequential control for burner management are outlined
- 10.3 Concepts and arrangements for central cooling and load dependent cooling control systems are explained
- 10.4 Main engine control arrangements for fixed pitch propeller and controllable pitch propeller (CPP) systems requiring sequential control are analysed
- 10.5 Tests and procedures to meet unmanned machinery spaces (UMS) requirements are explained, and alarm and monitoring systems involving data loggers, alarm print outs, and trend analysis are evaluated
- 11 **Analyse governors**
  - 11.1 Operating principle of proportional action hydraulic governors is explained
  - 11.2 Importance of spring stiffness in relation to response is clarified
  - 11.3 Purpose of an isochronous governor is outlined
  - 11.4 Principle of operation of an isochronous hydraulic governor is outlined
  - 11.5 Governor adjustments to allow operation of propulsion and power generation diesels in both shared load and standalone applications are specified
  - 11.6 Governor faults are diagnosed and interpreted, identifying and evaluating appropriate adjustments and maintenance to be made
  - 11.7 Specific governor applications requiring torque limitation, critical speed range avoidance are outlined
  - 11.8 Typical electronic governors are explained using labelled diagrams to indicate major components and features
  - 11.9 Response of a diesel engine governor on change in engine load using both feed-back and feed forward control is explained using labelled diagrams to indicate major components and adjustments
- 12 **Explain fault-finding techniques for control systems**
  - 12.1 Governor adjustments are demonstrated, and effect of incorrect adjustments is explained

- 12.2** Common defects in mechanical and electronic governors are itemised
  - 12.3** Indication of faults and procedures of fault finding in 4-20 mA loops are explained
  - 12.4** Fault-finding techniques in pneumatic control systems and their respective components are analysed
  - 12.5** Fault finding flow diagram is illustrated
  - 12.6** Off-limit performance, fault detection and principles of rectifications for common engine room control systems are evaluated
- 13 Explain operational applications of analogue and digital PLCs**
  - 13.1** Principles and operation of integrated circuit gates are explained
  - 13.2** Operational function of input/output devices connected to a digital PLC is detailed
  - 13.3** Methods of operation of flip flops, adders, counters, multiplexers and decoders are outlined
  - 13.4** Methods employed when changing set point values in a digital PLC are outlined
  - 13.5** Methods of programming PLCs are assessed
  - 13.6** Methods used for storing binary data and operating registers are explained
  - 13.7** Fibre optic data transmission systems are explained
  - 13.8** Procedure for connecting PLC to system control elements is outlined
  - 13.9** System operating procedure is outlined
  - 13.10** Procedure for modifying system and program as necessary to provide adequate and appropriate safety requirements is outlined
  - 13.11** Required documentation is prepared and accuracy is verified
  - 13.12** Maintenance and fault-finding procedures are outlined

- |  |  |
|--|--|
| <b>14 Explain typical machinery space control loops and UMS requirements</b> | <b>14.1</b> Fuel oil heating, lube oil (LO) cooling and jacket water (JW) cooling loop showing cascade and split range systems are outlined                |
|  | <b>14.2</b> Fuel oil viscosity control loop is outlined  |
|  | <b>14.3</b> Common methods of boiler water control and simple combustion control with burner management for an auxiliary boiler are outlined               |
|  | <b>14.4</b> Requirements and system arrangements for bridge control of main propulsion machinery, including changeover from local to bridge, are explained |
|  | <b>14.5</b> Common pressure control loops found in a ship's engine room are identified   |
|  | <b>14.6</b> UMS requirements are outlined  |
|  | <b>14.7</b> Troubleshooting procedures associated with control systems are outlined  |
|  | <b>14.8</b> Procedures for software version control are outlined   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is not equivalent to MARL026 Demonstrate intermediate knowledge of marine control systems and automation.

This unit replaces and is equivalent to MARL032 Demonstrate advanced knowledge of marine control systems and automation.



## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL049 Demonstrate advanced knowledge of marine control systems and automation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information and sketching diagrams, and interpreting and explaining testing requirements related to control systems on commercial vessels
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining advanced principles of marine automation and process control, and imparting knowledge and ideas verbally, in writing and visually
- identifying and interpreting numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in control systems on commercial vessels
- identifying methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- reading and interpreting written information related to operating control systems on commercial vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actuators and control valves, including:
  - electric
  - hydraulic
  - pneumatic
- analogue and digital programmable logic controllers (PLCs)
- Australian Standards for drawing symbols/layouts for schematic diagrams
- automatic control engineering and safety devices
- bridge control systems

- characteristics and functions of temperature, pressure and viscosity of fuel
- concept of 'fail safe' philosophy
- concepts of unmanned machinery spaces (UMS), and automated monitoring and control of machinery
- control and monitoring of ship machinery
- control:
  - loops
  - theory
- design features and system configuration of automatic control equipment and safety devices, including:
  - general requirements
  - generator and distribution system
  - main engine
  - steam boiler
- design features and system configuration of operational control equipment for electrical motors, including:
  - distribution
  - effects of varying frequency and voltage of alternating current (AC) motors
  - emergency power
  - insulated gate bipolar transistor (IGBT) motor speed control
  - motor control and protection
  - motor speed control by thyristors
  - three phase AC motors
  - three phase generators
  - three phase synchronous motors
  - three phase transformers
- design features of high voltage (HV) installations
- differential pressure transmitters
- electronic:
  - electronic systems circuit diagrams
  - temperature sensors and transmitters
  - transmitters
- electronic, power electronics
- faults, including:
  - earths
  - electronic component failure
  - high resistance joints
  - open circuits
  - power supply faults
  - short circuits

- fault-finding techniques for control systems
- features of hydraulic and pneumatic control equipment
- final control element arrangements
- governors and governor adjustments, including mismatching between prime mover types and responses
- industry standards for drawing symbols/layouts for schematic diagrams
- instrument process and control terms
- machinery space monitoring alarm and control systems
- marine electrotechnology
- measurement and test equipment used for fault finding electronic apparatus
- mechanical and electrical sensors
- meters, including:
  - rotometer
  - target meter
- methods of testing transmitter outputs, including:
  - MA test point
  - MV test point
  - no test points
- open and closed loop systems
- operation of hydraulic governors
- operation of pneumatic 3-term controller and controller adjustment procedures
- operation of PLCs
- operational safety of HV installation
- proportional-integral-derivative (PID) electronic controllers
- pneumatic and electrical instrumentation transmitters
- principles and operation of pneumatic control element and systems
- principles of:
  - basic electronic circuits
  - basic pneumatic systems and action of pneumatic instruments
  - process control
- safety devices, alarms and monitoring systems
- sensing and transmitting elements
- signal transmissions systems used for monitoring, controlling and shutting down machinery
- tests and procedures required to meet UMS requirements
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training

Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and relevant personal protective equipment (PPE) that replicate and are currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL050 Demonstrate advanced knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to analyse the operation and maintenance of marine diesel engines and systems on a commercial vessel. This includes evaluating fuel, cooling and lubrication systems; analysing starting, manoeuvring and reversing systems; analysing causes of vibration, scavenge fires and explosions; and interpreting combustion diagnostic equipment faults.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Evaluate diesel fuel systems**

- 1.1** Optimum combustion parameters, means of adjustment and legislation requirements limiting exhaust emissions are determined and analysed
- 1.2** Design modifications of pumps, camshafts and injectors for standard fuel types are evaluated
- 1.3** Variable injection timing and fuel quality adjustments in service are justified, specifying common methods of adjustment
- 1.4** Injection requirements for common diesel engine types, including combustion modifications for changes in engine service rating, are compared
- 1.5** Faults and symptoms of common diesel fuel injection problems are analysed and appropriate adjustments are explained
- 1.6** Work health and safety (WHS)/occupational health and safety (OHS) aspects of testing and handling fuel injection systems are explained
- 1.7** Operation and normal operating pressures and temperatures of fuel systems are analysed, including uni-fuel and dual fuel systems of varying viscosity fuel types

#### **2 Analyse cooling systems for main and auxiliary diesel engines**

- 2.1** Thermal efficiency optimisation of diesel engines and causes of thermal loads on engine components are explained
- 2.2** Cooling media selection is justified, and advantages and disadvantages of various diesel cooling methods are evaluated
- 2.3** Requirements of a coolant are identified and recorded
- 2.4** Corrosion principles and combustion side corrosion problems are explained

- 2.5 Appropriate action to be taken with common cooling system faults is established and evaluated
- 2.6 How cooling systems are commissioned, monitored and stored during idle periods is explained
- 2.7 Reasons for load-dependant cooling of diesel alternators on heavy fuels is explained
- 2.8 Use of additives in cooling water is explained, including water treatment
- 2.9 Normal operating temperatures, pressures and flow paths of typical methods of cooling medium and slow speed diesel engine pistons, exhaust valves, cylinders, turbochargers and cylinder heads are specified
- 3 **Evaluate diesel engine lubrication requirements**
  - 3.1 Principles of engine lubrication are explained
  - 3.2 Different lubrication systems and different lubricant properties are explained and assessed
  - 3.3 Methods for lubricating marine diesel engine components are specified and common faults are interpreted
  - 3.4 Conventional and synthetic lubricant properties and applications are identified
  - 3.5 Sources of contamination and deterioration of lubricants are analysed; treatment, monitoring and testing methods are explained; results are evaluated and appropriate actions to be taken are outlined
  - 3.6 Diagrams showing direction of flow, typical clearances and stating normal operating temperatures and pressures are used to explain how lubricating oil is distributed to the guides, top-end, bottom-end and main bearings of diesel engines
  - 3.7 Methods of crosshead lubrication are outlined and compared
  - 3.8 Methods of medium and slow-speed cylinder lubrication are evaluated
  - 3.9 Bearing materials and faults are evaluated and remedies to prevent them from occurring are determined
- 4 **Analyse diesel engine starting and**
  - 4.1 Starting procedures for diesel engines for power generation, propulsion and emergency use are specified



- manoeuvring**
- 4.2** Starting and manoeuvring sequences/requirements for direct-coupled reversible and geared propulsion diesels, including controllable pitch propeller (CPP) applications, are determined
  - 4.3** Common faults are analysed and appropriate actions to be taken with diesel starting and manoeuvring systems are determined
  - 4.4** Major components of a propulsion diesel engine typical manoeuvring and reversing system are outlined using labelled diagrams, explaining how remote, local and emergency manoeuvring is achieved
  - 4.5** Methods of achieving reversing capability with direct-coupled propulsion diesels are evaluated
  - 4.6** Layout of a diesel-electric drive is compared and contrasted with the layout of a turbo-electric drive
- 5 Analyse causes of vibration**
- 5.1** Common materials used in diesel engine construction are identified, justifying selection and specifying typical compositions and physical properties of components
  - 5.2** Dynamic loads and stresses are summarised, identifying service limitations, and different methods of component fabrication and reclamation are evaluated
  - 5.3** Two- and four-stroke operating cycle forces, couples and moments, relating to design principles of crankshafts, bedplates, foundations and crossheads are analysed
  - 5.4** Out-of-balance gas and inertia forces, couples and moments, and their relationship with flywheels, balance weights, first/second order balancing and hull vibration are explained
  - 5.5** Factors contributing to torsional vibration are specified and methods of minimising or eliminating harmful effects of critical speeds are outlined
  - 5.6** Torsional vibration dampers/detuners are explained using labelled diagrams, indicating construction features and operating principles
  - 5.7** Calibration is applied to identify wear patterns, limits and means of restoring working clearances and limits of pistons, liners, piston rings, bearings and crankshafts, sliding surfaces and interference fits of typical diesel engines
  - 5.8** Alignment and adjustment criteria of crankshafts, chain-drives,

- integral thrust bearings and crossheads are specified
- 5.9** Crankshaft deflection measurements are prepared and evaluated, alignment diagrams are constructed, and realignment procedures, including restoration of crankshaft shrink-fit slippage, are proposed
- 6 Analyse scavenge and uptake fires, air line, crankcase and gearbox explosions**
- 6.1** Operational and design factors contributing to waste heat unit fires are assessed
- 6.2** Appropriate strategies for extinguishing/containing soot and hydrogen fires are selected
- 6.3** Hazard reduction, inspection and isolation of waste heat units in service procedures are established
- 6.4** Operational factors that may contribute to scavenge fires are identified and methods of extinguishing and hazard reduction are determined
- 6.5** Factors contributing to explosive mixtures are analysed and hazard reduction procedures for starting air systems are proposed and evaluated
- 6.7** Causes of gearbox and crankcase explosions in propulsion and auxiliary drives are revised
- 6.9** Procedures to be implemented for hazardous atmosphere warning in oil and dual-fuel engines are evaluated
- 6.10** Relevant diagrams are used to identify operating principles of oil-mist detectors, crankcase breathers and explosion relief doors
- 6.11** Maintenance strategies are developed and criteria for piston rod scraper box inspection and maintenance intervals are specified
- 7 Plan safe working practices associated with diesel engine maintenance, operation and repair**
- 7.1** Safe working practices for isolating main and propulsion diesels under all operational contingencies are planned, including use of protective devices, interlocks and evaluation of their status
- 7.2** Safe working practices for machinery in enclosed spaces are planned
- 7.3** Hazard reduction procedures for safe working with flammable liquids under pressure, chemicals, acids and hydrocarbons associated with engine overhaul and maintenance are planned
- 7.4** Safe working strategies for diesel engine maintenance are planned according to manufacturer instruction manuals and

		product safety data sheets (SDS)/material safety data sheets (MSDS)
	<b>7.5</b>	Safe working practices associated with safe handling of hydraulic tools and dangers of lifting/isolating heavy components both unaided and with lifting gear are explained
<b>8 Interpret combustion diagnostic equipment faults and relate to fuel injection and pressure charging systems</b>	<b>8.1</b>	Two and four-stroke theoretical cycle diagrams are produced and discrepancies with results recorded by diagnostic tools are accounted for
	<b>8.2</b>	Combustion faults related to fuel injection and pressure charging systems are diagnosed, corrective action is specified and service values with trials or test bed figures are analysed
	<b>8.3</b>	Methods of pressure charging diesel engines are evaluated, efficiencies are determined from records, efficiency losses are accounted for and means of correction are identified
	<b>8.4</b>	Maintenance and emergency procedures for turbochargers and charge air coolers are planned
	<b>8.5</b>	Design features of turbochargers and charge air coolers are evaluated
	<b>8.6</b>	Relevant diagrams are applied to evaluate diesel scavenging systems, under normal and emergency operation modes
<b>9. Analyse construction and operation of marine gas turbines</b>	<b>9.1</b>	Flow of air and gas through a simple cycle marine gas turbine is analysed
	<b>9.2</b>	Materials and construction of compressor, combustion system and turbine in single and two-shaft designs are outlined
	<b>9.3</b>	Controls required for control and protection of marine gas turbines are detailed
	<b>9.4</b>	Functions of accessories necessary for safe operation of marine gas turbines are explained

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

## Unit Mapping Information

This unit replaces and is not equivalent to MARL027 Demonstrate intermediate knowledge of marine diesel engines and systems.

This unit replaces and is equivalent to MARL033 Demonstrate advanced knowledge of marine diesel engines and systems.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL050 Demonstrate advanced knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing diagnostic information related to marine diesel engines and systems
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining operation of marine diesel engines and systems, and imparting complex information and ideas verbally, in writing and visually
- identifying and applying relevant solutions for addressing problems associated with marine diesel engines and systems
- identifying and interpreting complex diagnostic information and performing mathematical calculations related to operating, repairing and maintaining marine diesel engines and systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine diesel engines and systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate actions to be taken with common cooling, including:
  - contamination
  - different cooling water treatments
- causes of vibration
- combustion diagnostic equipment faults
- common service faults, actions to rectify faults, emergency operation and isolation procedures
- cooling systems for main and auxiliary diesel engines

- crankcase and air-line explosions, scavenge and uptake fires
- design features and operating mechanism of marine diesel engine and associated auxiliaries, including:
  - combustion chamber components of diesel engine
  - fuel injection equipment of diesel engine
  - operative mechanism of diesel engine systems
  - piston rings, compatibility to cylinder liner and cylinder lubrication employed in a diesel engine
  - running gear of diesel engine
  - structure of diesel engine
- design features of turbochargers and charge air coolers, including:
  - bearing types
  - materials
- design features and operative mechanism of marine diesel engine and associated auxiliaries, including:
  - material selection and design features of the:
    - combustion chamber components of diesel engine
    - diesel engine system
    - fuel injection equipment of diesel engine
    - piston rings, compatibility to cylinder liner and cylinder lubrication employed in a diesel engine
    - running gear of diesel engine
    - structure of diesel engines
- diesel engines, including:
  - components
  - condition monitoring
  - engine system diagnostics
  - lubrication requirements
  - lubrication systems
  - propulsion and power generation
  - starting and manoeuvring
- diesel fuel systems
- fuel injection and pressure charging systems
- fuel systems, including:
  - conventional, low-inertia and dual-fuel (oil fuel/gas) injectors
  - fuel line pulsation damping devices
  - leakage protection
  - uni-fuel and dual-fuel systems (high/medium viscosity fuel types)
- hazards, including:
  - acids

- chemicals
- defective or bypassed machinery protective devices
- defective or inappropriately adjusted exhaust systems
- enclosed spaces
- flammable liquids under pressure
- hydrocarbons
- leaking oil and fuel
- lifting heavy components both unaided and with lifting gear
- manoeuvring systems of diesel engines
- methods of:
  - component fabrication and reclamation, including:
    - ceramics
    - composite
    - forged
    - laser-hardening
    - plasma-spraying
    - welded
  - medium and slow cylinder lubrication, including:
    - optimisation
    - running-in requirements
    - speed and load-dependant lubrication
- normal operating temperatures, pressures and flow paths, including:
  - bore cooling techniques
  - honeycomb techniques
  - strong-back techniques
- multi-engine propulsion arrangement
- pressure charging diesel engines
- principles of diesel engine operation, including precautions and procedures
- relevant diagrams, including light spring diagrams
- scavenge and uptake fires, air line, crankcase and gearbox explosions
- sources of contamination, including bacterial infection
- starting and reversing methods of diesel engine
- turbocharger operation
- WHS/OHS requirements and safe work practices, including:
  - diesel engine control and safety
  - diesel engine emergency operation
  - isolating main and propulsion diesels, including:
    - identifying hazards
    - minimising hazards
  - machinery in enclosed spaces, including:

- handling heavy components
- using hydraulic tools
- safe working practices associated with diesel engine maintenance, operation and repair.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, relevant personnel and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARL051 Demonstrate advanced knowledge of marine electrical systems

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 6.0.

## Application

This unit involves the skills and knowledge required to supply shipboard electrical power onboard a commercial vessel. It includes analysing electrical layout systems, alternators, marine motors, lighting systems, power management and uninterruptable power systems (UPS), shipboard electrical equipment and high voltage (HV) power systems.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited), Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Evaluate advanced electrical layout systems**

- 1.1** Effects of power factor changes on prime mover, alternator and electrical system are analysed
- 1.2** Methods of altering load power factor by means of capacitors or synchronous machines are explained
- 1.3** Methods of obtaining constant frequency from a variable frequency output, such as a main engine driven alternator and/or variable speed drives for a self-discharging equipment, are explained
- 1.4** Protecting systems available for shaft driven alternators are evaluated

#### **2 Analyse common faults in shipboard electrical machinery**

- 2.1** Effects and ways of detecting earth on 3-wire insulated and 4-wire earthed neutral systems are explained
- 2.2** Effects of short circuits and operation of discrimination protection are explained
- 2.3** Symptoms and effects of 'light' and 'heavy' short circuits on components and circuits are compared
- 2.4** Effects of open circuits on systems and components transformers are analysed
- 2.5** Causes and effects of 'hot spots' in circuits are identified
- 2.6** Cause and effects of static electricity on shafting and when cleaning tanks are identified

#### **3 Analyse construction and**

- 3.1** Construction and operating parameters of different types of

<b>principles of operation of different types of marine alternators</b>	marine alternators are compared and contrasted
	<ul style="list-style-type: none"><li>3.2 Cooling systems, leak detection, monitoring and protection systems in different types of marine alternators are compared and contrasted</li><li>3.3 Procedures for drying out an alternator with a low insulation resistance are explained</li><li>3.4 Excitation systems and methods of flashing alternator after loss of excitation are appraised</li><li>3.5 Systems used for protecting against high winding temperatures, circulating currents, loss of excitation and internal short circuit are evaluated</li></ul>
<b>4 Perform fault finding on electrical circuits</b>	<ul style="list-style-type: none"><li>4.1 Safe procedure for determining insulation resistance of a three phase motor or alternator, including protection of solid-state components and selection of suitable minimum insulation for the component, is applied</li><li>4.2 Procedure for safely drying out an electrical machine with a low insulated resistance (IR) is outlined</li><li>4.3 Open circuit in a three phase motor is safely tested</li><li>4.4 Procedure for testing internal short circuit in a three phase motor is clarified</li></ul>
<b>5 Analyse different types of direct current (DC) and alternating current (AC) marine motors</b>	<ul style="list-style-type: none"><li>5.1 Different types and applications of marine motors are compared and contrasted</li><li>5.2 Difference between types of encapsulation is explained and where they should be used is justified</li><li>5.3 Motor ratings and effect of overloading on different types of motor are assessed</li><li>5.4 Possible operational problems associated with marine motors are analysed and appropriate remedial action is devised</li></ul>

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|          | <b>5.5</b>   | Procedure for drying out a motor that has become unserviceable due to either long-term storage or immersion in seawater is formulated  |
|          | <b>5.6</b>   | Effects of operating star connected motors compared with delta connected motors are distinguished and when this may be required is suggested   |
|          | <b>5.7</b>   | Different types and applications of special motors for deck and cargo operation are analysed   |
| <b>6</b> | <b>Analyse complex shipboard switchboard layouts</b>                                 | <p><b>6.1</b> Switchboard layouts are interpreted</p> <p><b>6.2</b> The effects and indications of earths on the system, including intermittent and multiple earths, are explained</p> <p><b>6.3</b> Safe procedure for locating earths on main and low voltage (LV) circuits, including 24 volt (V) system, is outlined</p> <p><b>6.4</b> Operation of preferential tripping arrangements for overload protection is explained</p> <p><b>6.5</b> Different methods of start-up after black outs are outlined</p>  |
| <b>7</b> | <b>Analyse requirements of motor starters for three phase and synchronous motors</b> | <p><b>7.1</b> Differentiation is established between different types of motor starters</p> <p><b>7.2</b> Different types of starters are evaluated in terms of starting torque and current, and are compared to particular motor applications</p> <p><b>7.3</b> Simple starter circuit diagrams are evaluated, and operating principles of motor starters are explained</p> <p><b>7.4</b> Documentation and circuit and wiring diagrams are used for fault finding in motor starters</p> <p><b>7.5</b> Routine maintenance program for monitoring vibration and insulation resistance levels of motors is designed</p> |
| <b>8</b> | <b>Explain electrical safety procedures</b>  | <b>8.1</b> Potential problems associated with shore maintenance personnel working on ship electrical equipment are identified  |

<b>for ship and shore personnel</b>	
	<p><b>8.2</b> Safe procedure of isolating electrical machinery for repair or maintenance is applied</p> <p><b>8.3</b> Safe method of working on live electrical circuitry for purpose of repair or maintenance is explained</p> <p><b>8.4</b> Problems associated with shipboard electrical fires are explained</p> <p><b>8.5</b> Safe procedures for fighting shipboard electrical fires, including fires in switchboards, are clarified</p>
<b>9 Analyse lighting systems used onboard ships</b>	<p><b>9.1</b> Common types and applications of lighting systems are evaluated</p> <p><b>9.2</b> Distribution layout systems are explained</p> <p><b>9.3</b> Fault-finding method for lights and starter systems, including lighting in hazardous areas, is planned using circuit diagrams</p>
<b>10 Synchronise, parallel and load share alternators on manual and auto modes</b>	<p><b>10.1</b> Process of manually synchronising alternator and sharing kilowatt (kW) and kilovolt-amperes reactive (kVAR) loading under all loading conditions is explained</p> <p><b>10.2</b> Process of starting, testing and, where applicable, of transferring emergency generator power onto main board, is explained</p> <p><b>10.3</b> Operation of synchronising lights, synchroscope and all meters associated with synchronising is outlined</p> <p><b>10.4</b> Operation of automatic voltage regulator (AVR) and prime mover governor with respect to synchronising is outlined and how these can be adjusted at set points is explained</p>
<b>11 Evaluate alternator excitation system design</b>	<p><b>11.1</b> Different types of excitation systems and impact of load changes are compared</p> <p><b>11.2</b> Type, location and function of components involved in excitation are examined</p> <p><b>11.3</b> Function, cooling, failure mode and procedures for testing and</p>

- changing diodes are explained
- 11.4** Functions of an AVR and how it may be incorporated into an excitation system are explained
  - 11.5** Process of fault finding in an AVR and types, causes and remedies of common problems are explained
  - 11.6** The impact excitation systems have on output in normal and adverse circumstances is assessed
- 12 Examine operation, construction and maintenance of circuit breakers**
- 12.1** Features and applications of different types of circuit breakers are differentiated
  - 12.2** Closing and opening systems of circuit breakers are explained
  - 12.3** Arc extinguishing systems are explained
  - 12.4** Method for accessing an air circuit breaker for inspection is analysed
  - 12.5** Function and operation of protection devices associated with air circuit breaker and molded case circuit breaker are examined
- 13 Analyse power management and UPS fitted to vessels**
- 13.1** Operational functions of power management systems during high load, overload and short circuit conditions are analysed
  - 13.2** Functions and components of UPS systems are evaluated
  - 13.3** Limitations of power management and UPS fitted to vessels are analysed
  - 13.4** System response under possible fault conditions of vessel power management and UPS are determined
- 14 Analyse function of emergency battery systems**
- 14.1** Different types and characteristics of batteries used for emergency supplies are identified
  - 14.2** Methods of battery charging and ways in which charge condition of the battery can be determined are explained
  - 14.3** Requirements of emergency supply and how transfer can occur without adversely affecting solid state components are explained

- 14.4** Safety hazards associated with batteries, and procedures to be adopted to minimise explosion and short circuits are appraised
- 15 Analyse vessel cathodic protection system**
- 15.1** Cathodic protection systems and how they interact are analysed
- 15.2** Components of cathodic protection systems are identified and life cycle maintenance program is prepared
- 15.3** Modifications required for operating parameters of cathodic protection systems when operating alongside an active wharf or another vessel are determined
- 15.4** Likely causes of corrosion in relation to size, location or distribution of anodes or current densities are assessed
- 15.5** Other corrosion problems in shipboard environment that may be the cause of electrical problems are appraised
- 16 Assess requirements and components associated with electrical systems for hazardous spaces onboard vessels**
- 16.1** Different types, limitations and nameplate identification of 'E' equipment are compared
- 16.2** Requirements of classification societies are distinguished from administrations regarding electrical installations onboard vessels
- 16.3** Lighting and power supply requirements of pump rooms are identified
- 16.4** Safety requirements for electrical equipment and safety practices onboard vessels and how these are extended when alongside a berth are analysed
- 17 Assess existing electrical shipboard equipment**
- 17.1** Existing and new shipboard electrical equipment and systems are compared to assess future requirements as well as potential problems and preventative measures
- 17.2** Performance of existing shipboard electrical equipment and systems is analysed and cost-effectiveness studies for modifications or improvements are prepared

- 17.3** Factors involved in commissioning new electrical plant are evaluated
- 17.4** Procedures involved in organising survey of existing plant are outlined
- 17.5** Procedures involved in making recommendations for new systems consistent with modified new ship building requirements are outlined

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is not equivalent to MARL028 Demonstrate intermediate knowledge of marine electrical systems.

This unit replaces and is equivalent to MARL034 Demonstrate advanced knowledge of marine electrical systems.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL051 Demonstrate advanced knowledge of marine electrical systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining advanced principles of electrical circuits, switchboards, alternators and circuit breakers
- explaining advanced principles of lighting, cathodic protection and high voltage (HV) systems
- identifying and interpreting complex numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- identifying and suggesting ways of rectifying electrical hazards and emergency situations on a vessel
- identifying methods, procedures and materials needed for operating, maintaining, testing and repairing complex marine electrical systems
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information related to electrical circuitry and components on commercial vessels
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alternating current (AC)/direct current (DC) voltage
- AC and DC marine motors
- alternators, including:
  - alternator excitation system design
  - characteristics
  - construction

- synchronised operation
- types
- batteries
- cables, including:
  - calculation of voltage drop
  - classification and identification of cables and wires
  - cross section of cables
  - identifying types of cables
  - rules and purpose of cable shielding
  - sizing of cable for current tolerance and acceptable voltage drop
- cathodic protection system
- circuit breakers
- circuits
- distribution layout systems, including:
  - emergency lights
  - safety lights
- earthing
- electrical safe working practices
- electrical:
  - layout systems
  - measuring and testing instruments
  - shipboard equipment
  - symbols, basic electrical diagrams/circuits
- emergency battery systems
- encapsulation, including:
  - drip proof
  - submersible
  - totally enclosed fan cooled (TEFC)
- fault-finding procedures
- HV electrical motor propulsion systems
- how excitation systems impact on output normal and adverse circumstances, including:
  - loss of excitation
  - short circuit
- isolation procedures
- lighting systems used onboard ships, including:
  - fluorescent
  - halogen
  - incandescent
  - light-emitting diode (LED)
  - mercury

- sodium vapour
- marine motors, including:
  - polyphase
  - reduced starting current motors
  - single
  - speed changing
  - synchronous
  - variable speed
- motor ratings, including:
  - continuous
  - short time
- motor starters for three phase and synchronous motors
- motor starters, including:
  - direct on line (DOL)
  - primary and secondary resistance
  - soft or electronic starters
  - star-delta
  - transformer starter
- operating parameters, including:
  - excitation current
  - insulation grade
  - operating temperature
  - speed
- operational problems, including:
  - loss of insulation resistance
  - open circuit
  - overheating
  - short circuit
  - wrong connections
- phase angle, power factor, and current flow
- power management and uninterruptable power supply (UPS) fitted to vessels
- problems, including:
  - electric shock
  - enclosed space work
  - non-compliance with safe working procedures
  - unfamiliar with marine electrical systems
  - using equipment beyond safe working limits
  - working at heights
- procedures for dealing with hazards and emergencies
- regulations of relevant state/territory maritime and electrical licensing authorities

- resistance, inductance and capacitance
- requirements and components associated with electrical systems for hazardous spaces onboard vessels
- risks and safety procedures associated with working in HV environments
- safe electrical working practices
- safety requirements, including:
  - company requirements
  - manufacturer requirements
  - statutory requirements
- safety, environmental and hazard control precautions and procedures relevant to marine electrical systems
- switchboard layouts, including:
  - DC systems
  - dedicated power supplies
  - dual supply for steering gear
  - feed-back and feed forward arrangements
  - interconnection with low voltage (LV)
- systems and components, including:
  - motors
  - transformers
- switchboards and protection, including:
  - purpose
  - testing and maintenance
  - equipment removal
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personnel and personal protective equipment (PPE) currently used in industry.

## Links

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# **MARL052 Demonstrate advanced knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel. It includes analysing: methods of improving plant efficiency; changes in feed system that occur during fluctuating loads; design and construction of high-pressure water tube boilers and ancillary equipment; operation, maintenance and performance of high-pressure water tube boilers and ancillary equipment; turbine operation, maintenance and performance; and turbine-gearing performance.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Analyse methods of improving plant efficiency**

- 1.1** Heat losses in a turbine and turbine system are analysed
- 1.2** An enthalpy/entropy diagram is used to show how steam properties change through a turbine
- 1.3** The effect air heaters and economisers have on turbine plant efficiency is explained
- 1.4** Increase in Rankine efficiency of plant by increasing the pressure and temperature is analysed
- 1.5** How regenerative feed heating and steam reheating increases overall plant efficiency is shown on an enthalpy/entropy diagram
- 1.6** Practical methods of verifying energy losses are detailed

#### **2 Explain construction and operation of feed system**

- 2.1** Operation and components of the complete feed system are outlined
- 2.2** Construction, operating principles and maintenance requirements of a regenerative condenser are explained
- 2.3** Causes of loss of vacuum are identified and test procedure to identify leaks in a condenser is created
- 2.4** Construction and operation of air ejectors, vacuums and extraction pumps are explained
- 2.5** Construction and operation of gland condensers, low-pressure heaters, drain coolers and high-pressure heaters are explained
- 2.6** General arrangement and construction of turbo feed pumps is outlined

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|          | <b>2.7</b>  | Operating principles and construction details of de-aerators are explained   |
| <b>3</b> | <b>Analyse changes in feed system that occur during fluctuating loads</b>                                     | <b>3.1</b> Changes that occur during fluctuating loads are identified, detailing how make up to the system and dump from the system are performed                                    |
|          | <b>3.2</b>  | Condenser level control methods, how condenser is supported and how expansion stresses are avoided are explained   |
|          | <b>3.3</b>  | Loss of efficiency when heat transfer rate is interrupted is explained   |
|          | <b>3.4</b>  | Types, features, common defects and maintenance requirements of two-stage and super cavitating extraction pumps are compared and contrasted  |
|          | <b>3.5</b>  | Operation of a vacuum pump for air removal from a condenser is explained   |
|          | <b>3.6</b>  | Operation of a turbo feed pump differential pressure governor taking into account constant pressure, increasing pressure and decreasing pressure differential governing is explained |
|          | <b>3.7</b>  | Alarms, shutdowns, automatic cut-in arrangements and testing of over speed trips for a boiler feed pump are outlined   |
| <b>4</b> | <b>Analyse design and construction and repair of high-pressure water tube boilers and ancillary equipment</b> | <b>4.1</b> Various propulsion boiler designs are compared  |
|          | <b>4.2</b>  | Operating principles and construction methods of integral and external superheaters are explained  |
|          | <b>4.3</b>  | Drum, internal fittings and support and expansion arrangements are outlined  |
|          | <b>4.4</b>  | Procedures for repairing a membrane wall furnace are clarified   |
|          | <b>4.5</b>  | Operating principles of high-pressure boilers, including water and gas flow circulation, are explained   |



- 4.6 Temperature load relationships and temperature control of superheater are analysed
  - 4.7 Operation of superheater with parallel, contra and cross flow of gas/steam flow is predicted
  - 4.8 Correct material for high temperature operation of superheater tubes and headers is identified
  - 4.9 Construction and operation of economisers and air heaters is explained
  - 4.10 Chemistry of combustion is explained
  - 4.11 Burner tip design and operation for steam atomising oil burners are compared
  - 4.12 Typical burner register arrangements are outlined
  - 4.13 Construction, operation and maintenance of boiler gauge glasses and safety valves is explained
  - 4.14 Operation of boiler control and soot blowing system is detailed
  - 4.15 Features of a three-element water level control system and relationship with burner management system are outlined
  - 4.16 Operation of a combustion control system fitted with cross limits on air and fuel is explained
  - 4.17 Blow-down procedure for a high-pressure boiler is prepared
- 5 **Analyse operation, maintenance and performance of high-pressure water tube boilers and ancillary equipment**
  - 5.1 Warm-through procedure and checks to be carried out before connecting boiler to range are explained
  - 5.2 How boiler is laid up for short and/or long periods is explained
  - 5.3 Actions required after oil or saltwater contamination are detailed
  - 5.4 Chemical cleaning procedure to remove scale and oil

deposits from internal surfaces of a boiler is explained

**5.5** Tube failures are identified, and suitable methods of repair are selected

**5.6** Defects that can occur in economisers and how they can be repaired are listed

**5.7** Maintenance inspection procedures to prevent superheater and economise fires are produced

**5.8** Procedure to combat soot and steam/iron fires in generating banks, superheaters and economisers is outlined

**5.9** Coordinate and congruent feed water treatment is illustrated on a caustic/phosphate graph

**5.10** Different feed water tests, procedures for each test and appropriate chemical treatments are explained

**5.11** Program for an internal and external survey of a water tube boiler is compiled, defects that may be found and repair methods that will enable boiler to be returned to service are listed

**5.12** Procedures for setting lift, adjusting blow-down of safety valves and carrying out an accumulation test on a boiler are outlined

**6 Explain requirements for feed water treatment for high-pressure water tube boilers**

**6.1** How salts are precipitated and how metal is corroded in the boiler and feed system is explained and method of prevention is outlined

**6.2** How oxygen is eliminated in high-pressure boilers is shown

**6.3** How pH is measured and controlled is explained

**6.4** Normal and maximum operating limits for boiler feed water treatment are identified and procedure to follow if these limits are exceeded is clarified

**6.5** Different feed water tests, procedure for each test and appropriate chemical treatments are explained

**6.6** Coordinate and congruent feed water treatment is illustrated on a caustic/phosphate graph

<b>Explain construction and operation of high-pressure turbines</b>	<b>7.1</b>	Flow of steam through nozzles is analysed, and pressure and velocity compounding are illustrated
	<b>2.2</b>	Construction of blades, bearings, glands, rotors and casings is explained
	<b>7.3</b>	Warming-through procedure prior to start-up is explained
	<b>7.4</b>	Routine checks during operation are detailed
	<b>7.5</b>	Emergency operation of plant with one turbine inoperative is outlined
	<b>7.6</b>	Turbine shutdown procedure is clarified
	<b>7.7</b>	Procedures for opening up turbine for survey, routine checks of blades, casings, rotors, bearings, glands, drains and the reassembly of turbine are explained
	<b>7.8</b>	Precautions necessary when turbine and gearing casings are open are explained and any repairs or adjustments that may be required are identified
<b>8 Analyse turbine operation, maintenance and performance</b>	<b>8.1</b>	Relationship between sequential nozzle operation and bar lift in steam turbines is explained
	<b>8.2</b>	Principle of operation of different trips and cut-outs is explained
	<b>8.3</b>	Differentiation is made between resonance and critical speed, and their effect on the turbine operation is explained
	<b>8.4</b>	Types of turbine vibration and where each type is found in a turbine is analysed
	<b>8.5</b>	System torsional vibration and effect of operating at critical speeds and in-built design elements required to avoid critical speeds are explained
	<b>8.6</b>	Back pressure and self-condensing turbo alternators are compared
	<b>8.7</b>	Governor system is explained

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|           | <b>8.8</b>   | Turbine control systems are explained   |
|           | <b>8.9</b>   | Procedure for straightening a bowed turbine rotor is outlined   |
|           | <b>8.10</b>  | Effect of hull fouling, sea state and propeller design on turbine performance is discussed                      |
|           | <b>8.11</b>  | Limits for extended operation and overload operation are discussed  |
| <b>9</b>  | <b>Analyse turbine gearing arrangements and performance</b>                  |   |
|           | <b>9.1</b>   | Single and double reduction gearing systems are compared and contrasted   |
|           | <b>9.2</b>   | Features and applications of double helical involute gear teeth are outlined                                    |
|           | <b>9.3</b>   | Advantages and disadvantages of single and double locked train gearboxes are analysed                           |
|           | <b>9.4</b>   | Construction and reason for installing flexible couplings in gearing system is explained                        |
|           | <b>9.5</b>   | Purpose of fitting a nodal drive in gearing system is clarified   |
|           | <b>9.6</b>   | Features, functions and applications of star, planetary and solar epicyclic gearing are compared and contrasted |
|           | <b>9.7</b>   | Space savings resulting from use of epicyclic gearing are analysed  |
|           | <b>9.8</b>   | Layout of a turbo-electric drive is detailed  |
| <b>10</b> | <b>Analyse flow of air and gas through a simple cycle marine gas turbine</b> |   |
|           | <b>10.1</b>  | Construction of compressor, combustion system and single and two shaft turbines is explained                    |
|           | <b>10.2</b>  | Necessary controls required for control and protection of plant are confirmed                                   |
|           | <b>10.3</b>  | Accessories necessary for safe operation of simple cycle marine gas turbines are listed                         |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is not equivalent to MARL029 Demonstrate intermediate knowledge of marine steam turbines and main boilers.

This unit replaces and is equivalent to MARL035 Demonstrate advanced knowledge of marine steam turbines and main boilers.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL052 Demonstrate advanced knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing diagnostic information related to marine steam turbines
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions to complex problems that can occur during operating steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting complex diagnostic information and performing complex mathematical calculations related to operating, repairing and maintaining marine steam turbines
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- imparting advanced knowledge and ideas verbally, in writing and visually
- performing accurate and reliable calculations and producing accurate and reliable information.
- reading and interpreting complex manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine steam turbines.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- accessories, including:
  - accessory gear
  - lube oil:
    - coolers
    - filters
    - pumps

- starting devices
- basic principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
  - construction and operation of main and auxiliary steam turbines
  - methods of turbine control, including safety devices
  - procedures for emergency operation of a steam turbine
  - symptoms, causes and effects of defects of auxiliary steam turbines and actions to be taken
- boiler operation, maintenance and performance, including:
  - boiler water level control methods
  - boiler water testing and treatment
- changes in feed system that occur during fluctuating loads
- construction and operation of feed system
- construction and operation of high-pressure turbines
- construction, operation and repair of high-pressure water tube boilers
- design features and operative mechanism of marine steam turbine and associated auxiliaries, including:
  - material selection and design features of steam turbine
  - material selection and design features of steam turbine gearbox
- energy balance for a steam turbine plant
- established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start-up, normal running, emergency and shutdown situations
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur during operation of steam propulsion plant and associated systems, and appropriate preventative and remedial action
- high-pressure water tube boilers and ancillary equipment
- methods of lubricating principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes and actions to be taken with such faults
- operation of marine steam turbines
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
  - construction and operation of main and auxiliary steam turbines
  - methods of turbine control, including safety devices
  - procedures for emergency operation of a steam turbine
  - symptoms, causes and effects of defects of auxiliary steam turbines and actions to be taken
- procedures for reading and interpreting readings and indications of performance of steam propulsion plant and associated systems

- requirements for feed water treatment for high-pressure water tube boilers
- simple cycle marine gas turbine
- trip and cut-outs, including:
  - axial displacement
  - bearing high temperature
  - high condenser level
  - loss of vacuum
  - over speed
  - vibration
- turbine control systems, including:
  - bridge control
  - emergency operation
  - hydraulic control
  - local control
- turbine operation, maintenance and performance
- turbine-gearing arrangements and performance
- turbine vibration, including:
  - axial
  - torsional
  - transverse
- types, properties, tests, applications and treatment of fuels, lubricants and solvents/chemicals used onboard a steam vessel, including working principles, construction, maintenance and safe operation of centrifuges, filters and other treatment devices
- typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements, and established safety and anti-pollution rules and regulations
- units of measurement
- ways of improving plant efficiency
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.



Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL053 Demonstrate advanced knowledge of ship operations and maintenance**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to ensure that vessels comply with regulatory and survey requirements, the principles of ship construction as well as implementing maintenance and repair procedures associated with satisfying maintenance of class.

It includes analysing regulatory framework impacting on commercial shipping operations; maintenance strategies relating to classification surveys; statutory survey requirements; and factors influencing vessel stability.

It also includes analysing repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position; International Maritime Dangerous Goods (IMDG) Code requirements; safe working practices in enclosed or confined spaces; dry docking procedures and responsibilities of engineering staff; and shipboard vibration.

This unit applies to people working in the maritime industry in the capacity of:

- Engineer Class 1 (STCW Chief Engineer Unlimited)
- Engineer Class 2 (STCW Second Engineer Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 1 (STCW Chief Engineer Unlimited) or Engineer Class 2 (STCW Second Engineer Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

- 1 Analyse regulatory framework impacting on commercial shipping operations and survey requirements**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Functions of IMO, its fields of influence, role of member states, adoption of recommendations through maritime legislation and exemptions are analysed
- 1.2** Role of International Labour Organization (ILO) Convention in relation to dockyard and shipboard practices is analysed
- 1.3** Key provisions of Australian maritime legislation are analysed
- 1.4** Role of AMSA in relation to maritime safety, protection of marine environment, and aviation and marine search and rescue (SAR) is explained
- 1.5** Role of Flag State Administrations; purpose of the Navigation Act, Marine Notices, Marine Orders, Port State Control and other methods of implementation and enforcement of international agreements and conventions are analysed
- 1.6** Role of insurance underwriters, protection and indemnity (P & I) clubs and

procedures for lodging claims following machinery failure and/or damage are analysed

- 1.7** Role of classification societies, International Association of Classification Societies (IACS) and Memorandum of Agreement with Flag States is analysed
- 1.8** Role of ship owners and ship management companies regarding International Safety Management (ISM) Code and ship management responsibilities regarding operation and maintenance is analysed
- 1.9** Role of independent inspection agencies and adoption of inspection and maintenance guidelines for different ship types is analysed
- 1.10** STCW crew training requirements and implications for emergency response, administration, operation and maintenance are analysed
- 1.11** Key provisions of the Code of Safe Working Practice for Australian Seafarers are analysed
- 1.12** Areas of vessel covered by statutory surveys are identified
- 1.13** Statutory requirements for change of flag, owner and term expiry during layup are identified
- 1.14** Records and documentation required for statutory surveys, legislation and measures are identified to ensure protection of the marine environment and safety of life at sea are identified
- 1.15** Load line measurements and conditions of freeboard assignment are analysed
- 1.16** Key areas of maintenance and testing of load line items and actions for addressing identified maintenance requirements and defects are identified

- 1.17 Areas covered by safety construction surveys and associated faults, maintenance and repairs are identified
  - 1.18 Procedures for planning safety equipment surveys and actions for addressing identified maintenance requirements and defects are analysed
  - 1.19 Requirements for survey preparation under the International Convention for the Prevention of Pollution from Ships (MARPOL) are analysed
  - 1.20 Survey requirements for cargo ship safety construction, safety equipment and safety radio certificates; passenger ship safety certificates; chemical tanker and gas carrier certificates of fitness are analysed
  - 1.21 Application of Port State Control surveys, Flag State jurisdiction and IMO guidelines in relation to vessel detention and identification of substandard ships are analysed
  - 1.22 Substandard ship and factors causing ship detention are identified
- 2 Analyse maintenance for classification surveys and maintain class certification**
- 2.1 Common areas covered by classification surveys are analysed, reasons for class withdrawal are clarified and condition of class are explained
  - 2.2 Survey methods are analysed
  - 2.3 Terms of periodical, annual, renewal, intermediate and occasional surveys are identified
  - 2.4 Common defects identified in classification surveys and appropriate remedial actions are analysed
  - 2.5 Methods for repair and maintenance are analysed
  - 2.6 Properties and repair techniques of ordinary and high tensile hull grades of

steel are analysed

- 2.7** Processes and materials used in underwater hull repairs are assessed
- 2.8** Methods of minimising and controlling internal and external hull corrosion, including bacterial corrosion of bilges and fuel tanks, are evaluated
- 2.9** Drainage arrangements and connections to other systems of spaces outside the engine room are explained
- 2.10** Ballast main connections to fore and after peak tanks are outlined and procedures for filling and emptying tanks are clarified
- 2.11** Examination and repair techniques for fixed pitch and controllable propellers are assessed
- 2.12** Dismantling, inspection, repair and re-assembly of thrusters and rudders are explained
- 2.13** Methods of performance testing shipboard pumping systems are evaluated
- 2.14** Causes of common faults and methods of assessment of shipboard pumping systems are identified
- 2.15** Condition monitoring of machinery is compared with planned maintenance systems
- 2.16** Causes of damage to and losses of bulk ships and tankers, and appropriate remedies are explained
- 2.17** Types and purpose of special and enhanced surveys are outlined
- 2.18** Hull life extension surveys and enhanced survey requirements for tankers and bulk ships are outlined
- 2.19** Different methods and applications of welding used in shipbuilding and repair are

- outlined
- 2.20** How materials are joined so that the strength of components is not impaired is confirmed
- 2.21** Different methods used to connect aluminium to steel are outlined
- 3**                      **Analyse factors influencing vessel stability**
- 3.1** Theories and factors affecting trim and stability as well as measures necessary to preserve trim and stability are explained
- 3.2** IMO recommendations concerning ship stability are identified
- 3.3** Risks associated with carrying thixotropic bulk cargo, deck cargo or grain and consequences of cargo movement or loss are outlined
- 3.4** Damage and intact stability requirements for merchant ships, countermeasures for roll-on and roll-off (ro-ro) vessels and damage control assessment following collision or grounding is assessed
- 3.5** Operational procedures to minimise and control flooding are prepared
- 3.6** Stability requirements for routine and emergency dry docking, including stability assessment for the docking duration, are specified
- 3.7** Factors causing ship squat and other influences on vessel manoeuvrability are assessed
- 3.8** Stability documentation required for different ship types to satisfy International Convention for the Safety of Life at Sea (SOLAS) is identified
- 3.9** Intact and damage stability criteria are explained
- 3.10** Use of stabilisers is explained

- |          |   |   |
|----------|---|---|
|          |   | <b>3.11</b> Bilge keels and fin type stabilisers are compared and contrasted  |
|          |   | <b>3.12</b> How stabilisers are attached to the hull is explained   |
|          |   | <b>3.13</b> Hull stiffening requirements for fin and bilge keel types is explained  |
| <b>4</b> | <b>Analyse IMDG Code requirements</b>   | <b>4.1</b> Key principles of IMDG Code are analysed   |
|          |   | <b>4.2</b> Action plans for managing emergency situations onboard a vessel involving dangerous goods are developed  |
|          |   | <b>4.3</b> Criteria for evaluating effectiveness of action plans for managing emergency situations onboard a vessel involving dangerous goods are established   |
|          |   | <b>4.4</b> Requirements of ordering and taking bunkers, as well as discharging to shore side reception facilities, are specified  |
| <b>5</b> | <b>Analyse safe working practices in enclosed spaces</b>                        | <b>5.1</b> Function, status and limitations of chemist certificate of compliance is explained   |
|          |   | <b>5.2</b> Dangers of using cleaning solvents and painting in enclosed spaces using product safety data sheets (SDS)/material safety data sheets (MSDS) and work health and safety (WHS)/occupational health and safety (OHS) guidelines are assessed |
| <b>6</b> | <b>Analyse dry docking procedures and responsibilities of engineering staff</b> | <b>6.1</b> Dockyard contract, docking specifications and survey requirements are used to plan preparation of vessel for docking, explaining variations required for emergency docking   |
|          |   | <b>6.2</b> Dock work schedules, responsibilities for engineering personnel and procedures for dock entry, duration and re-floating are prepared   |



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|----------|--|--|
|          |  | <p><b>6.3</b> Inspection and maintenance procedures for hull and machinery items in dock are explained</p> <p><b>6.4</b> In-water hull cleaning methods and preparation essential for in-water surveys are evaluated</p> <p><b>6.5</b> Types and application procedures of coatings used to protect ship hulls and tanks are identified</p> <p><b>6.6</b> Procedures for vessel layup to satisfy class, insurance, owner and statutory requirements are prepared</p> <p><b>6.7</b> Inspection and reactivation processes after prolonged layup are outlined</p>  |
| <b>7</b> | <b>Analyse shipboard vibration</b>           | <p><b>7.1</b> Appropriate terms are applied when describing vibration</p> <p><b>7.2</b> Influence of materials, construction, loading patterns and ship type on natural hull vibration patterns is assessed</p> <p><b>7.3</b> Significance of hull response to excitation by sea state, machinery and propulsion systems is explained</p> <p><b>7.4</b> Methods of prediction and in-service assessment of resonant vibration are evaluated</p> <p><b>7.5</b> Vibration-related structural and equipment damage and failure is identified</p> <p><b>7.6</b> Solutions to troublesome vibration are proposed</p> <p><b>7.7</b> Acceptable vibration limits using relevant standards are established</p> |
| <b>8</b> | <b>Analyse vessel bunkering requirements</b> | <p><b>8.1</b> Requirements for bunkering orders are analysed</p>   |

- 8.2 Procedures for taking bunkers are analysed
  - 8.3 Bunkering guidelines for spills and fire are analysed
  - 8.4 Methods and requirements for sampling fuels are analysed
  - 8.5 Procedures for assessing the quality and quantity of fuels are explained
  - 8.6 Communication requirements and procedures during bunkering operations are analysed
  - 8.7 Methods for monitoring levels and facilitating changeover of tanks are analysed
- 9      **Outline maintenance, repair and safe working practices associated with lifting and lifesaving equipment**
- 9.1 Safe working practices applicable to cranes, chain blocks, items of loose gear and other lifting equipment are identified
  - 9.2 Safety and protective devices used in conjunction with lifting gear are identified
  - 9.3 Means of testing and adjusting lifting gear are confirmed
  - 9.4 Legislative and regulatory requirements for inspection, storage and maintenance of lifting gear are outlined
  - 9.5 Purposes and procedures involved in annual and quadrennial surveys of cargo gear are clarified
  - 9.6 Procedures for safe working load (SWL) and proof load tests, including lifeboat launching gear, are clarified
  - 9.7 Safe working practices applicable to rigging and lifting heavy items during maintenance and repair are identified

- 9.8** Installation, operation and maintenance of lifesaving appliances and launching equipment are outlined
- 9.9** Safety and protective devices associated with lifesaving appliances and launching equipment are confirmed
- 10**                      **Outline operation of an inert gas system for a tanker**
- 10.1** Construction, operation and maintenance of individual components of inert gas system (IGS) are explained
- 10.2** Mandatory controls, alarms and cut-outs are identified
- 11**                      **Outline components of vessels, frame and deck**
- 11.1** Correct terms to describe size and shape of vessels are used
- 11.2** Correct terms to describe structural components of vessels are used
- 11.3** Correct terms to describe size or cargo carrying capacity of vessels are used
- 11.4** Online and other sources of information on size, shape and structural components of vessels are accessed
- 11.1** Longitudinal, transverse and combined framing are compared and contrasted in relation to ship strength
- 11.2** Position, purpose and construction of a deep frame are explained
- 11.3** Transition methods from one frame type to another are outlined
- 11.4** How the strength of frames is maintained when connecting to deck beams and other strength members is explained
- 11.5** How stress raisers are reduced around hatchways, door openings, forecastle, bridge structure, watertight doors and gastight doors is explained

**11.6** Bilge keels structure with particular reference to fitment to hull is outlined and purpose for this type of fitting is explained

**11.7** Classification requirements and restrictions of sheer strake, keel strake and garboard strake are examined

**11.8** Requirements for use of suction and discharge valves and fittings in the shell above and below the waterline are outlined

**11.9** Strength members required for deck machinery are outlined

**12**                    **Explain static and dynamic forces and moments exerted on hull of a vessel**

**12.1** Correct terms to describe effects of forces exerted on hull are used

**12.2** Various forces acting on the vessel are analysed

**12.3** Stresses on various components of the hull are compared as a result of these forces

**12.1** Differentiation is made between panting and pounding forces

**12.2** How forepeak sections are strengthened to resist panting and pounding forces is explained

**12.3** Anchor and cable arrangements in forepeak tank are explained

**12.4** Strength members in afterpeak sections are outlined

**12.5** Different rudder support arrangements are clarified

**13**                    **Explain how vessel structure is designed to resist distortion**

**13.1** Scantlings are defined

**13.2** Classification society rules for determining scantling sizes are identified

**13.3** Main strength members of vessel hull are identified

**13.4** Importance of maintaining integrity of principal strength members is explained

**14**                    **Explain bottom structure, forepeak and afterpeak of vessels**

**14.1** Differentiation is made between different types of keel construction

**14.2** Advantages and disadvantage of duct keel in relation to ship strength are explained

**14.3** How safe access to the duct keel is obtained, is outlined

**14.4** Longitudinally framed double bottom construction is distinguished from a transversely framed double bottom construction

**14.5** Differentiation is made between bracket floors and plate floors

**14.6** Structural requirements for supporting different types of main engines are outlined

**14.7** Classification society rules for construction of forepeak and afterpeak sections are explained

**15 Explain construction of watertight bulkheads**

**15.1** Purpose of bulkheads is stated

**15.2** Minimum number of bulkheads and their locations are determined

**15.3** Bulkhead is sketched showing construction and attachment to hull

**15.4** Purpose, construction and location of collision bulkheads is outlined

**15.5** Test procedures for bulkheads are clarified

**15.6** How strength is maintained in openings is explained

**15.7** Requirements for penetration of collision bulkhead are stated

**15.8** Situations in which non-watertight bulkheads are fitted are identified

**16**                      **Outline vessel ventilation systems**

**16.1** Different types of ventilation systems are clarified

**16.2** Why ventilator cowls are required is explained

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is not equivalent to MARL036 Demonstrate advanced knowledge of ship operation and maintenance.

This unit replaces and is not equivalent to MARL023 Demonstrate basic knowledge of ship operation and maintenance.

This unit replaces and is not equivalent to MARL022 Demonstrate basic knowledge of ship construction.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL053 Demonstrate advanced knowledge of ship operations and maintenance**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information required in routine and emergency situations
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- detecting and identifying cause of machinery malfunctions and correct faults, including:
  - detecting machinery malfunctions, location of faults and actions to prevent damage
  - inspecting and adjusting equipment
  - non-destructive examination
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring safe working practices in accordance with ship safety management system (SMS)
- explaining advanced concepts of ship operation and maintenance
- identifying hazards and risks, and determining appropriate ways of responding to hazards, malfunctions and emergency situations and daily operations
- identifying methods and procedures needed to perform duties, such as preparing for dry docking and statutory surveys and other duties, on commercial vessels
- identifying, interpreting and processing complex numerical and graphical information required to analyse engineering functions and shipboard engineering-related problems in routine and emergency situations
- imparting knowledge and ideas through verbal, written and visual means
- planning and organising the resources needed to establish and maintain SMS on a tanker or gas carrier
- reading and interpreting legislation and regulations related to maritime operations
- reading and interpreting written instructions, procedures and information relevant to duties of an Engineer Class 2.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- areas covered by classification and surveys, including:
  - automation
  - boilers/pressure vessels
  - cargo gear
  - hull
  - machinery
  - specific notations for cargo pumping arrangements for tankers
  - tail shaft
- areas of a vessel covered by statutory surveys, including links with classification society requirements for endorsement of class certificates
- Australian maritime legislation key provisions, including:
  - Australian Maritime Safety Authority (AMSA) legislation
  - levy legislation
  - marine pollution legislation
  - navigation legislation
  - other relevant legislation
  - shipping industry legislation
  - shipping registration legislation
- classification societies
- classification surveys, including:
  - dry dock and in water bottom surveys
  - hull work
  - machinery
  - pipe work
  - propellers
  - pumping systems
- Code of Safe Working Practice for Australian Seafarers key provisions, including:
  - anchoring, docking and mooring
  - carriage of dangerous goods
  - entering and working in enclosed or confined spaces
  - general duties and responsibilities
  - general provisions
  - manual lifting and carrying
  - painting
  - permit to work systems
  - reporting of accidents
  - safe access to ship
  - safe movement about the ship
  - safety in living accommodation

- shipboard:
  - emergencies and emergency equipment
  - health and safety
  - specific vessel types
  - tools and materials
  - upkeep of wire and fibre ropes
  - welding flame cutting and other hot work
- working:
  - aloft and over the side
  - in galleys, pantries and other food handling areas
  - in machinery spaces
  - with dangerous and irritating substances and radiations
  - with electricity and electrical equipment
- communication methods, including:
  - checklists
  - rate
  - safety
  - stock methods
  - two-way radio
- dry docking:
  - procedures
  - responsibilities of engineering staff
- enclosed spaces
- emergency situations, including:
  - dangerous goods
  - disposal of dangerous/toxic materials
  - firefighting
  - first aid
  - hazard reduction
  - reporting
- Flag State responsibilities
- heavy items, including:
  - hatches
  - large movable structures
  - stern doors
- hierarchy and organisational structure of shipboard personnel
- inert gas system for tankers
- international maritime law, conventions and regulations, including:
  - International Safety Management (ISM) Code
  - certificates and other documents to be carried onboard ships by international conventions

- International Convention for the Prevention of Pollution from Ships (MARPOL)
- International Convention for the Safety of Life at Sea (SOLAS)
- International Convention on Load Lines 1966
- international health regulations
- international instruments affecting safety of ships, passengers, crew or cargo
- International Convention on Standards of Training, Certification and Watchkeeping (STCW) for Seafarers
- Maritime Labour Convention (MLC) 2006
- inspection and maintenance procedures for hull and machinery items in dock, including:
  - hull coating systems
  - measurement and evaluation of clearances
- International Maritime Dangerous Goods (IMDG) Code requirements and principles, including:
  - dangerous goods packaging/tanks which are of appropriate strength and which will prevent goods escaping
  - grouping dangerous goods together based on hazards they present in transport (classification)
  - principles for ensuring dangerous goods that will react dangerously together are kept apart
  - principles for where to place dangerous goods onboard ship to ensure safe transport
  - emergency response advice for dangerous goods involved in a fire or spillage on board ship
  - standard documentation to be provided when dangerous goods are being transported
  - hazard warning labels and other identifying marks to identify dangerous goods in transport
- ISM Code related to safe work practices, operation and maintenance, including:
  - managing safe and effective maintenance and repair procedures
  - planning maintenance, including statutory and class verifications
  - planning repairs
- key international and Australian Standards relating to shipping
- key shipping authorities and organisations
- maintenance strategies relating to classification surveys
- maintenance and repairs, including:
  - lifting and lifesaving equipment
  - hull, pumping systems, propellers, machinery and other items satisfying maintenance of class
- maritime communication techniques
- methods of minimising and controlling internal and external hull corrosion, including:
  - bacterial corrosion of bilges and fuel tanks
  - cathodic protection
  - coating systems

- surface preparation techniques
- methods of performance testing shipboard pumping systems, including:
  - bilge and ballast systems
  - hydraulic deck machinery
- operational procedures to minimise and control flooding, including:
  - action to ensure watertight integrity of ship
  - rules relating to watertight doors
- other systems of spaces outside engine room, including:
  - holds
  - pump rooms
  - spaces forward of the collision bulkhead
- planned maintenance systems, including guidelines for classification society approval of substitution for continuous machinery surveys
- Port State Control (PSC)
- properties of hull grades of steel including:
  - repair techniques and limitations
  - weld ability
  - welder qualification tests
- regulatory framework impacting on commercial shipping operations
- relevant sections of maritime regulations, codes and conventions related to tankers and gas carriers
- repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position
- safe practices for working with lifting gear
- safe working practices in enclosed or confined spaces
- safe working practices associated with lifting and lifesaving equipment
- shipboard enclosed space hazards, including:
  - engulfment
  - explosion
  - fire
  - lack of oxygen
  - re-entry of compartments after a major fire
  - release of fixed firefighting medium
  - toxic gases
- shipboard pumping, including:
  - bilge and ballast systems, including predictive health monitoring
  - hydraulic deck machinery
  - prevention of pollution of the sea by oil
  - sewage and sludge
- shipboard vibration
- solutions, including:

- damping
- detuning
- modification of ship:
  - design
  - operation
- specific notations
- stability requirements for routine and emergency dry docking, including stability assessment for docking duration
- statutory survey requirements
- survey methods, including:
  - alternative
  - continuous
  - special surveys
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- terms, including:
  - amplitude
  - anti-node
  - frequency
  - mode
  - node
  - resonance
- types of ships and key features, including:
  - bulk carrier
  - container
  - general dry cargo
  - passenger
  - ro-ro
  - tanker or gas carrier
- vessel stability and loss of metacentric height (GM), including:
  - derrick hook loads
  - free surface effect
- watertight integrity
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the

time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

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# **MARL054 Demonstrate basic knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).



## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

**1 Distinguish between different types of auxiliary boilers**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Design and use of water tube and fire tube auxiliary boilers are compared and contrasted

**1.2** Movement of water and gas in an operating boiler is sketched

**1.3** How variations to operating pressure and saturation temperature in an auxiliary boiler can be used to get wet, dry or superheated steam is explained

**2 Recognise different functions of steam and different components of steam systems**

**2.1** Key features of steam and other heating systems are compared and contrasted

**2.2** Steam side requirements of an auxiliary steam turbo alternator are compared and contrasted with other steam-powered machinery

**2.3** Typical steam and condensate system are outlined

**3 Explain fuel oil system of auxiliary boilers**

**3.1** Combustion process is explained and factors that affect combustion in a boiler are outlined

**3.2** Differentiation is made between different burner types

- |          |  |  |
|----------|--|--|
|          | <b>3.3</b>   | Operation of a complete fuel oil system for an auxiliary boiler, including the functions of components for automatic combustion control, is outlined |
| <b>4</b> | <b>Explain procedures for operating fired and unfired boilers</b>          |  |
|          | <b>4.1</b>   | Locations of all mountings and fittings on auxiliary boilers are identified and their functions are outlined   |
|          | <b>4.2</b>   | Purpose of all alarms and shutdowns incorporated in auxiliary boilers is clarified   |
|          | <b>4.3</b>   | Types and operation of safety valves are outlined  |
|          | <b>4.4</b>   | Procedure for lighting off a boiler from cold is clarified   |
|          | <b>4.5</b>   | Procedure for laying up for short and long periods, including full blow down and shutdown procedures, is clarified                                   |
|          | <b>4.6</b>   | Procedure for isolating an auxiliary boiler after shutdown is clarified  |
| <b>5</b> | <b>Explain procedures for sampling and testing boiler water</b>            |  |
|          | <b>5.1</b>   | Effects of poor water treatment practices on safety and boiler function are identified   |
|          | <b>5.2</b>   | Correct procedure for taking boiler and feed water sample and possible errors that might occur are clarified   |
|          | <b>5.3</b>   | Common water tests carried out are outlined and typical results are stated   |
|          | <b>5.4</b>   | Chemicals used for treatment of boiler water are named and acceptable range of chemical reserves found in boiler waters are confirmed                |
| <b>6</b> | <b>Explain procedure for maintaining water level in the boiler</b>         |  |
|          | <b>6.1</b>   | Method of testing and changing a gauge glass is outlined   |
|          | <b>6.2</b>   | Effects of blockages in water, steam and drain cocks on levels in gauge glass are outlined   |
|          | <b>6.3</b>   | Procedure for when a gauge glass apparently shows no water is clarified  |
| <b>7</b> | <b>Explain common hazards and defects and relevant prevention/ control</b> |  |
|          | <b>7.1</b>   | Hazards and defects associated with auxiliary boilers are identified   |

## **procedures**

- 7.2** How water hammer can be prevented in auxiliary boilers is outlined
- 7.3** Symptoms, causes, effects and actions to be taken in the event of oil contamination of boiler water are determined
- 7.4** Difference between and measures taken to avoid fire and water side explosions are clarified
- 7.5** Causes, mechanism, prevention and control of economiser fires are detailed

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARL003 Demonstrate basic knowledge of marine auxiliary boilers.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL054 Demonstrate basic knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information related to marine auxiliary boilers
- adjusting excess air proportional relating to combustion processes and fuel atomisation process
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic operation of marine auxiliary boilers
- identifying and applying relevant solutions for addressing problems associated with marine auxiliary boilers
- identifying and interpreting diagnostic information and performing mathematical calculations related to operating, maintaining and repairing marine auxiliary boilers
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- imparting knowledge and ideas through verbal, written and visual means
- monitoring exhausted gas
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, maintaining and repairing marine auxiliary boilers.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of operation of boilers and steam systems
- combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- combustion processes, including carbon dioxide, oxygen, nitrogen, sulphur dioxide and water vapor
- common boiler defects and repair procedures

- construction and operation of boilers, including fire tube and water tube, including:
  - general construction details of a fire tube boiler
  - material used commonly for construction
- corrugated furnaces, including:
  - higher strength and flexibility in comparison to plain furnaces
- fittings mounted on boilers
- fuel atomisation process, including atomiser design, air register design and viscosity of fuel and burners
- fuel oil system for an auxiliary boiler
- hazards and defects, including:
  - chemical hazards
  - enclosed space
  - illumination of work area
  - machine guarding
  - manual handling
  - materials
  - rubbish and combustible
  - steam and fuel leaks
  - thermal hazards
  - trips
- hazards associated with running boiler plant
- operating principles relating to steam generation in fired and unfired boilers
- principles of boiler operation in normal and emergency situations
- procedures for maintaining water level in boilers
- purpose of alarms and shutdowns in marine boilers
- shells of cylindrical form, including:
  - higher strength and weight ratios
  - sited vertically or horizontally
- stays, including forms of solid bars, thick tubes or plate girders
- treatment, sampling and testing of boiler water
- types of auxiliary boilers and typical operating pressures and temperatures
- typical feed systems for marine boilers
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the

time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including:
  - mountings and fittings on auxiliary boilers, including:
    - air release cock
    - auxiliary steam stop valve
    - blow down valve
    - feed check or control valve
    - main steam stop valve
    - pressure gauge connection
    - safety valves
    - sampling connection
    - scum valve
    - water level gauge
    - whistle stop valve.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL055 Demonstrate basic knowledge of marine auxiliary machinery and equipment**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems onboard a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |          |  |  |
|----------|--|--|
| <b>1</b> | <b>Outline layout of engine room and functions of auxiliary machinery in engine room</b> | <b>1.1</b> Layout of a typical engine room is outlined   |
|          |  | <b>1.2</b> Types and functions of auxiliary machinery found in an engine room are explained  |
|          |  | <b>1.3</b> Location, function and operation of all safety devices found on main and auxiliary machinery and within engine room, including shutdowns and engine room escape routes are outlined |
|          |  | <b>1.4</b> Common operating pressures and temperatures of fluids within engine room are identified, and how to respond to abnormal parameters is clarified                                     |
| <b>2</b> | <b>Explain duties and responsibilities of an Engineer Watchkeeper during a watch</b>     | <b>2.1</b> Duties and responsibilities of an Engineer Watchkeeper with respect to safety of personnel and vessel during and taking over the watch are clarified                                |
|          |  | <b>2.2</b> Importance of ensuring all events   |



related to machinery are recorded in the log is explained

- 2.3 Duties and responsibilities of an Engineer Watchkeeper in prevention and extinction of fire in machinery spaces are clarified
- 2.4 Duties and responsibilities of an Engineer Watchkeeper in relation to prevention of flooding and avoidance of pollution are clarified
- 2.5 Routine duties and responsibilities of an Engineer Watchkeeper with respect to safe operation of propulsion and auxiliary machinery are clarified
- 2.6 Duties and responsibilities of an Engineer Watchkeeper on an unmanned machinery space (UMS) vessel are clarified
- 2.7 Procedure for familiarising oneself on joining a new vessel is clarified

### 3 **Recognise key features, applications and treatment of fuels, lubricants and chemicals used onboard vessels**

- 3.1 Types, properties, applications and treatments of various fuels used onboard vessels are outlined
- 3.2 Procedures to be followed before and during fuel bunkering are clarified
- 3.3 Types, properties, applications and treatments of various lubricants used onboard vessels are outlined
- 3.4 Uses and safe handling methods for various types of chemicals used onboard vessels are outlined
- 3.5 Fuel system layout, including fuel treatment method, is detailed
- 3.6 Working principles, construction and safe operation of purifiers and clarifiers are explained

- |          |  |  |
|----------|--|--|
| <b>4</b> | <b>Explain operation and maintenance of typical pumping systems used onboard vessels</b> | <p><b>4.1</b> Basic working principles, components and properties of different types of pumps are outlined</p> <p><b>4.2</b> Types of heat exchangers, their basic working principles and applications are outlined</p> <p><b>4.3</b> Correct operation and maintenance of pumps and heat exchangers are detailed</p> <p><b>4.4</b> Key features of bilge, cargo and ballast pumping systems are outlined</p> <p><b>4.5</b> Types, operating principles and requirements for oily-water separators or similar equipment are outlined</p> <p><b>4.6</b> Other approved methods of disposing of oily water are identified</p> <p><b>4.7</b> Procedure for completing oil record book is clarified</p>  |
| <b>5</b> | <b>Explain operation and maintenance of marine air compressors</b>                       | <p><b>5.1</b> Types, characteristics, components and applications of various compressors used onboard vessels are compared and contrasted</p> <p><b>5.2</b> Correct pre-operational checks, starting procedures, safe operation and basic maintenance required for air compressors are detailed</p> <p><b>5.3</b> Potential safety hazards associated with compressed air are identified</p> <p><b>5.4</b> Locations of all mountings, safety devices, alarms and shutdowns on compressors, air receivers and compressed air systems are identified, and their functions are outlined</p> <p><b>5.5</b> Different requirements and production methods for control air, method of production and special requirements for a breathing apparatus compressor, are</p> |

		clarified
<b>6</b>	<b>Explain different types, safe operation and testing of steering gear commonly used onboard vessels</b>	<p><b>6.1</b> Essential statutory regulations covering operation of steering gear are established</p> <p><b>6.2</b> Operation of different types of steering gear used onboard vessels is clarified</p> <p><b>6.3</b> Working principles of variable delivery pumps used in steering gear are explained</p> <p><b>6.4</b> Location of all alarms and safety devices associated with steering gear is identified and their functions are outlined</p> <p><b>6.5</b> Process for testing steering gear and monitoring its performance is explained</p>
<b>7</b>	<b>Explain operation of an evaporator</b>	<p><b>7.1</b> Why freshwater may have to be produced from seawater is explained</p> <p><b>7.2</b> Function, construction and operation of evaporators is explained</p> <p><b>7.3</b> Correct starting procedures, safe operation and basic maintenance required for an evaporator are clarified</p> <p><b>7.4</b> Process for testing the evaporator and monitoring performance is explained</p> <p><b>7.5</b> Treatment of distillate for domestic purposes is outlined</p> <p><b>7.6</b> Quality necessary if water being produced by a distiller is to be used for human consumption is outlined</p>
<b>8</b>	<b>Explain basic operation of marine refrigeration systems</b>	<p><b>8.1</b> Properties of an ideal refrigerant are listed</p> <p><b>8.2</b> Refrigerants commonly used onboard are listed and reasons for their use are</p>

		clarified
		8.3 Basic construction and operation of a marine refrigeration system is explained
		8.4 Preparation, operation, fault detection and necessary actions to prevent damage in marine refrigeration systems are confirmed
		8.5 Personal safety and environmental hazards associated with chlorofluorocarbons (CFCs) and ozone depleting substances are identified
9	<b>Explain basic operation of marine air conditioning and ventilation systems</b>	9.1 Basic construction and operation of marine air conditioning and ventilation systems in routine and emergency situations are explained
		9.2 Preparation, operation, fault detection and necessary actions to prevent damage in marine air conditioning and ventilation systems are confirmed
10	<b>Explain basic operation of marine gas turbines</b>	10.1 Basic flow of air and gas through a simple cycle marine gas turbine is outlined
		10.2 Materials and construction of compressor, combustion system and turbine in a single and two-shaft design turbine are detailed
		10.3 Basic controls required for the control and protection of the plant are outlined
		10.4 Types, basic construction and operation of deck machinery are outlined, and accessories necessary for safe operation are listed
11	<b>Explain types, safe operation and maintenance of deck machinery</b>	11.1 Types, basic construction and operation of deck machinery are outlined
		11.2 Preparation, operation, fault detection and necessary actions to prevent damage in deck machinery are

confirmed

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARL004 Demonstrate basic knowledge of marine auxiliary machinery and equipment.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL055 Demonstrate basic knowledge of marine auxiliary machinery and equipment**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information and sketching diagrams to interpret and explain testing requirements related to the operation of marine auxiliary machines
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- calculating to show air can be treated as an ideal gas
- identifying and interpreting numerical and graphical information related to starting up and shutting down marine auxiliary machines on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications and electrical and control circuit diagrams.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- accessories, including:
  - accessory gear
  - lube oil coolers
  - lube oil drive
  - lube oil filter
  - starting device

- basic principles of marine auxiliary machines, including:
  - applying main power of engines for propulsion and manoeuvring
  - keeping ship dry and trimmed
  - mooring ship and handling cargo
  - providing for safety
  - supplying domestic needs, such as freshwater
  - supplying needs of main engines and boilers
  - supplying ship with electric power and lighting
- compressors, including:
  - breathing apparatus compressor
  - lubricated reciprocating air compressors
  - non-lubricated reciprocating air compressors
  - oil-free air compressors
  - rotary screw compressors
- deck machinery, including:
  - accommodation ladders
  - anchor winch
  - cranes
  - davits
  - mooring winch
- features of bilge, cargo and ballast pumping systems, including:
  - safety fittings
  - sensing devices
  - types of valves
- fuels and basic principles of fuel systems
- nature and causes of typical start-up and shutdown malfunctions of main and auxiliary machinery and associated systems, and available methods for their detection and rectification
- operational characteristics and performance specifications for different types of auxiliary machinery and associated systems usually found on a commercial vessel, including:
  - air compressors
  - evaporators
  - heat exchangers
  - pumps
  - steering gears
- principles and procedures of machinery lubrication
- procedures for carrying out start-up and shutdown of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- safety, environmental and hazard control precautions and procedures relevant to start-up and shutdown of marine auxiliary machinery and associated systems

- steering gear, including:
  - hunting gear
  - telemotor
- types of chemicals, including:
  - cleaning fluids
  - fuel additives
  - solvents
- types of heat exchangers, including:
  - plate
  - shell and tube
- types of steering gear, including:
  - electrical
  - ram
  - rotary vane
  - oscillating steering
- types of auxiliary machinery and components, including:
  - boiler
  - compressors
  - diesel generator
  - evaporators
  - pumps
  - purifiers and fuel oil treatment
  - refrigerating installation
  - thermal fluid heating systems
- types of pumps, including:
  - axial flow
  - centrifugal
  - gear
  - reciprocating
  - screw
  - vane
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.



Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL056 Demonstrate basic knowledge of marine control systems and automation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge of marine automation and process control required by engineers to operate control systems on board a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

### **Blue Waters Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

<b>1</b>	<b>Outline basic actions and functions of automation equipment in marine contexts</b>	<b>1.1</b> Basic concept of an automatic control system is explained using a simple block diagram, correct standard symbols and layout  <b>1.2</b> Components and operation of automatic control systems are outlined  <b>1.3</b> Relative advantages and disadvantages of different mediums used in shipboard automatic control systems are explained
<b>2</b>	<b>Explain action of nozzle/flapper mechanism in pneumatic instruments</b>	<b>2.1</b> Principle of operation of nozzle/flapper as a pneumatic control system component is outlined  <b>2.2</b> Modifications required to make the simple nozzle/flapper mechanism suitable for use in process control systems are explained
<b>3</b>	<b>Explain operating principles and application of sensing and transmitting elements</b>	<b>3.1</b> Different methods of measuring level in an unpressurised tank and in a closed pressurised vessel are

- sketched and outlined
- 3.2 Applications at sea, advantages and disadvantages and temperature ranges of filled system thermometers are outlined
  - 3.3 Operating principles of resistance temperature detector and thermocouple are outlined
  - 3.4 Different methods for measuring flow onboard ships that are suited to remote indication and automatic control are identified
  - 3.5 Different methods for measuring pressure onboard a ship that are suited to remote indication and automatic control are identified
- 4 Explain function of controller element and associated hand/auto changeover station in an analogue control loop**
- 4.1 Difference between ‘OFF-ON’ control action and fully modulating proportional control action is explained
  - 4.2 ‘Offset’ and how it may be removed is explained
  - 4.3 Basic principles of operation of a simple pneumatic controller are outlined
  - 4.4 Action and function of hand/auto changeover station in an automatic control loop is explained using suitable schematic diagrams
- 5 Explain basic operating principles of electronic circuits and components**
- 5.1 Components are identified and electronic circuit diagrams are interpreted
  - 5.2 Correct methods of testing electronic components are detailed
  - 5.3 Basic operation of operational amplifiers is outlined

- |          |  |  |
|----------|--|--|
| <b>6</b> | <b>Explain use of solid-state diodes and transistors to control monitoring and alarm systems</b>   | <b>6.1</b> Basic concept of logic and operation of logic gates is outlined   |
|          |  | <b>6.2</b> Operation of input/output devices and their application to sequential control systems are explained   |
| <b>7</b> | <b>Explain ‘fail safe’ philosophy and its implications for design and operation of main types of actuators available for operating final correcting elements</b> | <b>7.1</b> Purpose and function of a typical valve actuator and positioner are confirmed   |
|          |  | <b>7.2</b> Constructional differences between typical ‘air-to-open’ and ‘air-to-close’ actuators are confirmed   |
|          |  | <b>7.3</b> Why ‘fail safe’ may mean valves could either close, open, or remain where they are, upon failure of their associated automatic (or servo remote) operating system, is clarified |
|          |  | <b>7.4</b> Pneumatic piston actuator/positioner assembly used to move final correcting elements pneumatically is outlined  |
|          |  | <b>7.5</b> Operating principles of electrical actuators are outlined   |
|          |  | <b>7.6</b> Operation of a hydraulic steering gear actuator is compared and contrasted with valve actuator and positioner assemblies  |
| <b>8</b> | <b>Specify requirements for a pneumatic control system air supply</b>  | <b>8.1</b> Standard specifications for cleanliness, moisture and oil content of a typical control air system are outlined  |
|          |  | <b>8.2</b> Importance of ensuring that standards for cleanliness, moisture and oil content are maintained throughout operation of control air system is                                    |

		explained
		<b>8.3</b> Typical system that is able to supply compressed air that meets required standards for cleanliness, moisture and oil content is outlined
<b>9</b>	<b>Explain mechanisms for control of physical parameters in a ship's machinery space</b>	<p><b>9.1</b> Typical control loops associated with centralised cooling systems that serve the cooling water system are sketched</p> <p><b>9.2</b> Function of typical loops required for control of temperature, pressure and viscosity of fuel supplies to main and auxiliary engines are outlined and sketched</p> <p><b>9.3</b> Typical pressure and temperature control loops associated with main and auxiliary engine lubricating oil services are sketched</p> <p><b>9.4</b> Function of components of typical control loops for the automatic control of boilers are outlined and sketched</p> <p><b>9.5</b> Location and reasons for alarms associated with remote and/or automatic machinery operation to be separate from control function are explained</p> <p><b>9.6</b> Tests and procedures required to meet unmanned machinery space (UMS) requirements are specified and different types of associated alarm and monitoring systems are evaluated</p> <p><b>9.7</b> Power output and control of a main propulsion diesel engine (slow speed two-stroke) and an electrical generator prime mover (high or medium speed four-stroke) are compared and contrasted</p>
<b>10</b>	<b>Explain schematically total</b>	<b>10.1</b> Engine manufacturer schematic

## **bridge control of a commercial vessel**

diagram is interpreted and how total bridge control may be achieved to manoeuvre and control the engine is explained

**10.2** Safety interlocks in sequence of operation depicted in schematic diagram are identified and why they are required is explained

**10.3** Location of engine control positions, apart from the bridge, is identified from schematic diagram

**10.4** Why bridge control is preferred option for manoeuvring main engine in modern commercial vessels is explained

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARL005 Demonstrate basic knowledge of marine control systems and automation.

## **Links**

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL056 Demonstrate basic knowledge of marine control systems and automation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information and sketching diagrams to interpret and explain testing requirements related to control systems on commercial vessels
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic principles of marine automation and process control
- identifying and interpreting numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in control systems on commercial vessels
- identifying methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting written information related to the operation of control systems on commercial vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic control engineering, including:
  - fundamentals of automatic control
  - ON-OFF control
  - proportional-integral-derivative (PID) control
  - sequential control
  - various automatic control
- basic electronics, including:
  - basic electronic circuit elements:



- diodes
- integrated circuit (IC) and large-scale integrated circuit (LSIC)
- semiconductor
- thyristor
- electron theory
- electronic control equipment
- flowchart for automatic and control systems
- characteristics and functions of temperature, pressure and viscosity of fuel
- components, including:
  - actuators
  - responders
  - sensors
- concept of 'fail safe' philosophy
- concepts of unmanned machinery space (UMS), and automated monitoring and control of machinery
- control and monitoring of ship machinery
- control loops
- electronics and power electronics, including:
  - amplifiers
  - analogue and DC power supplies
  - cyclo-converters
  - MSI onverters
  - power electronic converters
  - rectifiers
  - stabilisers
  - transistors
- fundamentals of automatic control
- instrument process and control terms
- measurement of process value, including:
  - flow
  - general measurement of processes
  - level, including direct methods and inferential methods
  - pressure
  - temperature, including mechanical and electrical
- mechanical and electrical sensors
- mediums, including:
  - compressed air
  - electric currents
  - electric voltages
  - hydraulic fluids

- ON-OFF control
- pneumatic and electrical instrumentation transmitters
- preparation, operation, fault detection and necessary measures to prevent damage for machinery items and control systems
- principles of:
  - basic electronic circuits
  - basic pneumatic systems and action of pneumatic instruments
  - process control
- relevant industry standards for drawing symbols/layouts for schematic diagrams
- safety and emergency procedures for operation of propulsion plant machinery, including control systems
- safety devices, alarms and monitoring systems
- sensing and transmitting elements
- sequential control
- tests and procedures required to meet UMS requirements
- total bridge control
- transmission of signals, including:
  - controlling elements, including pneumatic
  - transmitters
- various automatic controls
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE)

currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL057 Demonstrate basic knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate and maintain marine diesel engines and systems on a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Outline stages of combustion in two-stroke and four-stroke cycle diesel engines**

**1.1** Two-stroke and four-stroke cycle diesel engines are compared and contrasted

**1.2** Methods and diagnostic information used in determining engine combustion characteristics are specified

**1.3** Diagnostic information is used to identify and interpret common combustion faults and to produce typical diagrams for analysing faults

**2 Explain means of pressure-charging diesel engines**

**2.1** Pressure-charging principles and their influence on engine design and waste heat recovery are explained

**2.2** Different methods of pressure-charging diesel engines are clarified

**2.3** Emergency isolation procedures used when pressure-charging diesel engines are clarified

**3 Explain operation of diesel engine governors**

**3.1** Governing principles, common governor types and related controls are outlined

**3.2** Different requirements for governing diesel engines for propulsion and power generation are explained

	<b>3.3</b>	Problems of mismatched engine sizes/prime mover types when sharing common loads are outlined
<b>4 Explain properties of materials used in construction of engine components</b>	<b>4.1</b>	Properties of materials used in construction of engine components are specified
	<b>4.2</b>	Dynamic stresses and loads, materials and service limitations of engine components are outlined
	<b>4.3</b>	Construction and operating cycle forces of diesel engine components are outlined
	<b>4.4</b>	Relationship between critical speed, use of detuners/dampers and materials in engine components is clarified
<b>5 Explain safe working practices associated with diesel engines during maintenance, repair and operation</b>	<b>5.1</b>	Safe practices for isolating propulsion and power generation diesel engines prior to work commencement are confirmed
	<b>5.2</b>	Personal protective (PPE) to be used during all aspects of diesel maintenance is identified
	<b>5.3</b>	Hazards associated with working on diesel engines and systems, including working in enclosed spaces, are identified
	<b>5.4</b>	Correct procedures for using hydraulic tools and high-pressure fuel injection test equipment are clarified
	<b>5.5</b>	Purpose, operation and maintenance of safety interlocks and protective cut-outs of engine manoeuvring systems is determined
<b>6 Explain procedures for preventing and responding to crankcase and air-line explosions, and scavenge and uptake fires</b>	<b>6.1</b>	Causes, symptoms and means of preventing and extinguishing uptake and economiser fires are outlined
	<b>6.2</b>	Risks of continued service with an isolated waste heat unit are assessed
	<b>6.3</b>	Causes, symptoms, methods of extinguishing and

prevention of scavenge fires are evaluated

- 6.4** Causes and hazards associated with starting air-line explosions are identified
- 6.5** Protective devices fitted to air starting systems to minimise risk of explosion, and routine inspection and maintenance required are detailed
- 6.6** Causes and ways of preventing crankcase explosions in both diesel and dual-fuel engines are outlined
- 6.7** Procedure to be taken in the event of an early warning of a hazardous crankcase atmosphere and required procedure to be followed after engine has stopped are clarified

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL006 Demonstrate basic knowledge of marine diesel engines and systems.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL057 Demonstrate basic knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing diagnostic information related to marine diesel engines and systems
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic operation of marine diesel engines and systems
- identifying causes associated with starting air-line explosions, including:
  - airlock in feed water system
  - cleanliness of economiser tubes
  - failure of economiser feed pump
  - loss of feed water supply
- identifying and applying relevant solutions for addressing problems associated with marine diesel engines and systems
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, maintaining and repairing marine diesel engines and systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, maintaining and repairing marine diesel engines and systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of diesel engine operation, including:
  - basic construction



- engine principles
- engine types
- fuel atomisation and combustion
- heat-engine cycle
- ideal gas cycle
- common combustion faults, including:
  - engine cylinder fuel supply
  - lack of total combustion
- components of diesel engines
- crankcase and air-line explosions, scavenge and uptake fires
- diesel engine, including:
  - medium speed and high-speed diesel engine
  - slow-speed diesel engine
- diesel engine:
  - lubrication systems
  - propulsion and power generation
- diagnostic information, including:
  - engine efficiency
  - fuel consumption
  - temperature
- hazards, including:
  - acids
  - chemicals
  - defective or bypassed machinery protective devices
  - defective or inappropriately adjusted exhaust systems
  - enclosed spaces
  - flammable liquids under pressure
  - hydrocarbons
  - leaking oil and fuel
  - lifting heavy components both unaided and with lifting gear
- manoeuvring systems of diesel engines
- methods of pressure-charging diesel engines, including:
  - exhaust gas turbocharging
  - positive displacement engine-driven blowers
  - under-piston assistance
- pressure-charging diesel engines, including common service faults, actions to rectify faults, emergency operation and isolation procedures
- properties and characteristics of fires
- safe working practices associated with diesel engines during operation, maintenance and repair

- starting methods of diesel engines
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including:
- diesel engine components:
  - camshafts
  - crankshafts
  - cross-heads
  - cylinder heads
  - exhaust valves
  - frames
  - fuel injectors
  - fuel pumps
  - liners
  - pistons
  - turbochargers
  - valves and rocker gear.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL058 Demonstrate basic knowledge of marine electrical systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to operate alternators, generators and control systems to supply shipboard electrical power onboard a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

**1 Explain hazards and isolation procedures associated with live electrical components**

**2 Explain principles of power generation and transmission in alternating current (AC) and direct current (DC) circuits**

**3 Outline key features of basic electrical diagrams used on vessels**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Effects of electricity on the human body are outlined

**1.2** Procedures to be taken in the event of a person suffering an electric shock are clarified

**1.3** Correct procedure for isolating an electrical circuit is clarified

**1.4** Electrical hazards in a vessel at sea or port are identified

**2.1** Excitation methods used to produce AC and DC voltages are outlined

**2.2** Basic voltage control of generated AC voltages is outlined

**3.1** Types of diagrams used to depict electrical systems on ships are outlined

- |          |   |  |
|----------|---|--|
|          | <b>3.2</b>  | Electrical symbols used in basic electrical diagrams are identified  |
|          | <b>3.3</b>  | Electrical devices used in basic electrical circuits are clarified   |
| <b>4</b> | <b>Use common electrical measuring and testing instruments</b>                |  |
|          | <b>4.1</b>  | Different types of multimeters are used appropriately  |
|          | <b>4.2</b>  | Functions of insulation and 'tong' testers are explained   |
|          | <b>4.3</b>  | Safety requirements when using test equipment are applied  |
| <b>5</b> | <b>Rectify basic electrical faults</b>  |  |
|          | <b>5.1</b>  | Fault situation is determined by appropriate questioning of client or operator                             |
|          | <b>5.2</b>  | Safe working practices are demonstrated when carrying out fault-finding work                               |
|          | <b>5.3</b>  | Basic common faults of equipment and techniques used to find faults are outlined                           |
|          | <b>5.4</b>  | Knowledge of various types of basic common faults of circuits and techniques is used to find faults        |
|          | <b>5.5</b>  | Basic common faults in electrical equipment are identified and rectified                                   |
| <b>6</b> | <b>Outline basic components and layout of a marine electrical switchboard</b> |  |
|          | <b>6.1</b>  | Layout of a typical three-wire insulated electrical system is sketched                                     |
|          | <b>6.2</b>  | Interconnections between main switchboard, emergency switchboard and shore supply are explained            |
|          | <b>6.3</b>  | Procedure for changing over to emergency switchboard for testing or during loss of mains power is outlined |
|          | <b>6.4</b>  | Safety features on a typical marine switchboard are identified   |
| <b>7</b> | <b>Explain operation of shipboard alternators</b>                             |  |
|          | <b>7.1</b>  | Types and construction methods of alternators used on a marine vessel are outlined                         |
|          | <b>7.2</b>  | Principles of operation of a marine type alternator are outlined   |

- |  |            |   |
|--|------------|---|
|  | <b>7.3</b> | Relationship is shown between voltage and speed in regulation of alternator   |
|  | <b>7.4</b> | Operational characteristics of a marine alternator are outlined   |
|  | <b>7.5</b> | Excitation and automatic voltage regulation systems used with marine alternators are clarified  |
| <b>8 Explain procedures for paralleling of alternators</b> | <b>8.1</b> | Process of measuring voltage, frequency and phase angle is outlined   |
|  | <b>8.2</b> | Automatic and manual procedures for synchronising and paralleling marine alternators, including machines of different capacities, are clarified |
|  | <b>8.3</b> | How two machines can be adjusted to share kilovolt-ampere reactive (kVAR) and kilowatt (kW) loads is confirmed                                  |
|  | <b>8.4</b> | Process of removing an alternator from the bus is outlined  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL007 Demonstrate basic knowledge of marine electrical systems.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL058 Demonstrate basic knowledge of marine electrical systems**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic principles of alternators, generators and control systems
- identifying and interpreting numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- identifying and suggesting ways of rectifying electrical hazards and emergency situations on a vessel
- identifying methods, procedures and materials needed for operating, maintaining and repairing basic marine electrical systems
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting written information related to electrical circuitry and components on commercial vessels
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alternating current (AC)/direct current (DC) voltage
- alternators:
  - characteristics
  - construction
  - synchronised operation
- automatic control devices, including:
  - process control
  - system control
- electrical:



- measuring and testing instruments
- safe working practices
- symbols, basic electrical diagrams/circuits
- electrical hazards, including:
  - electric shock
  - electrical fire
  - moving and rotating electrical equipment
  - non-compliance with safe working procedures
  - over-speed of electrical machinery
  - poor housekeeping procedures
  - using equipment beyond safe working limits
- electrical motors
- high voltage (HV)
- marine electrical systems, including:
  - earthing
  - instrumentation
  - power distribution boards
  - switchboards
- monitoring systems
- phase angle, power factor and current flow
- procedures for dealing with hazards and emergencies
- protective devices
- resistance, inductance and capacitance
- switchboards and protection, including:
  - equipment removal
  - purpose
  - testing and maintenance
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARL059 Demonstrate basic knowledge of marine steam turbines and main boilers**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

L – Engineering

### **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Interpret an energy balance diagram for a shipboard steam plant**

**1.1** Ideal theoretical thermodynamic cycle for the operation of a steam plant is outlined

**1.2** Why actual expansion of steam through a turbine differs from ideal cycle is explained

**1.3** Typical heat losses around a steam plant are identified

**1.4** Effect of air pre-heating, feed heating and economisation upon energy balance of steam plant's thermodynamic cycle are explained

**1.5** Typical heat (and/or mass) balance diagram for a ship's steam plant is interpreted

**2 Explain construction and operation of marine high-pressure water boilers**

**2.1** Advantages of water tube boiler over fire tube boiler for shipboard applications are outlined

**2.2** Construction and operation of a 'D' type membrane furnace boiler with superheater, economiser and air pre-heater is explained

**2.3** External fittings required by classification society rules on any large boiler are identified

**2.4** Internal fittings of a boiler's main steam drum are identified

**2.5** How automation is applied to boiler control is clarified

**2.6** Start-up, operation and shutdown of a main propulsion steam boiler are outlined

**3 Explain construction and operation of a main propulsion steam plant**

**3.1** How common forms of blading and rotor construction are manufactured is clarified

**3.2** How casings of common marine steam turbines are fitted out is clarified

- |          |            |   |
|----------|------------|---|
|          | <b>3.3</b> | Principles of thermodynamics are applied to explain expansion of steam in a typical marine turbine  |
|          | <b>3.4</b> | Importance of start-up and warming-through procedures for a steam turbine set is conveyed   |
|          | <b>3.5</b> | Checks required during routine turbine operation are explained  |
|          | <b>3.6</b> | Safety devices for a steam turbine set are identified and normal emergency shutdown (ESD) procedures are identified   |
|          | <b>3.7</b> | Operation of turbines under normal and emergency conditions is outlined   |
| <b>4</b> | <b>4.1</b> | <b>Explain auxiliary machinery required to support operation of main propulsion steam turbines and boilers</b><br>Construction and operation of different types of auxiliary machinery needed to support main propulsion steam turbines and boilers is outlined |
|          | <b>4.2</b> | Construction and operation of steam and electric motor prime movers required for driving auxiliary machinery are outlined   |
| <b>5</b> | <b>5.1</b> | <b>Explain configuration and operating principles of different steam distribution systems used in steam-powered vessels</b><br>Configuration and operating principles of different steam distribution systems is outlined                                       |
|          | <b>5.2</b> | Typical pressure reducing and pressure control valves suitable for steam service are outlined and illustrated   |
| <b>6</b> | <b>6.1</b> | <b>Explain operation principles of close feed systems used by boiler/turbine sets</b><br>Difference between an open and a closed feed system is clarified   |
|          | <b>6.2</b> | Closed feed system is outlined  |
|          | <b>6.3</b> | Pressure feed heaters are outlined  |
|          | <b>6.4</b> | Chemical injection equipment suitable for use on any ship's main feed system is explained   |
| <b>7</b> | <b>7.1</b> | <b>Explain feed and boiler water treatment</b><br>Recommended limits of characteristics for boiler water and recommended intervals at which tests are   |

- undertaken are clarified
- 7.2** Reasons for treating boiler water are outlined
- 7.3** Different types of hardness in water, consequences if left untreated, and ways of minimising their effect are explained
- 7.4** How corrosion within a boiler is minimised by treating boiler water is explained
- 7.5** Causes and ways of avoiding carry-over and caustic embrittlement are explained
- 7.6** Safety requirements for handling feed water and boiler water treatment chemicals are explained
- 8 Explain transmission of power from the steam turbine main engine to the propeller**
- 8.1** Why reduction gearing is required between steam turbines and propeller is clarified
- 8.2** Generation of tooth form is outlined
- 8.3** Double helical gearing and difference between single and double reduction gearing are explained
- 8.4** Applications of epicyclic gearing are explained
- 8.5** Function of flexible couplings in a turbine/gearing set is clarified
- 8.6** Components of a driveline from main wheel connection, aft, to propeller are listed
- 8.7** Methods and mechanisms for lubricating a driveline are detailed
- 9 Explain procedures for preventing and responding to fires and explosions specific to steam propulsion plant**
- 9.1** Causes, symptoms and means of preventing and extinguishing fires associated with steam propulsion plant are detailed
- 9.2** Protective devices associated with boilers to minimise risk of fires, explosions and water shortages are identified
- 9.3** Routine inspection and maintenance requirements to prevent fires, explosions and water shortages are

outlined

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARL013 Demonstrate basic knowledge of marine steam turbines and main boilers.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL059 Demonstrate basic knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing diagnostic information related to marine steam turbines
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions to problems that can occur when operating steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, repairing and maintaining marine steam turbines
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, maintaining and repairing marine steam turbines.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- auxiliary machinery, including:
  - lube oil supply pump and system
  - main boiler forced draught fan
  - main condensate extraction pump and air ejector
  - main condenser
  - main cooling water circulating pump
  - main feed pump
  - main fuel oil supply pump and system



- basic principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
  - construction and operation of main and auxiliary steam turbines
  - methods of turbine control, including safety devices
  - procedures for emergency operation of a steam turbine
  - Rankine cycle
  - symptoms, causes, effects, and actions to be taken with defects of auxiliary steam turbines
- effective verbal, written and visual communication strategies
- established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start-up, normal running, and emergency shutdown (ESD) situations
- fires, including:
  - blow back
  - economiser
  - explosions
  - low water level
  - uptake
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur when operating steam propulsion plant and associated systems, and appropriate preventative and remedial action
- marine steam turbines, including:
  - impulse
  - reaction
- methods of lubricating the principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- procedures for reading, interpretation of readings and indications of the performance of steam propulsion plant and associated systems
- safety devices, including:
  - axial movement
  - gland temperature
  - lube oil pressure
  - lube oil temperature
  - remote stops
  - safety valves
  - vacuum condenser pressure
  - vibration
- steam distribution systems, including:
  - auxiliary exhaust steam range

- auxiliary superheated steam range
- bled steam systems
- superheated main steam range
- types, properties, tests, applications and treatment of fuels, lubricants, and solvents/chemicals used onboard a steam vessel, including a basic understanding of the working principles, construction, maintenance and safe operation of centrifuges, filters, and other treatment devices
- typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements and established safety and anti-pollution rules and regulations
- units of measurement
- warming-through procedures, including:
  - ensuring air vent is open
  - minimising thermal shock
  - shutting down
  - warming up according to manufacturer instructions
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic industry approved marine operations site or simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- diagrams, specifications and other information required for performing basic calculations related to marine steam turbines
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL060 Demonstrate knowledge of ships and ship routines

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to maintain a safe engineering watch on a commercial vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Outline key features of different types of commercial ships**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Annotated sketch of profile and midship section of a range of ship types is constructed
- 1.2** Terms used to quote size of a ship are used appropriately
- 1.3** Plate materials and joining methods used in ship construction are detailed
- 1.4** Basic principles of watertight integrity are identified and applied
- 1.5** Shipping terms are applied to describe characteristics of commercial vessels

#### **2 Explain need for standards and other monitoring requirements for ships**

- 2.1** International standards relating to construction, equipment and conditions of commercial vessels are outlined
- 2.2** National legislation and IMO conventions concerning safety of life at sea, security and protection of marine environment are outlined
- 2.3** Requirements of International Safety Management (ISM) Code for the Safe Operation of Ships and for Pollution Prevention and safety management system (SMS) are outlined
- 2.4** Qualifications and experience requirements for key personnel on a ship are outlined

- 2.5 Personal and ship certificates, and other documents required to be carried onboard ship by international conventions, how they are obtained, how they may be verified, and period of their legal validity are identified
    - 2.6 Roles and functions of key national and international shipping authorities and organisations are outlined
    - 2.7 Purpose of surveys and dry-docking of ships are explained
- 3 **Explain responsibilities of personnel onboard ship**
  - 3.1 Roles and responsibilities of personnel onboard ship are clarified
  - 3.2 Organisational structure, lines of responsibility and communication onboard ship are outlined
  - 3.3 International maritime conventions, recommendations and national legislation concerning shipboard personnel and training are clarified
  - 3.4 Daily work and shipboard routines relating to engineering watchkeeping are outlined
  - 3.5 Personal and social responsibilities of personnel onboard ship are confirmed
- 4 **Explain engineering watchkeeping procedures**
  - 4.1 Established engineering practice and regulatory requirements for conduct, handover and relief of an engineering watch are outlined
  - 4.2 Operational procedures and requirements for main propulsion, auxiliary systems and associated controls are outlined
  - 4.3 Operational procedures and requirements for monitoring the performance of main propulsion, auxiliary systems and associated controls are outlined
  - 4.4 Procedures for identifying, rectifying and reporting problems associated with performance of main propulsion, auxiliary systems and associated controls are outlined
  - 4.5 Basic operation, monitoring and maintenance of shafting installations and propeller systems is detailed
  - 4.6 Engine room resource management principles and

- procedures required for a safe engineering watch are outlined
- 4.7** Safety precautions to be observed during a watch and immediate actions to be taken in a fire or incident are clarified
- 4.8** Requirements for recording activities and incidents that occur during keeping an engineering watch are detailed
- 4.9** Fatigue management strategies for engine room management team are identified
- 4.10** Personal tasks and workload management techniques appropriate for an Engineer Watchkeeper are outlined
- 5. Communicate between bridge, engine control room and main engine room**
- 5.1** Available tools are correctly used to communicate between bridge, engine control room and main engine room
- 5.2** Appropriate records of engineering communications are completed according to organisational procedures and regulatory requirements
- 6. Communicate with officers, crew and others**
- 6.1** Clear and precise communication is used, and established communication practices are followed
- 6.2** Communication misunderstandings are avoided using appropriate confirmation techniques and established communication practices
- 6.3** Messages concerning vessel safety and operations are received, read, clarified as required, correctly interpreted and applied to engineering activities
- 6.4** Appropriate techniques are used when communicating with multilingual crew to ensure communication is effective and messages are clearly understood
- 6.5** Non-verbal communication is appropriately used when working and communicating with others
- 7 Outline procedures and responses to malfunctions and emergency situations**
- 7.1** Potential malfunctions and emergencies relating to main propulsion and auxiliary systems are identified
- 7.2** Correct response and required action relating to potential malfunctions and emergencies in main

		propulsion and auxiliary systems are detailed
	<b>7.3</b>	Regulatory requirements and reporting requirements for incidents and emergency situations outside Watchkeeper limits of responsibility are confirmed
<b>8</b>	<b>Recognise tanker types and cargo characteristic</b>	<b>8.1</b> Principal features and layout of various types of tankers and gas carriers are identified and differences between them determined  <b>8.2</b> Terminology relating to the structure, capacities and operations of tankers is correctly used when describing the features of various types of tankers and gas carriers and their differences  <b>8.3</b> Principal features and distinguishing characteristics of various types of tanker cargoes are correctly identified and applied during watchkeeping duties on a tanker or gas carrier

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARL037 Demonstrate knowledge of ships and ship routines.

## Links

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL060 Demonstrate knowledge of ships and ship routines**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information required to undertake watchkeeping duties in routine and emergency situations
- applying effective decision-making techniques
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- developing, implementing and overseeing standard operating procedures
- identifying and determining appropriate ways of responding to malfunctions and emergency situations in daily watchkeeping operations
- identifying methods and procedures needed to implement watchkeeping duties on commercial vessels
- identifying, interpreting and processing numerical and graphical information required to undertake watchkeeping duties in routine and emergency situations
- reading and interpreting written instructions, procedures and information relevant to watchkeeping duties.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and include knowledge of:

- bridge instrumentation, controls and alarms
- bridge resource management systems
- causes of groundings, collisions and casualties
- composition of bridge/engine room management team
- enclosed spaces
- engine room resource management principles, including:
  - allocation, assignment and prioritisation of resources
  - assertiveness and leadership

- considering team experience
- effective communication
- obtaining and maintaining situational awareness
- engineering watchkeeping procedures and practices
- fatigue management principles and techniques
- functions of unmanned machinery space (UMS) controls, alarms and indicators
- general layout of tankers, including:
  - use of manufacturer's manuals
  - use of shipboard drawings
- hierarchy and organisational structure of shipboard personnel, including:
  - crew
  - Master
  - officers
- key international and Australian Standards relating to shipping
- key shipping authorities and organisations, including:
  - Australian Maritime Safety Authority (AMSA)
  - classification societies
  - International Maritime Organization (IMO)
  - National Maritime Safety Committee
  - state and territory marine authorities
- maritime communication techniques, including:
  - use of maritime terminology and technical terminology
- navigational hazards and implications for watchkeeping
- personal and social responsibilities onboard ship, including:
  - alcohol and drug abuse
  - discipline
  - finance
  - health and fitness
  - hygiene
  - relationships
  - safety
- personal task and workload management, including:
  - coordination
  - managing resource constraints
  - managing time constraints
  - personnel assignment
  - planning
- procedures for dealing with malfunctions and emergencies, including:
  - accidents
  - breakdowns

- collisions
- explosion fire
- flooding
- groundings
- relevant sections of maritime regulations, codes and conventions related to the Watchkeeper responsibilities on tankers and gas carriers
- rudder and propeller control and vessel manoeuvring characteristics
- sections of IMO, International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW) conventions and codes and AMSA Marine Orders dealing with watchkeeping principles, arrangements, procedures, roles and responsibilities
- shipping terms, including:
  - hogging
  - panting
  - pounding
  - racking
  - sagging
- ship types, including:
  - bulk carrier
  - container
  - general dry cargo
  - passenger
  - roll-on and roll-off (ro-ro)
  - tanker
- signs of fatigue
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- types of ships and key features of ships
- watch handover procedures
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL061 Perform basic marine engineering calculations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Application

This unit involves the skills and knowledge required to perform basic engineering calculations required for the operation of marine machinery and equipment.

This unit applies to people working in the maritime industry in the capacity of:

- Electro-Technical Officer (STCW Electro-Technical Officer Unlimited)
- Engineer Class 3 Near Coastal
- Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Engineer Class 3 Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Electro-Technical Officer (STCW Electro-Technical Officer Unlimited) or Engineer Watchkeeper (STCW Engineer Watchkeeper Unlimited) and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Apply mathematical formulae to solve engineering problems**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Proportions, variation, percentages and averages are calculated, and method of unity is applied

**1.2** Problems involving the manipulation of indices are solved

**1.3** Written descriptions of actual or hypothetical engineering problems are expressed in mathematical terms

**1.4** Algebraic formulae and equations are manipulated to change subjects, as and when required

**1.5** Index problems are converted to logarithmic problems, and vice versa, according to the Law of Logarithms

**1.6** Calculator is used to resolve engineering problems

#### **2 Calculate areas, volumes and masses of regular and irregular figures**

**2.1** Problems related to areas and volumes of regular geometric figures are solved using standard formulae

**2.2** Problems relating to surface areas and volumes of circular figures are solved

**2.3** Centres of gravity (CG) and centroids of area are found for both line figures and areas

**2.4** Concept of density is applied to calculate masses

#### **3 Apply trigonometry to solve problems relating**

**3.1** Basic trigonometric ratios of sine, cosine and tangent, together with their reciprocals are explained with respect

**to angular measurement  
and the resolution of  
vectors**

to the sides of a right-angled triangle

- 3.2** Pythagoras' Theorem is proved
- 3.3** Problems associated with single angle trigonometric identities, including those derived from the application of Pythagoras' Theorem to the basic sin, cos and tan identities, are solved
- 3.4** Derivation of multiple, double and half angle trigonometric identities are shown and used to simplify complicated trigonometric expressions and identities
- 3.5** Sine rule and cosine rule for solution of triangles are proved and applied

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit is equivalent to MARL009 Perform basic Engineering calculations.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL061 Perform basic marine engineering calculations**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic mathematical concepts and techniques relevant to engineering
- identifying and determining appropriate mathematical techniques and formula to solve engineering problems
- identifying the methods and procedures needed to select mathematical techniques and formula to solve engineering problems
- imparting knowledge and ideas through verbal, written and visual means
- performing accurate and reliable calculations
- performing calculations relevant to engineering, including volumes and masses of regular and irregular areas
- reading and interpreting written information on engineering problems and expressing this information in mathematical terms
- solving problems using appropriate laws and principles
- using a calculator to resolve engineering problems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- calculations, including:
  - algebra
  - calculations with positive and negative integers
  - graphs
  - indices
  - mensuration
  - simplifying expressions
  - trigonometry
- centre of gravity (CG), longitudinal centre of gravity (LCG) and vertical centre of gravity



(VCG)

- centroids of area
- formulae for areas, volumes and masses of regular and irregular shapes
- indices
- Law of Logarithms
- proportions, variation, percentages, averages and method of unity
- Pythagoras' Theorem.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery and materials currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARN010 Apply general purpose hand skills aboard a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to perform general purpose hand duties aboard a vessel.

It includes using and maintaining ropes, operating deck machinery and emergency stops, assisting in securing vessel at anchor, assisting in securing and adjusting vessel position during mooring operations, assisting in securing vessel for sea, performing tasks aloft and over vessel side, and assisting with safe refuelling operations.

This unit applies to people working in the maritime industry in the capacity of:

- assistant to the Master or Engineer of a vessel working under their direct supervision
- worker on deck or in the engine room of a vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- worker in the engine room only for a vessel with propulsion power less than 3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

N – Seamanship

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

<b>1 Use and maintain ropes</b>	<p><b>1.1</b> Rope types and common areas of use are correctly identified</p> <p><b>1.2</b> Ropes are checked for wear and any damage is reported according to workplace procedures</p> <p><b>1.3</b> Ropes are coiled and stowed correctly</p> <p><b>1.4</b> Knots and hitches are tied neatly and securely, and are used according to their correct application</p> <p><b>1.5</b> Ropes are spliced neatly and securely according to their correct application and rope ends are whipped where instructed, to maintain good condition</p>
<b>2 Operate deck machinery and emergency stops</b>	<p><b>2.1</b> Deck machinery is checked, prior to use, and prepared for operation</p> <p><b>2.2</b> Operations are carried out safely according to instructions and operating procedures or organisational safety management system (SMS)</p> <p><b>2.3</b> Emergency stops on motor and machinery are operated in response to an emergency situation</p>
<b>3 Assist in securing vessel at anchor</b>	<p><b>3.1</b> Prior to letting go, anchor and equipment are prepared as instructed and organisational communications are followed</p> <p><b>3.2</b> Instructions provided are complied with in relation to quantity of anchor cable run out or recovered</p> <p><b>3.3</b> Control of anchor cable is maintained within safe operating limits during operation</p> <p><b>3.4</b> Anchor and equipment are secured on completion of anchoring operations according to instructions</p> <p><b>3.5</b> Anchoring area is kept free of loose ropes, wires and debris throughout all operations</p>
<b>4 Assist in securing and adjusting vessel position</b>	<p><b>4.1</b> Mooring lines and associated equipment are handled safely at all times</p>

**during mooring operations**

- 4.2** Mooring plan and organisational communications are followed
  - 4.3** Mooring area is kept free of loose ropes, wires and debris throughout mooring operations
  - 4.4** Tension on ropes is maintained at an appropriate level for the stage and nature of the operation
  - 4.5** Mooring lines are secured according to instructions provided
  - 4.6** Equipment malfunction or problems encountered during operations are promptly reported
- 5 Assist in securing vessel for sea**
  - 5.1** Cargo and cargo handling equipment are checked to ensure they are stowed securely
  - 5.2** Hatches and openings are checked to ensure they are secured as required
  - 5.3** Maintenance equipment is returned to storage location and secured
  - 5.4** Assistance is provided in testing equipment as instructed
  - 5.5** All mooring lines are stowed and secured
  - 5.6** Assistance is provided in stowing the gangway
- 6 Perform tasks aloft and over vessel side**
  - 6.1** Area and equipment for working aloft or over the side are prepared as instructed
  - 6.2** Required precautions are taken when working aloft or over the side
  - 6.3** Chairs, safety harnesses and appropriate safety equipment are used according to workplace procedures
  - 6.4** Tasks are completed safely according to instructions and organisational SMS
  - 6.5** Equipment is maintained and stored after use
- 7 Assist with safe refuelling operations**
  - 7.1** Personal protective equipment (PPE) is accessed and used

- 7.2** Safety boundary for the refuelling process is established
- 7.3** Instructions are followed to ensure spill prevention systems are correctly deployed
- 7.4** Instructions are followed in completing tasks related to the refuelling or fuel transfer process

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARN001 Apply general purpose hand skills aboard a vessel.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARN010 Apply general purpose hand skills aboard a vessel**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assisting in different types of mooring operations
- assisting in the performance of common operations, including:
  - berthing and unberthing
  - rigging and recovering means of access to the vessel
- assisting in preparation and anchoring the vessel
- following safe work practices during mooring operations
- handling ropes and wires
- performing an eye splice, back splice and a short splice
- performing common whipping on ropes
- tying common knots, bends and hitches, including:
  - bowline
  - clove hitch
  - reef knot
  - round turn and two half hitches
  - rolling hitch
- using different types of deck machinery
- using synthetic rope mooring lines.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anchor cable markings
- anchoring the vessel in varying weather conditions
- characteristics, care and maintenance of different types of ropes
- correct application of common knots, bends and hitches, including:
  - bowline
  - clove hitch

- eye splice
- reef knot
- round turn and two half hitches
- rolling hitch
- short splice
- correct nautical terminology
- different configurations of mooring lines for various parts of a vessel, including:
  - back springs
  - bow and stern ropes
  - breast lines
  - fore and aft springs
- different types of anchors
- hazards and procedures associated with refuelling
- hazards associated with confined spaces
- hazards that could occur if the operation is not properly controlled
- procedures for:
  - lashing cargo
  - loading or discharging
  - making adjustments from both fore and aft mooring positions
  - making fast and letting go fore and aft to a wharf
  - making fast and letting go to a single-point mooring
- requirements and means of access to the vessel
- safe and environmentally responsible work practices
- safety management system (SMS)
- securing equipment and objects for sea passage, transit in port or ready for use
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse

weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARN011 Maintain seaworthiness of the ship (ship construction)**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to maintain the seaworthiness of the ship with regard to ship construction, inspection and reporting of defects and damage to ship cargo spaces, hatch covers and ballast tanks.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Watchkeeper Deck.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 500 gross tonnage (GT) or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

### **Pre-requisite Unit**

Not applicable.

## Competency Field

N – Seamanship

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Check weather tight and watertight integrity of ship

- 1.1 Inspections of ship are planned and carried out according to regulatory and organisational requirements
- 1.2 Elements of the vessel structure critical to the safety of the vessel are identified
- 1.3 Structural members of ship are inspected to establish weather tight and watertight requirements of ship
- 1.4 Checks are carried out to confirm weather tight and watertight integrity of ship at all times

#### 2 Take action to meet environmental changes

- 2.1 Anticipated sea and weather conditions are analysed to identify situations that may impact on ship weather tight and watertight integrity
- 2.2 Effect of severe wind and rolling in associated sea conditions on ship weather tight and watertight integrity is recognised
- 2.3 Effect of water on deck, on ship weather tight and watertight integrity is ascertained and taken into consideration
- 2.4 Appropriate action is taken to maintain ship weather tight and watertight integrity according to organisational procedures and damage control plans
- 2.5 Degree to which vessel is secured is appropriate to prevailing and forecast conditions

- 2.6** Location of defects and damage caused by vessel operations and the environment are ascertained
  - 2.7** Defects and damage to ship are identified, rectified and reported according to organisational procedures
  - 2.8** Irregularities beyond own ability to rectify are recognised in time to enable remedial action to be taken
- 3 Maintain records**
  - 3.1** Relevant documents and records are completed and maintained, as required, according to regulatory and organisational requirements
  - 3.2** Relevant documents are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements
  - 3.3** Documents are stored according to regulatory and organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARN005 Maintain seaworthiness of a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARN011 Maintain seaworthiness of the ship (ship construction)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adhering to procedures to distinguish between normal and defective and damaged parts of ship
- completing required records
- detecting defects to ballast water tank vents
- detecting defects and damage, including:
  - cargo operation damage
  - damage caused by corrosion
  - damage to structures through heavy weather
- developing damage control plans
- developing effective planning documentation
- identifying elements of the vessel structure that are critical to vessel safety
- inspecting and reporting defects and damage to cargo spaces, hatch covers and ballast tanks
- interpreting and following procedures for the coordination of planned maintenance processes
- preparing appropriate reports on inspection and maintenance outcomes
- reading and interpreting ship specifications and drawings
- taking actions to ensure and maintain the weather tight and watertight integrity of ship.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- application of appropriate safety, environment and hazard control procedures
- causes of corrosion to cargo spaces and ballast tanks, and how corrosion can be identified and prevented
- characteristics of stress and the principal stresses acting on a ship
- corrosion control methods
- coverage of tests, including areas requiring inspection under the planned maintenance schedule and survey requirements
- damage control measures that may be required to maintain the integrity of the hull in a range

of typical emergency situations, including damage control plans and safety management systems (SMS)

- defects and damage, including:
  - corrosion to operating or structural parts of the ship
  - damage to the ship through cargo shift, loading and unloading operations
  - hatch cover seals
  - structural damage through collision, grounding or fire
  - watertight door seals and closing arrangements
- fundamental actions to be taken in the event of partial loss of intact buoyancy
- fundamentals of watertight integrity, including:
  - appropriate equipment is in readiness for damage control
  - avoiding adverse weather
  - checking the watertight security of the ship
  - closing openings
  - free surface is minimised in ballast and fuel tanks
  - freeing ports allow water taken on deck to clear
  - passenger distribution does not exceed allowed limits
  - procedures for restoring or managing weather tight and watertight integrity during an emergency
  - stores, cargo and equipment are properly stowed and lashed
  - tanks and other watertight areas
- inspections of ship, including:
  - ballast tanks
  - cargo space
  - hatch covers
  - hull and fittings during dry-docking
  - inspections required after completion of maintenance work
  - inspections required after docking prior to re-floating
  - inspections to be made after any situation which may have caused damage to the ship
  - order of inspection
  - pre-sailing inspections
  - regulatory inspections
  - routine inspections
  - time periods
- maintenance procedures contained in the SMS
- one's surroundings and changes to these surroundings
- planned maintenance system for ships and associated maintenance inspection procedures
- principal materials, properties and application of materials used in the construction of a ship
- principal structured members and layout of a ship and the proper names for various parts
- principle features of vessel structure and construction

- principles and procedures to ensure the watertight integrity of ship hull in both normal and emergency situations
- principles of load lines and draught marks
- principles of rudder and propellers
- procedures for checking and inspecting ship seaworthiness, including reliable detection of defects and damages
- purpose of the enhanced survey program
- situations that may jeopardise ship weather tight and watertight integrity, including:
  - collision, grounding or fire
  - failure to conduct appropriate inspections
  - heavy weather damage
- structural members of ship, ship construction, layout and subdivision of a ship, including:
  - ballast tanks
  - bow and stern regions
  - bulkheads, including the collision bulkhead and bulkhead deck
  - cargo holds
  - cargo tanks
  - fittings
  - frames
  - freeboard deck
  - freshwater tanks
  - hatch and tank openings
  - hull structure
  - longitudinal and transverse girders
  - shell plating
  - tank tops
  - various types of keel arrangements
  - watertight and weather tight compartments
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the

normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including:
  - equipment manufacturer instructions
  - logbooks, including oil record and garbage logbooks as applicable
  - organisational operation orders under the International Safety Management (ISM) Code for the Safe Operation of Ships and for Pollution Prevention
  - plans and drawings
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARN012 Manage advanced operations of ships in polar waters**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage advanced operations of ships in polar waters.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

## **Licensing/Regulatory Information**

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/4 (3 and 4) and Code Section A-V/4, Table A-V/4-2.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers or Ratings for advanced operations in polar waters and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable



## Competency Field

Navigation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <p><b>1 Plan and conduct a polar passage</b></p>                             | <p><b>1.1</b> Navigational equipment, charts, ice information, ice publications and related documentation required for the voyage are enumerated and appropriate for the safe conduct of the voyage</p> <p><b>1.2</b> Route is planned using facts obtained from relevant sources, publications, statistical data, limitations of communication and navigational systems</p> <p><b>1.3</b> Voyage is planned using polar regulatory regimes, need for ice pilotage and icebreaker assistance, as required</p> <p><b>1.4</b> Potential navigational hazards are identified accurately at all times</p> <p><b>1.5</b> Positions, courses, distances and time calculations are accurate and correct within acceptable accuracy standards for navigational equipment</p> |
| <p><b>2 Manage operation of vessels operating in polar waters safely</b></p> | <p><b>2.1</b> Navigational decisions concerning ice are based on proper assessments of the ship's manoeuvring, engine characteristics and the forces to be expected while navigating polar waters, at all times</p> <p><b>2.2</b> Requests for ice routing, plot and commence voyage through ice is communicated clearly and accurately</p> <p><b>2.3</b> Decisions concerning berthing, anchoring, cargo and ballast operations are determined using an assessment of the ship's manoeuvring, engine characteristics, forces to be expected and in accordance with International Code for Ships Operating in Polar Waters (Polar Code)</p>  |

guidelines and applicable international agreements

- |          |  |
|----------|--|
| 2.4      | Ship is manoeuvred safely through moderate ice concentration in the range of 1/10 to 5/10  |
| 2.5      | Ship is manoeuvred safely through dense ice concentration in the range of 6/10 to 10/10  |
| 2.6      | Operations are planned and carried out in accordance with established rules and procedures to ensure safe operations and avoid pollution of the marine environment |
| 2.7      | Safe navigation is maintained using strategy, adjustment of ship's speed and heading through different types of ice  |
| 2.8      | Anchoring system in cold temperatures is permitted, where appropriate, and actions taken accordingly   |
| 2.9      | Preparation for icebreaker towing and notch towing are carried out in accordance with accepted principles and practices  |
| <b>3</b> | <b>Maintain safety of ship's crew and passengers</b>   |
| 3.1      | Lifesaving, firefighting and other safety systems are maintained at their operational condition  |
| 3.2      | Response measures are in accordance with established plans and procedures and are appropriate to the situation and nature of the emergency                         |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This is a new unit. No equivalent unit.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARN012 Manage advanced operations of ships in polar waters

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two occasions and include:

- communicating with icebreaker, other vessels in the area and with rescue coordination centres, where applicable
- determining limitations of navigational equipment and communication systems in polar waters
- establishing bridge watch team which is consistent with environmental conditions and vessel equipment and ice class
- evaluating limitations and determining the extent to which information is suitable for safe navigation and identifying navigational solutions in hazard conditions
- identifying presentations of various ice conditions as they appear on radar
- interpreting visuals of ice conditions as they appear on radar
- measuring and observing environmental conditions
- modifying and deviating voyage plan for dynamic ice conditions
- manoeuvring of a vessel through ice, including:
  - manoeuvring a vessel through moderate ice concentration (range of 1/10 to 5/10)
  - manoeuvring a vessel through dense ice concentration (range of 6/10 to 10/10)
- preparing and conducting risk assessment before approaching ice
- using and interpreting information from navigational equipment, nautical charts, nautical publications and related documentation
- using icebreaker terminology and communication, where applicable.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of elements and performance criteria and include knowledge of:

- effects of handling ship in various ice concentration and coverage including risks associated with navigation in ice, including:
  - avoid turning and backing simultaneously
- equipment limitations, including:
  - communication systems

- discrimination of radar targets and ice features in ice clutter
- electronic positioning systems at high latitude
- hazards associated with limited terrestrial navigational aids in polar regions
- high latitude errors on compasses
- nautical charts and pilot descriptions
- national, international and regional standards, including:
  - International Convention for the Safety of Life at Sea (SOLAS)
  - International Code for Ships Operating in Polar Waters (Polar Code)
  - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
  - International Maritime Organization (IMO) standards for operation in remote areas
  - International Code of Signals
- operate and manoeuvre a ship in ice, including:
  - anchoring in ice, including:
    - dangers to anchoring system
    - ice accretion to hawse pipe and ground tackle
  - communications including:
    - icebreaker communication
    - communication with other vessels in the area
    - communication with Rescue Coordination Centres
  - conditions for safe entry and exit to and from ice and open water, including:
    - avoiding icebergs
    - cracks
    - dangerous ice conditions
    - leads
    - maintaining safe distance to icebergs
  - conditions which impact polar visibility and give indications of:
    - ice blink
    - local ice
    - refraction
    - sea smoke
    - water conditions
    - water sky
  - need for bridge watch team augmentation based on:
    - environmental conditions
    - vessel equipment
    - vessel ice class
  - icebreaker convoy terminology, including:
    - convoy communications

- icebreaker direction
- moving in convoy
- ice ramming procedures, including double and single ramming passage
- methods to avoid besetment, free best vessel and consequences of besetment
- preparation and risk assessment before approaching ice and icebergs and conditions, including:
  - darkness
  - fog
  - pressure ice
  - swell
  - wind
- presentations of various ice conditions as they appear on radar
- towing and rescue in ice, including risks associated with operation
- use of different type of propulsion and rudder systems, including:
  - avoiding damage when operating in ice
  - limitations in ice
- use of heeling and trim systems, including hazards associated with operation and various techniques to safely dock and undock in ice covered waters
- publications and manuals, including:
  - Polar Water Operations Manual (PWOM)
  - shipboard documentation
- ship crew and passenger safety, including:
  - limitations of firefighting systems and lifesaving applications due to low air temperatures
  - procedures and techniques for abandoning the ship and survival on ice and in ice covered waters
  - unique concerns when conducting emergency drills in ice and low temperatures
  - unique concerns when conducting emergency response in ice and low air and water temperatures
- voyage planning and reporting, including:
  - development of safe routing and passage planning to avoid ice where possible
  - evaluating information to determine if it is suitable for safe navigation
  - information sources
  - limitations of hydrographic information and charts in polar regions
  - passage planning deviation and modification for dynamic ice conditions
  - reporting regimes in polar waters.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include

requirements in the Standards for Registered Training Organisations current at the time of assessment.

Training and assessment must meet Australian Maritime Safety Authority (AMSA) regulatory requirements which are mandated in sections of International Maritime Organization (IMO) model courses for AMSA accreditation.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARN013 Manage seaworthiness of a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to manage vessel in a seaworthy condition for all stages of a voyage or operation being undertaken.

It includes supervising weather tight and watertight integrity of vessel, taking action to meet changed sea and weather conditions and maintaining records.

This unit applies to people working in the maritime industry in the capacity of:

- Master on commercial vessels less than 35 metres in length within the exclusive economic zone (EEZ)
- Master on vessels less than 80 metres in length in inshore waters
- Chief Mate or Deck Watchkeeper on vessels less than 80 metres in length within the EEZ.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 35 metres Near Coastal and a Mate less than 80 metres Near Coastal, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

N – Seamanship

## **Unit Sector**

Not applicable.



## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <p><b>1 Supervise weather tight and watertight integrity of vessel</b></p> | <p><b>1.1</b> Principal structural components of vessel are identified from vessel drawings to understand the function of these components in relation to conventional vessel design</p> <p><b>1.2</b> Pumping and pipeline systems of vessel are investigated to establish survivability of vessel in case of flooding and damage control</p> <p><b>1.3</b> Procedures for maintaining weather tight and watertight integrity of vessel are interpreted and implemented according to vessel safety management plan and regulations</p> <p><b>1.4</b> Crew are instructed on requirements of plan and their responsibilities</p> <p><b>1.5</b> Actions are instigated to confirm weather tight and watertight integrity of vessel at all times</p> |
| <p><b>2 Take action to meet changed sea and weather conditions</b></p>     | <p><b>2.1</b> Weather forecasts and observations of sea and weather conditions are used to predict situations that may jeopardise vessel weather tight and watertight integrity</p> <p><b>2.2</b> Effect of severe wind and rolling in associated sea conditions on vessel weather tight and watertight integrity is recognised</p> <p><b>2.3</b> Effect of water on deck on vessel weather tight and watertight integrity is ascertained</p> <p><b>2.4</b> Appropriate action is taken to maintain vessel weather tight and watertight integrity according to organisational procedures</p>   |
| <p><b>3 Maintain records</b></p>   | <p><b>3.1</b> Relevant documents and records are completed and maintained, as required, according to regulatory and organisational requirements</p> <p><b>3.2</b> Relevant documents are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements</p>   |

- 3.3** Documents are stored according to regulatory and organisational requirements

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARN004 Manage seaworthiness of a vessel up to 80 metres.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARN013 Manage seaworthiness of a vessel up to 80 metres**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- appropriately using bilge and other pumping arrangements
- assessing damage control measures
- completing required records
- establishing procedures for restoring or managing weather tight and watertight integrity during an emergency
- reading and interpreting vessel specifications, drawings and operational manuals.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bilge pumping arrangements
- different vessel types
- effects of adding and removing weights, water on deck, slack tanks, rolling period, stiff and tender vessel, and additions or alterations to vessels
- principal parts of vessel and their various functions
- structural components, including:
  - design characteristics attributing to watertight integrity
  - principal components of vessel structure
  - structural arrangements to restrain fires
  - watertight and collision bulkheads
- weather tight and watertight integrity of vessel, including:
  - closing openings
  - ensuring passenger distribution does not exceed allowed limits
  - ensuring stores, cargo and equipment are properly stowed and lashed
  - maintaining stability condition within approved limits
  - methods for testing tanks and other watertight openings
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work

practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel greater than or equal to 12 metres in length
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARN014 Plan and manage safe loading, unloading, securing and stowage of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to plan and ensure safe loading, stowage, securing and care during the voyage and unloading of cargo, including dangerous goods.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel Unlimited.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master Unlimited and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

N – Seamanship

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Develop cargo plan

- 1.1 Cargo properties and characteristics are identified and their impact on safety, the environment and vessel operations are outlined
- 1.2 Communication is conducted with terminal personnel to establish loading and unloading arrangements
- 1.3 Information and equipment are used in planning to ensure hull stress is kept within acceptable limits
- 1.4 Cargo plan is prepared according to legislative and organisational requirements

#### 2 Oversee cargo operations

- 2.1 Preparations for loading are monitored according to the cargo plan and organisational procedures
- 2.2 Regulations, procedures and instructions are interpreted to ensure that cargo is correctly identified, inspected and confirmed against documentation
- 2.3 Communication is maintained with crew and terminal personnel involved in cargo loading/unloading to facilitate loading/unloading
- 2.4 Cargo operations are managed to ensure they comply with regulations, procedures and instructions
- 2.5 Vessel stability is monitored during loading/unloading operations
- 2.6 Ballast management procedures are carried out according to organisational procedures and port authority requirements
- 2.7 Action is taken in a cargo handling incident or emergency to secure the cargo and the vessel and to maintain the safety of persons involved
- 2.8 All cargo handling documentation is completed according to organisational procedures and regulatory requirements

#### 3 Comply with legislation

- 3.1 Regulations, procedures and instructions are interpreted

- for dangerous cargo** to ensure that dangerous cargo is correctly identified, inspected and confirmed against documentation, prior to cargo operations
- 3.2** Information regarding dangerous cargo is made readily available in an incident
  - 3.3** Cargo operations are managed to ensure they comply with regulations, operational and security procedures, and cargo plan
  - 3.4** Safety data sheets (SDS)/material safety data sheets (MSDS) are accessed and interpreted to identify relevant cargo-related hazards to vessel and to personnel
  - 3.5** Procedures for safety and safety management are identified and documented
  - 3.6** Hazards associated with dangerous cargo are identified and action is taken to minimise risk to personnel, cargo, vessel and the environment
  - 3.7** Action is taken in a dangerous cargo handling incident or emergency to secure cargo and vessel, and to maintain the safety of persons involved
  - 3.8** All documentation is completed according to organisational procedures and regulatory requirements
- 4 Manage the care of cargo during the voyage**
- 4.1** Plan for the care of cargo during the voyage is prepared according to organisational and customer requirements and relevant regulations
  - 4.2** Cargo care operations are managed to ensure they comply with regulations, procedures and instructions
  - 4.3** Cargo stowage and security is managed to ensure stability and stress conditions remain within safe limits at all times during the voyage
  - 4.4** Extent and frequency of cargo condition monitoring is determined appropriate to its nature and prevailing conditions
  - 4.5** Hazards associated with cargo stowage are identified and action is taken to minimise risk to personnel, cargo, vessel and the environment
  - 4.6** Unacceptable or unforeseen variations in the condition or specification of the cargo is promptly recognised and

- remedial action is taken immediately to safeguard the safety of the vessel and those onboard
- 4.7** Documentation is completed according to organisational procedures and regulatory requirements
- 5 Manage emergencies related to cargo**
- 5.1** On becoming aware of emergency, initial actions are taken according to contingency plans, urgency of the situation and nature of the emergency
- 5.2** Onboard personnel are given information and instructions clearly and accurately
- 5.3** Procedures are implemented to combat emergency and protect persons onboard
- 5.4** Communications are established with others to facilitate the emergency response process
- 5.5** Injured persons are provided with assistance
- 5.6** Contact is maintained with others at all times to keep them briefed on the emergency response process
- 5.7** Preparation for abandoning vessel is undertaken, as required
- 5.8** Cessation of emergency is communicated to appropriate personnel
- 6 Prevent pollution of the environment**
- 6.1** Procedures to prevent pollution are identified and observed at all times
- 6.2** Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
- 6.3** All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud
- 6.4** Shore-based response personnel are promptly notified when a vapour leak or cloud occurs
- 7 Complete documentation related to cargo**
- 7.1** Correct logbook entries are made relating to cargo operations and incidents according to regulatory requirements and organisational procedures
- 7.2** Letter of protest is completed in an incident relating to



cargo operations and care

- 7.3** Cargo reports and documentation are completed and maintained according to regulatory requirements and organisational procedures
- 7.4** Independent cargo surveyor reports are received and acknowledged as required
- 7.5** Cargo samples are correctly documented and secured as required

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARN006 Manage cargo operations.

## **Links**

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARN014 Plan and manage safe loading, unloading, securing and stowage of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargo
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and effectively, establishing effective communications and improving working relationships
- conducting and recording tests and inspections of cargo handling equipment according to regulations and organisational procedures
- conducting loading and unloading operations of cargo and heavy cargo to ensure safe stowage of cargo, vessel stability, trim and stress limitations are not exceeded at any time
- correctly identifying safety data sheets (SDS)/material safety data sheets (MSDS), relevant cargo-related hazards to vessel and personnel, and taking appropriate action according to organisational procedures
- developing effective planning documents and providing high-quality reports that conform international regulations
- ensuring currency of relevant regulatory and legislative knowledge
- establishing procedures for safe cargo handling according to provisions of the relevant instruments, such as:
  - International Maritime Dangerous Goods (IMDG) Code,
  - International Maritime Solid Bulk Cargoes (IMSBC) Code
  - International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 Annexes III and V
  - International Safety Guide for Oil Tankers and Terminals (ISGOTT)
  - other relevant information
- interpreting and applying knowledge of bulk carriers, containers and container ships, chemical and oil tanker, and liquefied gas tanker layouts, platform supply vessels, roll-on and roll-off (ro-ro) carriers, cargo features, and characteristics applying available shipboard data related to loading, care and unloading of cargo
- reading and interpreting cargo handling documentation
- recognising problems and hazards that can arise when managing safety on chemical and

oil tankers, and liquefied gas tankers, taking appropriate remedial action and initiating appropriate solutions

- using draft survey methods to determine cargo quantities and vessel displacement
- using stability and trim diagrams, and stress-calculating equipment to keep hull stress and stability within acceptable limits at all times.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- application of ventilation requirements for various cargo
- bulk carrier, chemical and oil tanker layouts, and liquefied gas tanker layouts, cargo features and characteristics, common structural rules and design limitations
- cargo care operations, including:
  - checking cargo lashings
  - maintaining ventilation requirements
  - monitoring cargo temperatures liable to spontaneous combustion
  - monitoring refrigerated cargo temperatures
- cargo handling documentation, including:
  - bills of lading
  - cargo gear register
  - cargo plan
  - letter of protest
  - logbook
  - ship/shore safety and security checklists
- cargo handling incidents or emergencies, including:
  - cargo shift
  - damaged cargo
  - damaged dangerous goods and escaping cargo or fumes
  - failure of cargo handling equipment, including lashings
  - failure of refrigeration machinery
  - fire in cargo spaces
  - incorrect ventilation
  - incorrectly stowed cargo
  - spontaneous combustion
- cargo plan, including:
  - allocating cargo containers requiring refrigeration appropriate spaces
  - avoiding incompatible cargo stowage
  - calculations relating to stability and stress
  - ensuring cargo is evenly distributed to maintain acceptable trim at all phases of the

voyage

- ensuring the loading/unloading sequence is in accordance with agreed cargo plan
- loading cargo manifest
- observing regulations relating to hazardous material/dangerous goods handling and stowage
- cargo stowage plan
- chemical tankers, including tank cleaning and control of pollution in chemical tankers
- compliance with the minimum freeboard requirements of the load line regulations
- confined space entry procedures
- dangerous goods classification, signage, stowage and segregation requirements under the IMDG Code and relevant Marine Orders
- effect on trim and stability of cargo and cargo operations
- gas tankers, including cargo operations in gas tankers
- hazards and control measures and additional safety measures associated with:
  - bulk carriers
  - chemical and oil tanker
  - liquefied gas tanker cargo operations
- information and equipment, including:
  - automatic databased (ADB) equipment
  - ballasting and deballasting procedures, including ballast water management convention
  - bulk cargo codes
  - calculations relating to drafts, deadweight, stability, trim and stress
  - cargo and lashing codes
  - IMSBC Code, MARPOL 73/78 Annexes III and V and other relevant information, including Australian Maritime Safety Authority (AMSA) and Notices relating to cargo carriage, loading and unloading
  - IMDG Code
  - international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargo
  - relevant sections of maritime regulations, codes and conventions related to chemical and oil tankers, and liquefied gas tankers
  - requirements for loading and care of various cargo types
  - requirements for the carriage of grain, grain stability and timber cargo
  - shipboard data, including drawings, load limitations and safe working loads
  - stability and trim diagrams
  - stress-calculating equipment
- loading and unloading operations with special regard to the transport of cargo identified in the Code of Safe Practice for Cargo Stowage and Securing
- loading cargo and ballasting to keep hull stress within acceptable limits
- maintenance required for cargo handling equipment and hatch covers

- methods and safeguards when fumigating hold
- oil tanker operations and related pollution prevention regulations
- preparation requirements for loading, including:
  - checking hatch covers for damage and ensuring watertight integrity of hatches
  - checking holds to ensure they are clean, dry and free of odour
  - checking bilges and bilge systems are operational before sealing cargo stowages
  - covering bilges with tarpaulins/wrappers before loading, as required
  - ensuring survey certification for all cargo handling equipment is valid and cargo record book is available for inspection
  - following confined space entry procedures, as required
  - inspecting access arrangements in holds to ensure they are in a safe condition
  - reviewing supplies of dunnage, mats and cargo-securing equipment to ensure sufficient are available
- procedures for receiving and delivering cargo
- relevant firefighting operations and the use of firefighting equipment
- shear forces, bending moments and torsional moments
- stability, trim and stress records
- stowage and securing of cargo onboard vessels, cargo-handling gear, and securing and lashing equipment, including timber deck cargo
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARN015 Use seamanship skills on board a vessel**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### **Application**

This unit involves the skills and knowledge required to apply practical seamanship skills as part of operations on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Engine/Deck
- Integrated Rating
- Navigational Watch - Deck/Engine

who assist the responsible officer in a range of seamanship activities on a range of vessels.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Engine/Deck, Integrated Rating or Navigational Watch - Deck/Engine and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

N – Seamanship

### **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <p><b>1 Use and maintain ropes and wires</b></p> | <p><b>1.1</b> Knots, splices, stoppers, whippings and servings are created and used in the course of operations onboard a vessel</p> <p><b>1.2</b> Ropes are spliced neatly and securely according to their correct application and rope ends are whipped, as required, to maintain good condition</p> <p><b>1.3</b> Breaking strain and working load limits (WLL) of rope and wire is determined and applied as load limits in the course of operations onboard a vessel</p> <p><b>1.4</b> Wear and damage to rope and wire are identified and reported</p> <p><b>1.5</b> Rope and wire are maintained and stored according to workplace procedures</p> |
| <p><b>2 Secure vessel at anchor</b></p>          | <p><b>2.1</b> Anchor and equipment are prepared for use according to workplace procedures</p> <p><b>2.2</b> Control of anchor cable is maintained within safe operating limits during anchoring operations</p> <p><b>2.3</b> Anchor and equipment are secured on completion of anchoring operations as instructed for anticipated forecast conditions</p> <p><b>2.4</b> Anchoring area is kept free of loose ropes, wires debris and personnel during all operations</p>   |
| <p><b>3 Secure vessel at a berth</b></p>         | <p><b>3.1</b> Mooring lines and associated equipment are handled safely at all times</p> <p><b>3.2</b> Mooring area is kept free of loose ropes, wires and debris throughout operations</p> <p><b>3.3</b> Rope stoppers are correctly applied to transfer mooring lines when securing vessel or tug</p> <p><b>3.4</b> Securing a tug using tug or ships lines is carried out safely and tug lines are monitored at all times</p>   |



- |  |            |  |
|--|------------|--|
|  | <b>3.5</b> | Tension on ropes is maintained at an appropriate level for stage and nature of the operation   |
|  | <b>3.6</b> | Snap-back zones are adhered to when working with lines under tension   |
|  | <b>3.7</b> | Tension on shore power leads and other umbilicals is monitored   |
| <b>4 Lash and secure stores, cargo and access ways</b> | <b>4.1</b> | Lashing equipment is inspected, maintained and correctly stored after use according to workplace procedures  |
|  | <b>4.2</b> | Cargo is stowed according to recognised principles and workplace procedures and shipboard procedures relating to transporting and handling dangerous goods |
|  | <b>4.3</b> | Cargo is lashed and secured according to recognised principles and workplace procedures  |
|  | <b>4.4</b> | Equipment and items on deck and in galley spaces are secured according to workplace procedures   |
|  | <b>4.5</b> | Personnel access ways are rigged and secured according to workplace procedures   |
|  | <b>4.6</b> | Accommodation spaces and personnel facilities onboard vessel are checked and correctly secured for sea according to workplace procedures                   |
| <b>5 Conduct fuelling and oil transfer operations</b>  | <b>5.1</b> | Appropriate personal protective equipment (PPE) is accessed and used   |
|  | <b>5.2</b> | Safety boundary for fuelling and transferring operations is established  |
|  | <b>5.3</b> | Spill prevention and response (shipboard oil pollution emergency plan (SOPEP) equipment) systems are correctly deployed                                    |
|  | <b>5.4</b> | Tank levels are correctly measured by sounding and/or ullage and reported pre-fuelling and post-fuelling and transferring operations                       |
|  | <b>5.5</b> | Fuelling and transferring operations are performed safely, and associated valves and pipelines are secured on completion to avoid spillages                |
|  | <b>5.6</b> | Appropriate action is taken to handle incidents arising during fuelling and transferring operations according to   |

emergency procedures and regulatory requirements

- 5.7** Effective communication is maintained with crew during fuelling and transferring operations to ensure the safety and integrity of the vessel and crew

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARN007 Use seamanship skills on board a vessel.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARN015 Use seamanship skills on board a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchoring a vessel in varying weather conditions
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices, including:
  - chemical and biohazard safety
  - lifting techniques and methods of preventing back injury
- coiling and stowing ropes correctly
- handling ropes and wires safely
- handling, stowing and securing dangerous, hazardous and harmful substances and liquids safely
- identifying and correctly using personal protective equipment (PPE)
- lashing and securing moveable equipment, especially on deck, in holds and freezers
- measuring and reporting tank levels correctly by sounding and ullage
- operating anchoring equipment under various conditions, such as anchoring, weighing anchor, securing for sea and in emergencies
- performing:
  - appropriate whippings on ropes and line
  - eye and joining splice in 8-strand multi-plait mooring rope
  - eye splice (with locking tuck) in 6-strand flexible steel wire rope
  - eye splice, joining and a short splice in 3-strand hawser laid rope
- preparing and throwing a heaving line
- securing a vessel at its berth according to operational requirements
- securing from fuelling and transferring operations
- tying a:
  - bowline
  - clove hitch
  - figure-eight knot
  - half hitch
  - reef knot

- rolling hitch, sheet bend and timber hitch
- round turn and two half hitches
- using basic crane, winch and hoist signals
- using knots and hitches and securing arrangements.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate use and selection of PPE
- basic crane, winch and hoist signals
- capacities, safe working loads and breaking strengths of mooring equipment, including:
  - anchor windlasses
  - bitts
  - bollards
  - capstans
  - chocks
  - mooring wires
  - synthetic and fibre lines
  - winches
- correct application of common knots and hitches
- dangers of working with ropes under tension
- different type of PPE and their application
- function of mooring and tug lines and how each line functions as part of an overall system
- incidents, including:
  - failure of communications systems
  - leakage from faulty valves and hoses
  - tank overflow
- maintenance of different types of rope, wire and chain
- methods of securing cargo, including vehicles, stores and equipment on a vessel before it puts to sea
- preparations for fuelling and transfer operations
- procedures and order of events associated with mooring to a buoy or buoys
- procedures and order of events for making fast and letting go mooring, tug lines and wires
- procedures and order of events for the use of anchors in various operations
- procedures and precautions for safe handling, stowage and securing of cargo and stores, including dangerous, hazardous and harmful substances and liquids
- procedures for connecting and disconnecting fuelling and transfer hoses
- procedures relating to incidents that may arise during fuelling and transferring operations
- purpose and application of lock out tags
- purpose and application of the Australian Dangerous Goods (ADG) Code and International

### Maritime Dangerous Goods (IMDG) Code

- purpose of a permit to work and restricted access guidelines
- purpose of safety data sheets (SDS)/material safety data sheets (MSDS)
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- safe working practices, procedures and personal shipboard safety when working over the side and working aloft
- types of anchors, principles, method of operation and use in various conditions.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Seamanship practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARO007 Contribute to monitoring and controlling a safe engine watch**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to contribute to a safe engine watch on a vessel while under the direction of the officer in charge of the engineering watch.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Engine or Integrated Rating who assists, under the direction of the officer in charge of the engineering watch, in performing engine watchkeeping duties
- Navigational Watch - Deck/Engine.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer – Engine, Integrated Rating or Navigational Watch - Deck/Engine and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

O – Watchkeeping

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Follow instructions to monitor engine room machinery and equipment**

**1.1** Unsafe conditions and potential hazards are recognised, and risk is assessed and reported according to workplace procedures

**1.2** Unsafe conditions and hazards are rectified according to workplace procedures

**1.3** Effective communication is maintained with the officer in charge of the engineering watch about matters relevant to the safety and integrity of the vessel

**1.4** Procedures for relief, maintenance and handover of a watch are followed

**1.5** Emergency situations are promptly reported to the officer in charge of the engineering watch

**1.6** Alarms are recognised and reported

**2 Respond to potential emergency situations**

**2.1** Control measures to minimise a potential emergency are implemented

**2.2** Containment procedures are applied as required

**2.3** Appropriate safety procedures are followed, and personal protective equipment (PPE) is used according to workplace procedures

**2.4** Emergency is eliminated where possible or actions are taken to control the emergency

**2.5** Appropriate firefighting equipment is identified to carry out firefighting operations

**2.6** Unsafe conditions and potential hazards are recognised, and risk is assessed and reported to the officer in charge of the engineering watch according to workplace procedures

**2.7** Unsafe conditions and hazards are rectified according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARO005 Contribute to monitoring and controlling a safe engine watch.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARO007 Contribute to monitoring and controlling a safe engine watch**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely, and acknowledging orders in a seamanlike manner
- communicating effectively with the officer in charge of the engineering watch about matters relevant to watchkeeping duties
- conforming to accepted practices, principles and procedures in the maintenance, handover and relief of the watch
- conforming to established procedures and practices in taking initial action in the event of an emergency or abnormal situation
- maintaining the integrity of emergency alarm systems at all times
- monitoring and anticipating hazards and risks that may arise during engine watchkeeping duties
- monitoring engine room machinery and equipment, including:
  - boiler water levels and steam pressure
  - temperatures
  - oil levels
- monitoring propulsion and auxiliary machinery according to instructions during watchkeeping duties
- performing basic engine watchkeeping duties under the direction of the officer in charge of the engineering watch on a vessel moored, at anchor or under way
- recognising potential hazards, assessing risks and reporting them to the officer of the watch
- responding to engine orders given by the officer in charge of the engineering watch
- seeking advice/clarification from the officer in charge of the engineering watch where watch information or instructions are not clearly understood
- using internal communications and alarm systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- alarms associated with engine room machinery and their meaning
- appropriate selection and use of personal protective equipment (PPE)
- correct use of monitoring equipment used in the engine room
- emergency duties and alarm signals and response to emergency situations, including:
  - crankcase and gearbox explosions
  - fire, including engine room scavenge fires
  - gearbox failure
  - generator failure
  - loss of engine cooling water
  - starting air line
- engine room alarm systems and the difference between the various alarms, including fire-extinguisher gas alarms
- engine room emergency situations, and appropriate actions and solutions
- escape routes from machinery spaces
- function and operation of main propulsion and auxiliary machinery
- information required to maintain a safe engine watch
- location and use of firefighting equipment
- monitoring equipment used in the engine room
- orders as they relate to watchkeeping provided by the officer in charge of the engineering watch
- procedures for the relief, maintenance and handover of a watch
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies, including shipboard oil pollution emergency plan (SOPEP)
- requirements for the safe operation of boilers
- shipboard terms and definitions
- terms used in machinery spaces, and names of machinery and equipment.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental

damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARO008 Contribute to monitoring and controlling a safe navigational watch**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to contribute to a safe navigational watch on a vessel while under the direction of the officer in charge of the navigational watch.

This unit applies to people working in the maritime industry in the capacity of:

- Able Seafarer - Deck or Integrated Rating who assists under the direction of the officer in charge of the navigational watch, in performing navigational watchkeeping duties.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as an Able Seafarer - Deck or Integrated Rating and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

O – Watchkeeping

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Follow instructions to monitor vessel situation when moored or anchored**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Scheduled checks and inspections are conducted to comply with instructions

**1.2** Appropriate action is taken in irregularities or abnormal conditions to maximise the safety and integrity of the vessel

**1.3** Restrictions on access within the vessel are enforced according to Master instructions

**1.4** Very high frequency (VHF) is monitored and information is communicated to the Master in accordance with workplace procedures

**1.5** Procedures for the relief, maintenance and handover of a watch are followed

#### **2 Follow instructions to monitor vessel situation when at sea**

**2.1** Responsibilities of a lookout are established

**2.2** Proper lookout is maintained by sight and hearing at all times according to instructions

**2.3** Lights, shapes and sound signals are correctly recognised and recorded

**2.4** Approximate bearing of a sound signal, light or other object is reported in degrees or points, to the officer in charge of the navigational watch

**2.5** Effective communication is maintained with the officer in charge of the navigational watch about matters relevant to the safety and integrity of the vessel

- |  |            |  |
|--|------------|--|
|  | <b>2.6</b> | VHF is monitored and information is communicated to the officer in charge of the navigational watch, as required |
|  | <b>2.7</b> | Procedures for the relief, maintenance and handover of a watch are followed                                      |
| <b>3 Respond to potential emergency situations</b> | <b>3.1</b> | Emergency situations are promptly reported to the officer in charge of the navigational watch                    |
|  | <b>3.2</b> | Distress signals are recognised and reported   |
|  | <b>3.3</b> | False distress alerts are avoided and correct action is taken in an accidental activation                        |
|  | <b>3.4</b> | Integrity of emergency and distress alerting systems is maintained at all times                                  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARO006 Contribute to monitoring and controlling a safe navigational watch.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARO008 Contribute to monitoring and controlling a safe navigational watch

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely and acknowledging orders in a seamanlike manner
- communicating effectively with the officer in charge of the navigational watch about matters relevant to watchkeeping duties
- conforming to accepted practices and procedures in the maintenance, handover and relief of the navigational watch
- conforming to established procedures and practices in taking initial action in the event of an emergency or abnormal situation
- identifying and reporting lights, buoys and sound signals
- monitoring and anticipating hazards and risks that may arise during watchkeeping duties
- monitoring vessel situation, including:
  - communicating with other vessels
  - communicating with those onshore
  - regularly checking weather reports and warnings
- monitoring very high frequency (VHF) equipment
- recognising and reporting distress signals, including:
  - pyrotechnic distress signals
  - satellite emergency position indicating radio beacons (EPIRBs)
  - search and rescue transponders (SARTs)
- recognising potential hazards, assessing and reporting risks to the officer in charge of the navigational watch
- reporting approximate bearing of a sound signal, light or other object in degrees or points
- reporting other ships, objects, lights and navigation marks correctly, in relation to the ship's head
- responding to orders given by the officer in charge of the navigational watch
- seeking advice/clarification from the officer in charge of the navigational watch where watch information or instructions are not clearly understood
- undertaking the following scheduled checks and inspections:

- coverage
- frequency
- timing
- using internal communications and alarm systems.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate use and selection of personal protective equipment (PPE)
- basic purpose of bridge equipment, display modes and interpreting values of displays, including:
  - automatic identification system (AIS)
  - electronic chart display and information system (ECDIS) symbols and alarms
  - echosounder
  - Global Maritime Distress and Safety System (GMDSS)
  - global positioning system (GPS)
  - gyrocompass
  - log
  - magnetic compass
  - radar
  - VHF and VHF communication channels
- basic function and use of main steering systems, including:
  - changeover procedures between Autor (pilot), follow up (FU) or hand and non-follow up (NFU)
  - steering gear
- collection and documentation of weather data
- effect of tides on depth of water
- emergency situations, appropriate action and solutions taken to address them engine or propulsion controls
- environmental protection procedures as they apply on a vessel
- functions and purpose of pyrotechnic distress signals, satellite EPIRBs and SARTs
- information required to maintain a safe navigational watch on a vessel, including interpreting course, depth and speed data from nautical instruments
- International Regulations for Preventing Collisions at Sea (COLREGs)
- mooring lines
- nautical charts and publications relevant to planning navigational voyages
- person overboard
- procedures for the relief, maintenance and handover of a watch
- reception of distress signal
- relevant WHS/OHS requirements, work practices and pollution control regulations and



policies

- shipboard terms and definitions that are critical to a safe navigational watch
- stranding
- sudden list or loll
- synchronous rolling
- types, function and purpose of navigational lights, shapes and sound signals
- vessel position terminology
- watertight integrity.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARO009 Maintain a safe navigational watch

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to apply the accepted principles and procedures to be observed in maintaining a watch according to bridge resource management principles, to ensure a safe navigational watch on a vessel, deal with maritime emergencies, incidents and to a distress signal at sea.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial ship less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

#### Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

#### Blue Waters Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck. To meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

O – Watchkeeping

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Maintain watch on the bridge**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Own responsibility for the safety of navigation is clearly defined at all times, including periods when the Master is on the bridge and while under pilotage
- 1.2** Proper lookout is maintained at all times according to organisational procedures and regulatory requirements
- 1.3** Lights, shapes and sound signals are correctly recognised and acted upon
- 1.4** Frequency and extent of monitoring traffic, vessel and environment are scheduled to conform with organisational procedures and regulatory requirements
- 1.5** Bridge communication is maintained with other team members on matters relevant to the safety and integrity of the vessel
- 1.6** Clear and unambiguous bridge communications are maintained, and clarification is sought from or given to other team members when watch information or instructions are not clearly understood
- 1.7** Internal and external communications systems are used according to organisational procedures and regulatory requirements.

- |  |            |  |
|--|------------|--|
|  | <b>1.8</b> | Conduct, handover and relief of the watch is completed according to organisational procedures and regulatory requirements                                      |
| <b>2 Maintain watch when anchored</b>                            | <b>2.1</b> | Organisational procedures and regulatory requirements are complied with through frequency, timing and coverage of scheduled checks and inspections             |
|  | <b>2.2</b> | Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of the vessel                           |
|  | <b>2.3</b> | Restrictions on access to the vessel by non-authorised persons are followed according to organisational procedures and regulatory requirements                 |
|  | <b>2.4</b> | Internal and external communications systems are used according to organisational procedures and regulatory requirements                                       |
| <b>3 Respond to potential collision and emergency situations</b> | <b>3.1</b> | Potential collision situations are analysed and appropriate actions are taken in ample time according to regulatory requirements                               |
|  | <b>3.2</b> | Correct responses are made to emergencies and situations that pose a danger to the vessel and personnel onboard  |
|  | <b>3.3</b> | Distress signals are recognised and appropriate actions are taken to initiate search and rescue (SAR) operations   |
|  | <b>3.4</b> | Master is called in the event of a navigational incident which falls outside own responsibility  |
| <b>4 Respond to onboard emergency situations</b>                 | <b>4.1</b> | Initial actions in the event of an emergency are undertaken according to contingency plans and are appropriate to urgency of situation and nature of emergency |
|  | <b>4.2</b> | Urgency of situation and nature of emergency is identified promptly  |
|  | <b>4.3</b> | Relevant alarms are activated  |
|  | <b>4.4</b> | Distress signals are used to indicate need for assistance, as required   |
|  | <b>4.5</b> | Crew, personnel and passengers are given information and instructions clearly and accurately   |

- |          |            |   |
|----------|------------|---|
|          | <b>4.6</b> | Procedures are implemented to combat emergency and to protect crew, personnel and passengers  |
|          | <b>4.7</b> | Communications are established with others to facilitate emergency response process   |
| <b>5</b> |            | <b>Resource the bridge according to bridge resource management principles</b>   |
|          | <b>5.1</b> | Bridge resource management principles are interpreted to establish the functions and responsibilities of the watchkeeping team onboard a vessel     |
|          | <b>5.2</b> | Resources are allocated and assigned as needed in correct priority to perform necessary tasks to obtain and maintain situational awareness          |
|          | <b>5.3</b> | Watchkeeping schedule is developed with due consideration to team experience  |
|          | <b>5.4</b> | Instructions on watchkeeping and lookout requirements are clearly and unambiguously given in relation to monitoring traffic, vessel and environment |
|          | <b>5.5</b> | Clear and unambiguous roles and responsibilities of watchkeeping team are determined and allocated  |
|          | <b>5.6</b> | Effective communication is maintained with team on matters relevant to safety and integrity of vessel   |
|          | <b>5.7</b> | Questionable decisions and/or actions are dealt with using an appropriate challenge and response  |
| <b>6</b> |            | <b>Maintain navigation records</b>  |
|          | <b>6.1</b> | Proper records of the movements and activities related to the navigation of the vessel are maintained   |
|          | <b>6.2</b> | Records are filed and stored according to organisational procedures   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARO002 Maintain a safe navigational watch.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARO009 Maintain a safe navigational watch

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- activating relevant alarms, including:
  - abandon ship signals
  - emergency broadcasts
  - fire and general muster alarms
- allocating and assigning resources as needed in correct priority to perform necessary tasks
- applying International Regulations for Preventing Collisions at Sea (COLREGs)
- applying principles of bridge and maritime resource management
- appropriately challenging and responding to questionable decisions and/or actions
- clearly defining responsibility for the safety of navigation at all times
- communicating effectively with others on watchkeeping issues, arrangements and requirements
- communicating an accurate understanding of current and predicted vessel state, navigation path and external environment with team members
- conforming to accepted principles and procedures in the conduct, handover and relief of the watch
- correctly providing sound signals
- correctly recognising lights, shapes and sound signals
- giving and receiving clear and unambiguous communications
- identifying and implementing effective leadership behaviours
- identifying and solving problems that may arise during watchkeeping duties, reporting problems and issues and taking appropriate actions based on available information
- identifying type and scale of emergency promptly
- implementing contingency plans and instructions in standing orders when responding to a distress signal at sea
- interpreting and implementing procedures relevant to the role and responsibilities of Watchkeeper
- maintaining a proper lookout at all times and in such a way as to conform to accepted principles and procedures
- maintaining accurate and compliant records of the movements and activities relating to the navigation of the vessel

- modifying activities dependent on differing vessel contingencies, risk situations and environments
- manoeuvring vessel, according to contingency plans
- monitoring and anticipating hazards and risks that may arise during watchkeeping duties and taking appropriate action
- monitoring traffic, the ship and the environment to conform to accepted principles and procedures
- recognising a distress or emergency signal
- reporting according to the General Principles for Ship Reporting Systems and Vessel Traffic Services (VTS) procedures
- responding to vessel emergencies
- selecting and using appropriate internal and external communications equipment during watchkeeping
- using bridge communication equipment
- using information from navigational equipment to maintain a safe navigational watch
- using routing according to the General Provisions on Ships' Routing
- working as part of a team.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian Maritime Safety Authority (AMSA) watchkeeping procedures contained in Marine Orders and Marine Notices
- blind pilotage techniques
- bridge instrumentation, controls and alarms relevant to the function of watchkeeping
- bridge procedures onboard a vessel
- bridge resource management principles, including allocation, assignment and prioritisation of resources; effective communication; assertiveness and leadership; obtaining and maintaining situational awareness; and consideration of team experience
- causes of groundings, collisions and casualties
- contingency plans with response to emergencies, including responding to distress signal at sea
- distress signals as listed in Annex IV of COLREGs
- fatigue management principles and techniques
- functions and responsibilities of the watchkeeping team onboard a vessel
- initial actions to be taken following a collision or grounding, including:
  - initial damage assessment and control
  - manoeuvring vessel
  - precautions when breaching a vessel
- International Association of Lighthouse Authorities (IALA) buoyage system A and B
- irregularities or abnormal conditions, including:
  - dragging anchor



- fog and restricted visibility
- heavy weather
- lights, shapes and sound signals as listed in COLREGs parts C
- manual and electronic navigational aids available to the bridge team and procedures for their operation and use during a watch
- maritime communication techniques onboard a vessel in accordance with the Standard Marine Communication Phrases
- nature of assistance, including:
  - assisting a ship in distress
  - rescuing persons from a vessel in distress and from a wreck
  - responding to emergencies occurring in port
- nature of emergencies
- navigational aids
- navigational hazards and implications for watchkeeping
- precautions for the protection and safety of crew and passengers
- precautions necessary when navigating in or near traffic separation schemes or other routing measures
- principles and use of navigational recording devices for keeping records of the operation, behaviour and performance of the vessel and navigation equipment
- principles for the use of vessel routing and reporting systems for safe navigation, including weather routing
- principles to be observed in keeping a safe navigational watch
- principles to be observed in keeping a watch in port, including when carrying hazardous cargo
- procedures for rescuing a person at sea, assisting a vessel in distress and responding to emergencies that arise in port
- procedures for the conduct, handover and relief of a watch
- procedures for the use of internal communications and alarm systems
- range of lifesaving appliances
- search and rescue using International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
- signs of personnel fatigue and hours of rest requirements
- typical bridge instrumentation, controls and alarms and their functions
- typical watchkeeping problems and emergency situations, and appropriate actions and solutions
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory

requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARO010 Perform basic lookout duties

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

### Application

This unit involves the skills and knowledge required to contribute to a safe lookout on a vessel less than 80 metres under instructions from the Master.

It includes following instructions to monitor vessel situation when moored or anchored, following instructions to monitor vessel situation when at sea and responding to potential emergency situations

This unit applies to general purpose hands working in the maritime industry on vessels less than 80 metres. They could be working independently or as part a vessel crew.

This unit applies to people working in the maritime industry in the capacity of:

- assistant to the Master or Engineer of a vessel working under their direct supervision
- worker on deck or in the engine room of a vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- worker in the engine room only for a vessel with propulsion power less than 3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand Near Coastal as defined in the National Standard for Commercial Vessels (NSCV) Part D.

### Pre-requisite Unit

Not applicable.

### Competency Field

O – Watchkeeping

### Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Follow instructions to monitor vessel situation when moored or anchored**

- 1.1** Scheduled checks and inspections are conducted to comply with instructions
- 1.2** Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of the vessel
- 1.3** Restrictions on access to the vessel by visitors are followed according to instructions
- 1.4** Very high frequency (VHF) equipment is monitored and information is communicated to the Master as required

**2 Follow instructions to monitor vessel situation when at sea**

- 2.1** Proper lookout is maintained at all times according to instructions
- 2.2** Lights, shapes and sound signals are correctly identified and reported
- 2.3** Effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel
- 2.4** VHF equipment is monitored and information is communicated to the Master as required

**3 Respond to potential emergency situations**

- 3.1** Emergency situations are promptly reported to the Master
- 3.2** Distress signals are recognised and reported

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARO001 Perform basic lookout duties.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARO010 Perform basic lookout duties

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating required information in a timely manner
- identifying and reporting lights, buoys and sound signals
- monitoring communications equipment
- reporting other ships, objects, lights and navigation marks in relation to the ship's head correctly
- responding to helm and engine orders given by the Master.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anchor watch
- communicating effectively with others on lookout issues and arrangements
- coverage, frequency and timing of checks and inspections
- hazards and risks that may arise during lookout duties
- navigation lights, shapes and sound signals
- typical emergency situations and appropriate action and solutions, including:
  - collision
  - fire
  - heavy weather
  - loss of engine or propulsion controls
  - loss of watertight integrity
  - person overboard
  - personal injury or other medical emergency
- watch in port.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MAR0011 Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to transmit and receive information by Global Maritime Distress and Safety System (GMDSS) subsystems and equipment.

This unit applies to people performing radio duties on a ship required to participate in the GMDSS.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

This unit is equivalent and delivers the objectives of the following STCW provisions:

- STCW Reg IV/2 and Code Section A-IV/2, Table A-IV/2.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

O – Watchkeeping



## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Operate GMDSS subsystems and equipment to send and receive messages**

**1.1** GMDSS communication equipment is operated to send and receive various types of signals according to manufacturer instructions, established GMDSS procedures and regulatory requirements

**1.2** GMDSS procedures appropriate for the sea area concerned are correctly applied according to regulatory requirements

**1.3** Regulations and procedures applicable to vessel stations equipped with GMDSS communication equipment and digital selective calling facilities are applied during radio communication

**1.4** Work health and safety (WHS)/occupational health and safety (OHS) procedures and hazard control strategies and the application of the International Safety Management (ISM) Code are applied

#### **2 Maintain radio equipment**

**2.1** Routine maintenance checks are conducted on GMDSS equipment according to manufacturer specifications and organisational procedures

**2.2** Out-of-specification performance and faults are investigated using fault-finding techniques

**2.3** Identified faults and defective equipment and component parts are rectified or replaced according to manufacturer specifications and organisational procedures

#### **3 Provide radio services**

**3.1** Emergencies are correctly identified according to organisational procedures

**3.2** Organisational procedures are conformed with when taking initial actions in the event of an emergency or

abnormal situation

- 3.3 Communications are established with others using GMDSS communication equipment to facilitate the emergency response process
- 3.4 Contact is maintained at all times with others to keep them briefed on the emergency response process
- 3.5 Radio procedures as defined in the International Telecommunications Union (ITU), International Convention for the Safety of Life at Sea (SOLAS) and the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual are applied during the emergency

#### **4 Maintain records**

- 4.1 Records are completed and maintained, as required, according to regulatory and organisational requirements
- 4.2 Relevant records are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARO003 Transmit and receive information by the global maritime distress and safety system.

## **Links**

Companion Volume implementation guide can be found in VetNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARO011 Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety/occupational health and safety (WHS/OHS) procedures when operating Global Maritime Distress and Safety System (GMDSS) subsystems and equipment
- communicating effectively with others when using GMDSS subsystems and equipment
- conducting operational checks on GMDSS subsystems and equipment
- keeping a radio logbook of communications using the GMDSS equipment, including the required regulatory entries into the radio logbook
- operating GMDSS subsystems and equipment according to manufacturer instructions
- performing routine maintenance checks, including:
  - antennas
  - battery checks
  - equipment testing
- reading and interpreting instructions for the use of GMDSS subsystems and equipment
- recognising typical faults with GMDSS subsystems and equipment, and taking appropriate action
- using the international phonetic alphabet and numeral code.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- different types of marine radio equipment, their features, applications, operating characteristics and operating procedures
- GMDSS components
- GMDSS procedures in response to emergency situations, such as abandon ship, fire, persons in survival craft or piracy at sea
- hazards associated with radio transmission and the repair and maintenance of radio equipment and related hazard control measures

- identification of radio stations
- international and national radio regulations applicable to GMDSS communications, including Australian Maritime Safety Authority (AMSA) Marine Orders, International Telecommunications Union (ITU) and the International Convention for the Safety of Life at Sea (SOLAS) Chapter IV
- maintenance strategies and requirements for GMDSS equipment as defined in SOLAS, radio regulations and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)
- means to prevent the transmission of false distress alerts
- miscellaneous skills and operational procedures for general communications
- operational checks, including checking radio performance, measuring capacity of batteries, and measuring on and off load voltage
- principles and features of marine radio communications, including:
  - correct use of frequencies, frequency bands and modes of emission
  - definition of coverage and sea areas for digital selective calling (DSC)
  - distress, urgency and safety communication
  - frequencies for routine call and reply
  - limitations on the performance of different types of marine radio equipment
  - methods of communicating vessel position
  - purpose of and procedures for the monitoring of calling and working frequencies
  - purpose of silence periods when operating radio equipment
  - radio calling, replying and relaying procedures
- principles of radio propagation, including:
  - basic propagation mechanisms at low frequency (LF), medium frequency (MF), high frequency (HF) and very high frequency (VHF)
  - classes of emission
  - duplex, simplex paired frequencies and ITU channels
  - frequency bands
  - maximum usable frequency (MUF)
  - optimum working frequency (OWF)
- procedures for:
  - international phonetic alphabet and numeral code
  - keeping records of radio communication
  - using various GMDSS systems and services, including:
    - current inmarsat services enhanced group calling (EGC) system
    - MF/HF radio with narrow band direct printing (NBDP)
    - DSC facilities and usage
    - Enhanced group call (EGC) receiver
    - maritime safety information (MSI) services
    - navigational telex (NAVTEX) system
    - SafetyNET system

- prohibitions on connecting non-GMDSS equipment to reserve source of supply
- radio communication problems and appropriate actions and solutions
- radio equipment faults, defects and related fault-finding techniques
- requirements of ship reporting systems
- role and method of use of ship reporting systems
- search and rescue (SAR) operation
- service publications
- statutory framework of the Maritime Mobile Service
- systems used onboard, including:
  - automatic identification system (AIS)
  - ship security alert system
  - ultra-high frequency (UHF) handhelds
- types, applications and features of basic antenna systems used in marine radio communications
- use of radio medical services.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including GMDSS communication equipment.

## Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARO012 Transmit and receive information by visual signalling**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to transmit and receive information by visual signalling.

This unit applies to people working in the maritime industry in the capacity of:

- Master of a commercial vessel less than 80 metres in length within the exclusive economic zone (EEZ)
- Master of a commercial vessel less than 500 gross tonnage (GT)
- Master of a commercial vessel Unlimited
- Watchkeeper Deck.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training

## **Near Coastal Qualifications:**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master less than 80 metres Near Coastal as defined in the Marine Order 505 (Certificates of competency - National Law) 2013.

## **Blue Waters**

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master of a commercial vessel less than 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

## Pre-requisite Unit

Not applicable.

## Competency Field

O – Watchkeeping

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Use code to send and receive messages by flashing light**

#### **2 Use International Code of Signals to send and receive messages with flags**

#### **3 Maintain records of visual communications**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Morse codes for letters and numerals are correctly recognised

**1.2** Message is correctly coded and transmitted using a flashing light

**1.3** Message received in code by flashing light is correctly decoded

**2.1** Flags used in the International Code of Signals are correctly recognised

**2.2** Message is correctly coded and sent with flags using the International Code of Signals

**2.3** Message coded and sent with flags using the International Code of Signals is correctly received and decoded

**3.1** Records of messages sent and received are completed and maintained as required according to regulatory and organisational requirements

**3.2** Relevant records are sent to appropriate bodies if requested and copies are filed according to regulatory

		and organisational requirements
	<b>3.3</b>	Documents are stored according to regulatory and organisational requirements
<b>4 Use English in written and oral communication</b>	<b>4.1</b>	IMO standard marine communication phrases are used in written and oral form
	<b>4.2</b>	English language nautical publications and messages relevant to the safety of the ship are correctly interpreted or drafted

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARO004 Transmit and receive information by visual signalling.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARO012 Transmit and receive information by visual signalling**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with others, including the Master, when transmitting and receiving information by visual signalling
- keeping records of visual signalling communications
- reading and interpreting maritime regulations relating to visual signalling
- transmitting and receiving by Morse light, distress signal SOS as specified in Annex IV International Regulations for the Prevention of Collisions at Sea (COLREGs) and Appendix 1 of the International Code of Signals
- transmitting and receiving messages using flags according to the International Code of Signals
- using International Maritime Organization (IMO) Standard Marine Communication Phrases and using English in written and oral terms
- using the International Code of Signals.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian Maritime Safety Authority (AMSA)
- IMO Standard Marine Communication Phrases
- International Code of Signals, including:
  - Morse code
  - single letter and numeral international code flags
- messages, including:
  - distress signal SOS
  - medical advice
  - single letter flag signal codes
- procedures for sending visual messages with flags using the International Code of Signals
- procedures for using a flashing light to send messages using Morse code
- visual signalling of single letter signals as specified in the International Code of Signals

- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## AURREA2001 Apply environmental and sustainability best practice in a marine workplace

### Modification History

Release	Comment
Release 1	Replaces AURR271103A Apply environmental regulations in the marine service industry Performance Criteria updated to reflect sustainability

### Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes required to identify and apply environmental regulations and sustainability best practice to work safely and avoid potential environmental hazards in the maintenance and service of marine vessels.</p> <p>Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.</p>
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### Application of the Unit

Application of the unit	<p>Work involves the theory, knowledge and application of skills related to environmental regulations and sustainability best practice in a marine workplace while maintaining and servicing marine vessels.</p> <p>Work requires individuals to demonstrate discretion, judgement and problem-solving skills in undertaking environmentally sound work practices.</p>
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### Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

Employability skills	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify and apply environment regulations	1.1.Reasons for <b><i>ethical environmental practice</i></b> in an marine mechanical workplace are identified 1.2.Environmental responsibilities and penalties for individual breaches of legislation and regulations are identified 1.3. <b><i>Documents and procedures</i></b> relevant to environmental safety and <b><i>hazards</i></b> are located and determined 1.4. <b><i>Safety equipment and other material</i></b> necessary to support environmentally sound practices are identified and sourced
2. Identify and avoid hazards to water, foreshores and marine environments	2.1.Wastewater or <b><i>contaminants</i></b> are contained to restrict entry to water systems, foreshores or marine environments 2.2.Vessel and component maintenance, service and repair is undertaken in an environmentally responsible manner to avoid hazards to water systems, foreshores and marine environments 2.3.Preparation areas are checked to ensure accidental spillage cannot escape into water systems, foreshores and marine environments 2.4.Spill kit is identified and located in preparation to prevent damage to the marine environment 2.5.Waste containment areas are identified and inspected to

	avoid contamination of the surrounding area
3. Identify and avoid hazards to air quality	<p>3.1. Hazardous airborne particles, including anti-foulant are identified, minimised and contained</p> <p>3.2. Hazardous gases and fumes are identified, minimised and contained</p> <p>3.3. Clean-up of guns, general tools, equipment and spray and painting equipment is conducted in an environmentally safe manner</p>
4. Identify and avoid noise hazards	<p>4.1. Hazardous noise activities are identified, prevented, reduced and contained</p> <p>4.2. Hazardous noise activities are carried out within approved operating hours and regulations</p>
5. Identify and apply sustainability best practice	<p>5.1. <i>Sustainability best practice</i> is identified and applied to minimise waste and potential damage to the environment according to workplace policies and procedures</p> <p>5.2. Methods to reduce resource consumption (water, electricity, fossil fuels, chemicals) are identified and applied</p> <p>5.3. Environmental damage and breaches of environmental regulations are reported</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

- communication skills to:
  - follow oral instructions
  - communicate verbal and written ideas and information as they relate to environmental regulations and sustainability best practice of a marine mechanical workplace
- initiative and enterprise to:
  - identify sources of information, assistance and expert knowledge to expand knowledge, skills and understanding
- literacy skills to:
  - identify and apply workplace environmental procedures
  - read and apply environmental regulations for a marine mechanical workplace
- numeracy skills to measure and calculate length, area and volume
- planning and organising skills to:
  - identify risk factors and actions to minimise risk
  - identify planning, checking and inspection techniques to avoid environmental

## REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

- contamination and wastage
- problem-solving skills to:
  - recognise a workplace problem or a potential problem
  - refer problems outside area of responsibility to appropriate person and suggest possible causes
  - identify processes which contribute to improvements for sustainability best practice
- self-management skills to:
  - identify appropriate safety and environmental response equipment, materials, processes and procedures
  - recognise limitations and seek timely advice
- teamwork skills to:
  - collaborate and cooperate with other team members relating to environmental and sustainability issues
- technical skills to:
  - collect, organise and interpret technical information relating to recognising workplace situations that are potentially harmful to the environment
  - use spill kits
- technology skills to:
  - use workplace environmental and safety-related technology to assist with clean and safe work practices

### Required knowledge

- effects of pollution and methods to minimise it
- environmental regulations and their implications for work being undertaken in a marine mechanical service and repair workplace
- characteristics and potential environmental impact of products used in the maintenance, repair and service of marine vessels, components and electrical systems
- philosophy of prevention, reuse, reduce, recycle
- awareness of the environmental effects of chemicals and contaminants on the marine environment
- procedures for use of spill kit
- reporting procedures for environmental damage and breaches of environmental regulations

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge.

A person who demonstrates competency in this unit must be able to:

- apply environmental regulations and sustainability best practice in a marine mechanical service and repair workplace
- identify materials used in an marine mechanical workplace and assess their potential environmental impact
- use a spill kit
- report environmental damage and breaches of environmental regulations.

#### Context of and specific resources for assessment

Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting.

Assessment is to occur:

- using standard workplace practices and procedures
- following safety requirements
- applying environmental constraints.

Assessment is to comply with relevant:

- regulatory requirements
- Australian standards
- industry codes of practice.

The following resources must be made available for the assessment of this unit:

- access to environmental legislation, regulations and best practice models including access to workplace documents and reference images
- access to a marine maintenance and service workplace or simulated environment that accurately reflects workshop working conditions, including conditions for the removal and application of anti-foulants, recycling bins, liquid, sludge and solid wastes
- access to PPE and other equipment of the type intended to be used in response to an environmental incident or accident.

## EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### Method of assessment

Assessment must satisfy the endorsed Assessment Guidelines of this Training Package.

Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge.

Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application.

Competence in this unit may be assessed in conjunction with other units which together form part of an holistic work role.

Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients.

Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

## Range Statement

### RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

#### ***Ethical environmental practice*** may include:

- correct disposal methods for waste and cleaning and/or washing of internal and external surfaces, glass surfaces and wet areas
- painting with anti-foulant based products
- compliance with legislative obligations
- hazardous materials handling best practice applications
- organisation insurance requirements
- discretion, judgement and problem-solving skills in undertaking



**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

	environmentally sound work practices.
<b><i>Documents and procedures</i></b> may include:	<ul style="list-style-type: none"> <li>• material safety data sheets (MSDS)</li> <li>• environmental legislation</li> <li>• health regulations</li> <li>• hazardous substances register</li> <li>• site environmental policy</li> <li>• workplace environmental procedures and safety instructions</li> <li>• dangerous goods code safe operating procedures.</li> </ul>
<b><i>Hazards</i></b> may include:	<ul style="list-style-type: none"> <li>• toxic fumes and substances</li> <li>• flammable materials and fire hazards</li> <li>• spillages</li> <li>• waste and debris especially on floors, ladders, trolleys</li> <li>• electricity and water</li> <li>• toxic substances</li> <li>• damaged packing material or containers</li> <li>• broken or damaged equipment</li> <li>• unsafe lifting practices.</li> </ul>
<b><i>Safety equipment and other material</i></b> may include:	<ul style="list-style-type: none"> <li>• personal protective equipment (PPE) including: <ul style="list-style-type: none"> <li>• eye protection</li> <li>• hearing protection</li> <li>• gloves</li> <li>• other suitable protective clothing</li> <li>• safety footwear</li> </ul> </li> <li>• spill kit</li> <li>• absorbent materials</li> <li>• drip and catchment trays</li> <li>• waste bags</li> <li>• waste segregation systems</li> </ul>
<b><i>Contaminants</i></b> may include:	<ul style="list-style-type: none"> <li>• solid or liquid wastes</li> <li>• oil, fuel and grease</li> <li>• hydrocarbon based degreasing agents and solvents</li> <li>• acids</li> <li>• alkaline wastes</li> <li>• tributyltin, arsenic, mercury and DDT</li> </ul>

**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

	<ul style="list-style-type: none"> <li>• paint, lacquer, varnish</li> <li>• anti-foulant based products</li> <li>• glues and adhesive compounds</li> <li>• household chemicals and pesticides.</li> </ul>
<b><i>Sustainability best practice</i></b> may include:	<ul style="list-style-type: none"> <li>• recycling waste</li> <li>• energy conservation practices</li> <li>• natural resources (water, etc.) conservation practices</li> <li>• reusing</li> <li>• environmental (green) purchasing practices</li> <li>• noise minimisation.</li> </ul>

**Unit Sector(s)**

<b>Competency field</b>	Marine
<b>Unit sector</b>	Environment

**Custom Content Section**

Not applicable.

## BSBADM307 Organise schedules

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Application

This unit describes the skills and knowledge required to manage appointments and diaries for personnel within an organisation, using manual and electronic diaries, schedules and other appointment systems.

It applies to individuals employed in a range of work environments who provide administrative support to teams and individuals.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Administration – General Administration

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1 Establish schedule requirements	1.1 Identify organisational requirements and protocols for diaries and staff planning tools 1.2 Identify organisational procedures for different types of appointments 1.3 Determine personal requirements for diary and schedule items for individual personnel 1.4 Establish appointment priorities and clarify in discussion with

ELEMENT	PERFORMANCE CRITERIA
	individual personnel
2 Manage schedules	<p>2.1 Identify recurring appointments and deadlines, and schedule these in accordance with individual and organisational requirements</p> <p>2.2 Establish availability of attendees, and schedule new appointments in accordance with required timelines and diary commitments</p> <p>2.3 Negotiate alternative arrangements and confirm when established appointments are changed</p> <p>2.4 Record appointments and manage schedules in accordance with organisational policy and procedures</p>

## Foundation Skills

This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.

Skill	Performance Criteria	Description
Reading	1.1-1.3, 2.1, 2.2, 2.4	<ul style="list-style-type: none"> <li>Interprets textual information from a range of sources and identifies relevant information</li> </ul>
Writing	2.1-2.4	<ul style="list-style-type: none"> <li>Uses clear and succinct language to complete and update workplace documentation</li> </ul>
Oral Communication	1.1, 1.3, 1.4, 2.3	<ul style="list-style-type: none"> <li>Participates effectively in spoken interactions using listening and questioning techniques to confirm and clarify understanding</li> </ul>
Numeracy	2.1, 2.2	<ul style="list-style-type: none"> <li>Makes time estimations and checks logistics when scheduling appointments</li> </ul>
Navigate the world of work	1.1, 1.2, 2.1, 2.4	<ul style="list-style-type: none"> <li>Recognises and responds to explicit and implicit organisational procedures and protocols</li> </ul>
Interact with others	1.3, 1.4, 2.3	<ul style="list-style-type: none"> <li>Selects the appropriate form, channel and mode of communication for a specific purpose relevant to own role</li> <li>Collaborates and negotiates with others to achieve agreeable outcomes</li> </ul>
Get the work done	1.1, 1.3, 1.4, 2.1, 2.2, 2.4	<ul style="list-style-type: none"> <li>Plans a range of routine tasks accepting goals and aiming to achieve them according to predetermined</li> </ul>

		<p>deadlines</p> <ul style="list-style-type: none"><li>• Follows routine procedures for using digital technology to enter, store and retrieve information directly relevant to role</li><li>• Takes responsibility for routine low-impact decisions within familiar situations</li></ul>
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## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBADM307 Organise schedules	BSBADM307B Organise schedules	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBADM307 Organise schedules

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

## Performance Evidence

Evidence of the ability to:

- appropriately manage the schedules of various individuals through a process of careful planning and negotiation.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

## Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- identify the key provisions of relevant legislation, standards and codes that affect aspects of business operations or the achievement of team goals
- describe organisational requirements for managing appointments for personnel within the organisation
- summarise the range of appointment systems that could be used
- outline important considerations when managing the schedules of others.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced in the general administration field of work and include access to:

- office equipment and resources
- a range of diaries, planners and calendars to record and schedule appointments.

Assessors must satisfy NVR/AQTF assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBCMM201 Communicate in the workplace

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package version 1.0

### Application

This unit describes the skills and knowledge required to communicate in the workplace including gathering, conveying and receiving information and completing routine written correspondence.

It applies to individuals who perform a range of routine workplace communication tasks using a limited range of practical skills and fundamental knowledge of effective listening, questioning and non-verbal communication in a defined context under direct supervision or with limited individual responsibility.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Communication – Interpersonal Communication

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1 Gather, convey and receive information and ideas	1.1 Collect information to achieve work responsibilities from appropriate sources 1.2 Use method/s and/or equipment to communicate appropriate ideas and information to the audience 1.3 Use effective listening and speaking skills in verbal communication



ELEMENT	PERFORMANCE CRITERIA
	<p>1.4 Seek input from internal and external sources to develop and refine new ideas and approaches</p> <p>1.5 Respond to instructions or enquiries promptly and in accordance with organisational requirements</p>
2 Complete workplace documentation and correspondence	<p>2.1 Present written information and ideas in clear and concise language to ensure the intended meaning of correspondence is understood by the recipient</p> <p>2.2 Draft and present correspondence within designated time lines</p> <p>2.3 Ensure presentation of written information meets organisational standards of style, format and accuracy</p> <p>2.4 Complete workplace forms and documentation in a clear, concise and easy to read format</p>
3 Communicate in a way that responds positively to individual differences	<p>3.1 Value all individuals and treat them with respect, courtesy and sensitivity</p> <p>3.2 Take into consideration cultural differences in all verbal and non-verbal communication</p> <p>3.3 Use communication to develop and maintain positive relationships, mutual trust and confidence</p> <p>3.4 Make efforts to use basic strategies to overcome language barriers</p> <p>3.5 Ensure that behaviour is consistent with legislative requirements, enterprise guidelines and/or social protocols</p>

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Learning	1.4	<ul style="list-style-type: none"> <li>Seeks advice from others to implement strategies to improve knowledge or skills</li> </ul>
Reading	1.1, 1.4, 1.5, 2.3, 2.4	<ul style="list-style-type: none"> <li>Reviews textual information to identify and interpret communication requirements and organisational standards</li> </ul>
Writing	1.2, 1.5, 2.1, 2.2,	<ul style="list-style-type: none"> <li>Develops simple written texts using appropriate grammar, spelling and punctuation in accordance with</li> </ul>

	2.3, 2.4	organisational formats <ul style="list-style-type: none"> <li>Completes workplace forms and texts in accordance with organisational conventions and legislative requirements.</li> </ul>
Oral Communication	1.1, 1.2, 1.3, 1.4, 1.5, 3.3, 3.4	<ul style="list-style-type: none"> <li>Explains ideas and requirements clearly and listens carefully to verbal instructions and discussions</li> <li>Asks questions to confirm understanding</li> </ul>
Navigate the world of work	1.5, 2.3, 3.5	<ul style="list-style-type: none"> <li>Understands responsibilities of role and complies with legislative, regulatory and organisational requirements</li> </ul>
Interact with others	1.2, 1.4, 1.5, 3.1, 3.2, 3.3, 3.4	<ul style="list-style-type: none"> <li>Recognises common cultural and other differences of people in the work context and makes adjustments to accommodate the differences</li> <li>Follows accepted communication practices and protocols to assist in building and maintaining positive working relationships</li> </ul>
Get the work done	1.1, 1.2, 1.4, 1.5, 2.1-2.4	<ul style="list-style-type: none"> <li>Plans and implements routine tasks and workload making limited decisions on sequencing, timing and collaboration, seeking assistance in setting priorities</li> <li>Uses digital technology to find, record or communicate basic information</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBCMM201 Communicate in the workplace	BSBCMM201A Communicate in the workplace	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBCMM201 Communicate in the workplace

## Modification History

Release	Comments
Release 1	This version first released with Business Services Training Package Version 1.0.

## Performance Evidence

Evidence of the ability to:

- communicate information and ideas verbally and non-verbally, taking cultural differences and language barriers into consideration
- produce written material, used routinely in day to day work, which is clear, concise and effectively convey the intended meaning to the recipient
- complete workplace forms
- use style, format and level of accuracy appropriate to the type of written material
- provide prompt responses to requests for information in accordance with organisational requirements.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

## Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- identify any organisational policies, plans and procedures which detail organisation's standards or protocols for workplace communication
- describe different communication styles
- outline barriers to communication.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced by individuals using interpersonal communication skills in the workplace and include access to:

- office equipment
- business resources

- workplace policies and procedures relating to communication
- case studies and, where possible, real situations
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBCMM211 Apply communication skills

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

### Application

This unit describes the skills and knowledge required to apply basic communication skills in the workplace, including identifying, gathering and conveying information along with completing assigned written information.

The unit applies to individuals working under direct supervision, who are developing basic skills and knowledge of workplace communication in preparation for working in a broad range of settings.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Social Competence – Verbal Communication

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify communication requirements	1.1 Identify work task 1.2 Identify communication channels in the organisation 1.3 Identify relevant stakeholders 1.4 Seek advice from supervisor on communication methods
2. Communicate using verbal and non-verbal communication skills	2.1 Plan verbal communication 2.2 Use verbal communication to communicate with stakeholders 2.3 Use non-verbal behaviour to communicate with stakeholders 2.4 Seek and respond to feedback on communication

ELEMENT	PERFORMANCE CRITERIA
3. Draft written communications	3.1 Identify formats for written information according to organisational policies and procedures 3.2 Draft written information and submit to supervisor for approval 3.3 Seek and respond to feedback on written communication

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

SKILL	DESCRIPTION
Learning	<ul style="list-style-type: none"><li>Develops skills required to carry out own role by seeking and acting on feedback</li></ul>
Reading	<ul style="list-style-type: none"><li>Reviews textual information to identify communication requirements and organisational procedures</li></ul>
Writing	<ul style="list-style-type: none"><li>Drafts simple texts using appropriate grammar, spelling and punctuation in accordance with organisational standards</li><li>Proofreads own texts for accuracy and compliance with organisational requirements</li></ul>
Teamwork	<ul style="list-style-type: none"><li>Seeks to cooperate with others to achieve results in immediate work context</li></ul>
Self-management	<ul style="list-style-type: none"><li>Follows clearly defined instructions, seeking assistance when necessary</li><li>Follows organisational policies and procedures and practices relevant to own role</li></ul>
Technology	<ul style="list-style-type: none"><li>Uses digital tools to complete tasks</li></ul>
Initiative and enterprise	<ul style="list-style-type: none"><li>Asks questions and listens to gain information and confirm understanding</li></ul>

## Unit Mapping Information

No equivalent unit. Supersedes but is not equivalent to:

- BSBCMM101 Apply basic communication skills
- BSBCMM201 Communicate in the workplace.

## Links

Companion Volume Implementation Guide is found on VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBCMM211 Apply communication skills

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- use verbal and non-verbal skills to seek and convey information in face-to-face situations on at least three occasions
- draft written documents and confirm that the documents meet organisational requirements on at least three occasions.

## Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- organisational policies and procedures related to workplace communication
- communication styles
- questioning, listening and speaking skills
- standards of written information applicable to own role
- presentation styles, format and detail relevant to own role.

## Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- workplace policies and procedures relating to communication.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.



## Links

Companion Volume Implementation Guide is found on VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBCUS201 Deliver a service to customers

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Application

This unit describes the skills and knowledge required to deliver all aspects of customer service at an introductory level. It includes creating a relationship with customers, identifying their needs, delivering services or products and processing customer feedback.

It applies to individuals who perform a range of routine tasks in the workplace using a limited range of practical skills and fundamental knowledge of customer service in a defined context under direct supervision or with limited individual responsibility.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Stakeholder Relations – Customer Service

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1 Establish contact with customers	1.1 Acknowledge and greet customer in a professional, courteous and concise manner according to organisational and legislative requirements 1.2 Maintain personal dress and presentation in line with organisational requirements 1.3 Communicate using appropriate interpersonal skills to facilitate accurate and relevant exchange of information

ELEMENT	PERFORMANCE CRITERIA
	<p>1.4 Maintain sensitivity to customer specific needs and any cultural, family and individual differences</p> <p>1.5 Establish rapport/relationship with customer and express a genuine interest in customer needs/requirements</p>
2 Identify customer needs	<p>2.1 Use appropriate questioning and active listening to determine customer needs</p> <p>2.2 Assess customer needs for urgency to identify priorities for service delivery</p> <p>2.3 Provide customer with information about available options for meeting customer needs and assist customer to identify preferred option/s</p> <p>2.4 Identify personal limitations in addressing customer needs and seek assistance from designated persons where required</p>
3 Deliver service to customers	<p>3.1 Provide prompt customer service to meet identified needs according to organisational requirements</p> <p>3.2 Provide information regarding problems and delays, and follow-up within appropriate timeframes as necessary</p> <p>3.3 Communicate with customers in a clear, concise and courteous manner</p> <p>3.4 Identify opportunities to enhance the quality of service and products, and take action to improve the service whenever possible</p>
4 Process customer feedback	<p>4.1 Promptly recognise customer feedback and handle sensitively according to organisational and legislative requirements</p> <p>4.2 Accurately record any feedback and communication between customers and the organisation according to organisational standards, policies and procedures and legislative requirements</p> <p>4.3 Identify any unmet customer needs and discuss suitability of other products/services</p> <p>4.4 Support customers to make contact with other services according to organisational policies and procedures</p>

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	1.1, 1.2, 3.1, 4.1, 4.2, 4.4	<ul style="list-style-type: none"> <li>Understands requirements in organisational policy and procedure documents</li> <li>Interprets product and service information in a range of formats to provide customer advice</li> </ul>
Writing	4.2	<ul style="list-style-type: none"> <li>Records customer information according to organisational requirements</li> </ul>
Oral Communication	1.1, 1.3, 1.4, 1.5, 2.1-2.4, 3.2, 3.3, 4.3	<ul style="list-style-type: none"> <li>Provides information or advice using structure and language to suit the audience</li> <li>Asks questions and listens to gain information or confirm understanding</li> </ul>
Navigate the world of work	1.1, 1.2, 3.1, 4.1, 4.2, 4.4	<ul style="list-style-type: none"> <li>Follows organisational procedures and practices relevant to own role</li> </ul>
Interact with others	1.1, 1.3-1.5, 2.1-2.4, 3.1, 3.2, 3.3, 4.1, 4.3, 4.4	<ul style="list-style-type: none"> <li>Uses accepted communication practices to establish connections, build rapport and develop professional working relationships</li> <li>Adjusts personal communication style in response to the opinions, values and particular needs of others</li> </ul>
Get the work done	3.2, 3.4, 4.1- 4.3	<ul style="list-style-type: none"> <li>Addresses routine problems in familiar work contexts</li> <li>Recognises opportunities to enhance work practices and outcomes</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBCUS201 Deliver a service to customers	BSBCUS201B Deliver a service to customers	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBCUS201 Deliver a service to customers

## Modification History

Release	Comments
Release 1	This version first released with Business Services Training Package Version 1.0.

## Performance Evidence

Evidence of the ability to:

- greet customer and establish rapport/relationship in accordance with organisational requirements
- identify customer needs using appropriate interpersonal skills
- provide prompt service to address customer needs in accordance with organisational requirements
- identify and follow up opportunities to increase the quality of service and products
- respond to and record all customer feedback according to organisational standards, policies and procedures.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

## Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- identify and briefly describe key provisions of relevant legislation from all forms of government that apply to provision of customer services
- identify and explain workplace organisational policies and procedures relating to customer service and the customer service process.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced in the customer service field of work and include access to:

- office equipment and technology
- workplace documents, organisational policies and procedures for customer service

- examples of customer complaints and feedback
- case studies and, where possible, real situations
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBFLM303 Contribute to effective workplace relationships

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Application

This unit describes the skills and knowledge required to gather information and maintain effective relationships and networks, with particular regard to communication and representation.

This unit applies to individuals who use leadership skills including motivation, mentoring and coaching to develop efficient, effective and unified teams and facilitate communication between team members and management of the organisation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Management and Leadership – Frontline Management

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1 Seek, receive and communicate information and ideas	1.1 Collect information associated with the achievement of work responsibilities from appropriate sources 1.2 Communicate ideas and information to diverse audiences in an appropriate and sensitive manner 1.3 Seek contributions from internal and external sources to develop and refine new ideas and approaches in accordance with organisational processes

ELEMENT	PERFORMANCE CRITERIA
	<p>1.4 Facilitate consultation processes to allow employees to contribute to issues related to their work, and promptly communicate outcomes of consultation to the work team</p> <p>1.5 Promptly deal with and resolve issues raised, or refer them to relevant personnel</p>
2 Encourage trust and confidence	<p>2.1 Treat people with integrity, respect and empathy</p> <p>2.2 Encourage effective relationships within the framework of the organisation's social, ethical and business standards</p> <p>2.3 Gain and maintain the trust and confidence of colleagues, customers and suppliers through competent performance</p> <p>2.4 Adjust interpersonal styles and methods in relation to the organisation's social and cultural environment</p>
3 Identify and use networks and relationships	<p>3.1 Identify and utilise workplace networks to help build relationships</p> <p>3.2 Identify and describe the value and benefits of networks and other work relationships for the team and the organisation</p>
4 Contribute to positive outcomes	<p>4.1 Identify difficulties and take action to rectify the situation within own level of responsibility according to organisational and legal requirements</p> <p>4.2 Support colleagues in resolving work difficulties</p> <p>4.3 Regularly review workplace outcomes and implement improvements in consultation with relevant personnel</p> <p>4.4 Identify and resolve poor work performance within own level of responsibility and according to organisational policies</p> <p>4.5 Deal constructively with conflict, within the organisation's established processes</p>

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	1.1, 1.3, 1.4, 1.5, 4.3	<ul style="list-style-type: none"> <li>Comprehends textual information to determine regulatory requirements and adhere to job processes</li> </ul>



		and internal policies
Writing	1.1-1.5, 4.3, 4.4, 4.5	<ul style="list-style-type: none"> <li>• Uses appropriate language to record key information related to the outcomes of the job</li> <li>• Varies writing style to meet requirements of audience and purpose</li> </ul>
Oral Communication	1.2-1.5, 2.1, 2.2, 2.4, 3.1, 4.2-4.5	<ul style="list-style-type: none"> <li>• Speaks clearly using tone and pace appropriate for the audience and purpose</li> <li>• Uses appropriate techniques, including active listening and questioning, to clarify information and to confirm understanding</li> </ul>
Navigate the world of work	1.3, 2.1, 2.2, 2.4, 4.1, 4.4, 4.5	<ul style="list-style-type: none"> <li>• Takes personal responsibility for adherence to explicit and implicit organisational policies, procedures, standards and legislative requirements within own job role and in all interactions with others</li> </ul>
Interact with others	1.2, 1.3, 1.4, 1.5 2.1, 2.2, 2.3, 2.4 4.2, 4.3, 4.4, 4.5	<ul style="list-style-type: none"> <li>• Selects and uses appropriate conventions and protocols when communicating with internal and external stakeholders to build rapport, establish networks, seek or share information,</li> <li>• Adjusts personal communication style in response to a diverse range of individuals in the work context</li> <li>• Uses collaborative techniques to engage team members in consultations and negotiations</li> <li>• Implements strategies to respond appropriately to conflict and poor work performance</li> </ul>
Get the work done	1.1, 1.3, 1.4, 1.5, 2.3, 3.1, 3.2, 4.1, 4.2, 4.3, 4.4	<ul style="list-style-type: none"> <li>• Takes responsibility for planning, sequencing and prioritising tasks and own workload for effective outcomes</li> <li>• Uses formal analytical thinking techniques and broad ranging consultative processes to identify issues and implement a constructive approach to solutions and improvement opportunities</li> <li>• Uses familiar digital technologies and systems to access, present and communicate information</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBFLM303 Contribute to effective workplace	BSBFLM303C Contribute to effective workplace	Updated to meet Standards for Training Packages	Equivalent unit

<b>Code and title current version</b>	<b>Code and title previous version</b>	<b>Comments</b>	<b>Equivalence status</b>
relationships	relationships		

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## Assessment Requirements for BSBFLM303 Contribute to effective workplace relationships

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Performance Evidence

Evidence of the ability to:

- access and analyse information to achieve planned outcomes
- apply techniques for resolving problems and conflicts and dealing with poor performance within organisational and legislative requirements
- review and improve workplace outcomes in consultation with relevant personnel
- adjust interpersonal style and communications to respond to cultural and social diversity
- apply relationship management and communication skills with a range of people that:
  - demonstrate integrity, respect, empathy and cultural sensitivity and promote trust
  - forge effective relationships with internal and/or external people and help to maintain these networks
  - encourage participation and foster contribution of and respect for ideas and feedback
  - provide support to colleagues to resolve difficulties.
- communicate ideas and information to diverse audiences
- develop networks and build team relationships.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

### Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- give examples of how work relationships and the cultural and social environment can support or hinder achieving planned outcomes
- explain techniques for developing positive work relationships and building trust and confidence in a team
- identify relevant legislation from all levels of government that affects business operation

- describe a range of methods and techniques for communicating information and ideas to a range of stakeholders
- outline problem solving methods
- explain methods to resolve workplace conflict
- explain methods to manage poor work performance
- explain how to monitor, analyse and introduce ways to improve work relationships.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced in the management field of work and include access to:

- relevant legislation and regulations
- relevant workplace documentation and resources
- case studies and, where possible, real situations
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBINN201 Contribute to workplace innovation

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Application

This unit describes the skills and knowledge required to make a pro-active and positive contribution to workplace innovation.

It applies to individuals working in any industry or community context, in both small and large organisations who take a pro-active approach to identifying, suggesting and developing ideas about better ways of doing things at a practical operational level in a specific area of activity. While the individual's overall work is undertaken with some supervision and guidance, they apply discretion, judgement and effective interpersonal skills in order to contribute to workplace innovation.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

### Unit Sector

Creativity and Innovation – Innovation

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1 Identify opportunities to do things better	1.1 Be aware of own role in workplace innovation 1.2 Proactively identify opportunities for improvement in own area of work 1.3 Gather and review information which may be relevant to ideas and which might assist in gaining support for ideas

ELEMENT	PERFORMANCE CRITERIA
2 Discuss and develop ideas with others	2.1 Identify people who could provide input into ideas for improvements 2.2 Select the best way of approaching people to begin sharing ideas 2.3 Seek feedback on improvement of ideas, and discuss and develop options and possible variations 2.4 Review and select ideas for follow up based on feedback and further review
3 Address the practicalities of change	3.1 Take action to implement routine changes in consultation with others and within scope of own responsibility 3.2 Identify and articulate issues and practical processes for implementing proposed ideas 3.3 Present ideas and practical suggestions to the appropriate people about how improvements could be made

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	1.3, 2.4, 3.2	<ul style="list-style-type: none"> <li>Categorises, interprets and reviews information from a range of sources to generate ideas relevant to the workplace</li> </ul>
Writing	3.2, 3.3	<ul style="list-style-type: none"> <li>Communicates information using clear language and formats appropriate for the audience</li> </ul>
Oral Communication	2.3, 3.1, 3.2, 3.3	<ul style="list-style-type: none"> <li>Actively participates in verbal exchanges of ideas and elicits the view and opinions of others by listening and questioning</li> <li>Uses clear and relevant language to clarify workplace issues and promote ideas</li> </ul>
Numeracy	1.3, 3.2	<ul style="list-style-type: none"> <li>Performs basic mathematical calculations to estimate time and cost in relation to implementation of ideas</li> </ul>
Navigate the world of work	1.1, 1.2, 3.1	<ul style="list-style-type: none"> <li>Understands responsibilities of own role</li> </ul>
Interact with	2.3, 3.1-3.3	<ul style="list-style-type: none"> <li>Follows accepted communication practices and protocols when discussing or presenting ideas to others</li> </ul>

others		<ul style="list-style-type: none"> <li>Seeks and takes into account perspectives and opinions of others</li> </ul>
Get the work done	1.2, 1.3, 2.1, 2.2, 2.4, 3.1-3.3	<ul style="list-style-type: none"> <li>Plans and implements routine tasks making limited decisions and seeking assistance, when necessary</li> <li>Uses analytical or lateral thinking processes to identify improvements or new ways of approaching tasks</li> <li>Identifies and anticipates operational problems and develops possible solutions</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBINN201 Contribute to workplace innovation	BSBINN201A Contribute to workplace innovation	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## Assessment Requirements for BSBINN201 Contribute to workplace innovation

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Performance Evidence

Evidence of the ability to:

- identify ideas for improvements and use information from a range of sources including other people to review and select ideas to put forward for implementation
- communicate the ideas and seek input from others in order to identify how the ideas could be implemented
- implement routine changes within scope of responsibility.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

### Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- explain the role of individuals in suggesting and making improvements and the importance of pro-active involvement
- list the positive impacts and the challenges of change and innovation
- provide examples of the types of changes that can occur as a result of effective individual participation within own scope of responsibility
- give examples of the types of changes that are within and outside own scope of responsibility
- list typical reasons why suggested improvements or innovations may not be implemented, including operational and management constraints
- explain how to prepare and communicate ideas for improvement to maximise likelihood of support.



## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced in the creativity and innovation and include access to:

- workplace documents
- case studies and, where possible, real situations
- office equipment and resources
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBOPS203 Deliver a service to customers

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

### Application

This unit describes the skills and knowledge required to deliver aspects of customer service at an introductory level. It includes creating a relationship with customers, identifying their needs, delivering services or products, and processing customer feedback.

The unit applies to those who perform a range of routine tasks in the workplace using a limited range of practical skills and fundamental knowledge of customer service in a defined context under direct supervision or with limited individual responsibility.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Business Competence – Business Operations

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Establish contact with customers	1.1 Greet customers according to organisational requirements 1.2 Share relevant information with customers 1.3 Identify and respond to specific customer requirements 1.4 Express interest in customer needs and develop rapport with customer
2. Identify customer needs	2.1 Ask questions to identify customer needs 2.2 Assess customer needs for urgency and identify priorities for service delivery 2.3 Provide customer with information about available options

ELEMENT	PERFORMANCE CRITERIA
	2.4 Assess limitations in addressing customer needs and seek assistance from designated persons, where required
3. Provide service to customers	3.1 Confirm details of service and delivery with customer according to organisational requirements 3.2 Convey information regarding problems and delays, and follow-up within appropriate timeframes, where required 3.3 Identify opportunities to enhance the quality of service and products, and take action to improve the service
4. Process customer feedback	4.1 Seek customer feedback and handle according to organisational and legislative requirements 4.2 Record feedback and communication between customer and the organisation according to organisational requirements 4.3 Identify any unmet customer needs and discuss suitability of alternative products or services 4.4 Encourage customers to maintain contact with organisation for future needs

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Description
Reading	<ul style="list-style-type: none"> <li>Identifies requirements from organisational policy and procedure documents</li> <li>Interprets product and service information in a range of formats to provide customer advice</li> </ul>
Writing	<ul style="list-style-type: none"> <li>Records customer information according to organisational requirements</li> </ul>
Oral communication	<ul style="list-style-type: none"> <li>Provides information and advice using structure and language to suit the audience</li> <li>Asks questions and listens to gain information and confirm understanding</li> </ul>
Planning and organising	<ul style="list-style-type: none"> <li>Follows organisational procedures and practices relevant to own role</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>Uses accepted communication practices to establish connections, build rapport and develop professional working relationships</li> <li>Adjusts personal communication style in response to the opinions, values and needs of others</li> </ul>

Skill	Description
Initiative and enterprise	<ul style="list-style-type: none"><li>Identifies opportunities to enhance work practices and outcomes</li></ul>
Problem solving	<ul style="list-style-type: none"><li>Addresses routine problems in familiar work contexts</li></ul>

## Unit Mapping Information

Supersedes and is equivalent to BSBCUS201 Deliver a service to customers.

## Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBOPS203 Deliver a service to customers

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- deliver a service to at least three different customers.

In the course of the above, the candidate must:

- greet the customer and establish rapport according to organisational requirements
- identify customer needs using interpersonal skills
- provide prompt service to address customer needs
- identify and follow up opportunities to increase the quality of service and products
- respond to and record all customer feedback according to organisational standards, policies and procedures.

## Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- key provisions of customer service legislation and consumer law
- requirements for responding to the needs of customers from a diverse background
- workplace organisational policies and procedures relating to customer service and the customer service process.

## Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- workplace documents, and organisational policies and procedures for customer service
- examples of customer complaints and feedback.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

## **Links**

Companion Volume Implementation Guide is found on VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBPEF301 Organise personal work priorities

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

### Application

This unit describes the skills and knowledge required to organise personal work schedules, to monitor and obtain feedback on work performance and to maintain required levels of competence.

The unit applies to individuals who exercise discretion and judgement and apply a broad range of competencies in various work contexts.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

### Unit Sector

Critical Thinking & Problem Solving – Personal Effectiveness

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Organise and complete own work schedule	1.1 Develop work goals and key performance indicators (KPIs) according to task and organisational requirements 1.2 Prioritise workload according to task timeframes 1.3 Identify factors affecting achievement of work objectives 1.4 Develop personal work plans
2. Evaluate own work performance	2.1 Identify variations between expected and actual work performance according to task requirements and KPIs 2.2 Report variations to relevant personnel 2.3 Seek feedback from relevant personnel for solutions to minimise variations in expected and actual work outputs

ELEMENT	PERFORMANCE CRITERIA
	2.4 Research sources of stress and access appropriate supports according to organisational policies and procedures
3. Coordinate personal skill development and learning	3.1 Identify personal and professional development needs for job role 3.2 Identify opportunities to undertake personal skill development activities in consultation with supervisor 3.3 Access professional development opportunities 3.4 Record professional development undertaken for continuous learning and career development process 3.5 Incorporate feedback into review of further learning needs

## Foundation Skills

*This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.*

Skill	Description
Learning	<ul style="list-style-type: none"> <li>Employs a range of approaches and investigative techniques to source the knowledge necessary to arrange personal learning experiences</li> </ul>
Reading	<ul style="list-style-type: none"> <li>Interprets textual information to determine organisation's procedures, own work performance and objectives</li> </ul>
Writing	<ul style="list-style-type: none"> <li>Prepares written reports and workplace documents that communicate information clearly and effectively</li> </ul>
Oral communication	<ul style="list-style-type: none"> <li>Provides and receives feedback using specific and relevant language</li> <li>Uses listening and questioning techniques to confirm understanding</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>Complies with organisational policies, procedures and protocols</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>Selects the appropriate form, channel and mode of communication for a specific purpose relevant to own role</li> <li>Proactively collaborates with others to achieve specific goals</li> </ul>
Planning and organising	<ul style="list-style-type: none"> <li>Plans and organises work commitments to ensure deadlines and objectives are met</li> <li>Uses formal analytical thinking techniques to recognise and respond to routine problems</li> </ul>
Technology	<ul style="list-style-type: none"> <li>Uses digital systems and tools to enter, store and monitor information</li> </ul>



## Unit Mapping Information

Supersedes and is equivalent to BSBWOR301 Organise personal work priorities and development.

## Links

Companion Volume Implementation Guide is found on VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBPEF301 Organise personal work priorities

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- prepare and implement a personal work plan.

In the course of the above, the candidate must:

- prepare a work plan according to organisational requirements and work objectives
- use technology to schedule, prioritise and monitor completion of tasks in a work plan
- assess and prioritise own work tasks and address contingencies
- monitor and assess personal performance against job role requirements by seeking feedback from relevant personnel
- identify personal development needs and access, complete and record skill development and learning.

## Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- organisational policies and procedures relevant to work tasks
- goals, objectives and key performance indicators for task within scope of job role
- methods to elicit, analyse and interpret feedback when communicating with other people in the workplace
- content of work plans including:
  - timeframes
  - tasks requirements
  - risks
  - contingencies for identified risks
- types of personal learning and professional development requirements
- principles and techniques of goal setting, measuring performance and time management

- signs and sources of stress and strategies to deal with stress in the workplace
- methods to identify and prioritise personal learning needs.

## Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- challenges and situations to demonstrate application of performance evidence.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

## Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBSTR301 Contribute to continuous improvement

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

### Application

This unit describes the skills and knowledge required to support continuous improvement in an organisation. Particular emphasis is on actively encouraging teams to participate in the process, monitoring and reporting on specified outcomes and supporting opportunities for further improvements.

The unit applies to individuals who use initiative, and organisational and communication skills to influence the ongoing development of the organisation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Critical Thinking and Problem Solving – Business Strategy

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Coordinate continuous improvement	1.1 Communicate objectives and continuous improvement processes of the organisation to team members 1.2 Establish roles and skills within the team and identify training needs and performance improvement opportunities 1.3 Encourage team members to participate in decision making processes and exercise initiative
2. Monitor and report specified outcomes	2.1 Monitor team progress using systems and technology of the organisation and identify ways planning and operations could be improved 2.2 Report changes to processes and training to relevant

ELEMENT	PERFORMANCE CRITERIA
	stakeholders 2.3 Develop plans, in collaboration with team members, to apply continuous improvement techniques and processes
3. Support opportunities for further improvement	3.1 Communicate recommendations for improvements in achieving organisational objectives to team members 3.2 Monitor work performance and support team members to identify further opportunities for improvement 3.3 Maintain records, reports and recommendations for improvement within the organisation's systems and processes

## Foundation Skills

*This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.*

SKILL	DESCRIPTION
Learning	<ul style="list-style-type: none"> <li>Contributes to ongoing organisational improvement by mentoring others to support continuous improvement processes</li> </ul>
Reading	<ul style="list-style-type: none"> <li>Interprets everyday workplace documentation</li> </ul>
Writing	<ul style="list-style-type: none"> <li>Uses appropriate vocabulary and grammatical structures to achieve precise meaning in a range of documentation</li> </ul>
Oral communication	<ul style="list-style-type: none"> <li>Articulates information in a positive manner using appropriate terminology, tone and style appropriate to context and audience</li> <li>Uses questioning and listening techniques to exchange and clarify information</li> </ul>
Enterprise and initiative	<ul style="list-style-type: none"> <li>Identifies the nature and purpose of own role and associated responsibilities and how own role relates to others and contributes to broader work goals</li> <li>Takes responsibility for adherence to organisational processes and systems</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>Shares information and resources, offers assistance and facilitates effective group interactions</li> </ul>
Planning and organising	<ul style="list-style-type: none"> <li>Takes responsibility for routine low-impact decisions within familiar situations</li> <li>Evaluates effectiveness of decisions in terms of how well they meet stated goals</li> </ul>
Technology	<ul style="list-style-type: none"> <li>Uses a range of digitally based technology and applications to organise, monitor, manage and communicate relevant information effectively</li> </ul>

## Unit Mapping Information

No equivalent unit. Supersedes but is not equivalent to:

- BSBFLM309 Support continuous improvement systems and processes
- BSBINN201 Contribute to workplace innovation.

## Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBSTR301 Contribute to continuous improvement

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- coordinate, monitor and support the continuous improvement of a work task for a team or work area.

In the course of the above, the candidate must:

- identify options and benefits for improvements
- address barriers to continuous improvement
- use analysis work performance to identify improvement opportunities
- use technology to monitor operational progress
- apply recordkeeping processes.

## Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- principles and techniques relating to:
  - continuous improvement systems and processes
  - benchmarking
  - best practice
- benefits and barriers to continuous improvement
- quality approaches that may be implemented in an organisation
- methods that can be used in continuous improvement
- organisational recording, reporting and recommendation processes.

## Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- workplace documents and resources relevant to performance evidence.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

## **Links**

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>



## BSBTWK201 Work effectively with others

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

### Application

This unit describes the skills and knowledge required to work cooperatively with others and deal effectively with issues, problems and conflict.

The unit applies to individuals who perform a range of routine tasks in a team environment and use a basic knowledge of teamwork in a defined context, under direct supervision or with limited individual responsibility.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

### Unit Sector

Social Competence – Teamwork and Relationships

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Develop effective workplace relationships	1.1 Identify individual responsibilities in relation to workgroup members 1.2 Clarify individual and workgroup responsibilities with work team 1.3 Participate in informal meetings and information sharing with workgroup 1.4 Request and apply feedback from supervisor on individual practices
2. Improve workgroup processes	2.1 Support team members to meet workgroup goals 2.2 Contribute to workgroup goals and tasks according to organisational requirements

ELEMENT	PERFORMANCE CRITERIA
	2.3 Share work-related information with workgroup according to organisational policies and procedures 2.4 Plan strategies for team performance improvement with workgroup
3. Resolve issues, problems and conflict	3.1 Identify advantages of differences in values and beliefs between workgroup members 3.2 Respond to any linguistic and cultural differences in communication styles according to legislation, organisational policies and procedures and ethical standards 3.3 Identify potential workgroup issues, problems and conflicts encountered in the workplace 3.4 Seek assistance from supervisor to address problems and conflicts that arise 3.5 Suggest possible ways of dealing with identified workplace issues

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

SKILL	DESCRIPTION
Reading	<ul style="list-style-type: none"> <li>Identifies and interprets information to determine task requirements</li> </ul>
Writing	<ul style="list-style-type: none"> <li>Completes required documentation using organisational formats</li> <li>Composes simple documents for others to read</li> </ul>
Oral Communication	<ul style="list-style-type: none"> <li>Presents information and seeks advice using language and features appropriate to audience</li> <li>Participates in discussions using listening and questioning to elicit views of others and to clarify or confirm understanding</li> </ul>
Initiative and enterprise	<ul style="list-style-type: none"> <li>Identifies responsibilities of own role and follows explicit and implicit organisational protocols and procedures</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>Selects and uses appropriate communication practices when seeking or sharing information</li> <li>Establishes and builds rapport and relationships with others to foster a culture of respect and cooperation in communications</li> <li>Listens to the ideas of others and considers their needs</li> </ul>
Planning and organising	<ul style="list-style-type: none"> <li>Plans and organises work commitments to ensure deadlines and objectives are met</li> </ul>

## Unit Mapping Information

Supersedes and is equivalent to BSBWOR203 Work effectively with others.

## Links

Companion Volume Implementation Guide is found on VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBTWK201 Work effectively with others

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- work with a group to achieve an objective on at least two occasions and address at least one identified problem or conflict on each occasion.

In the course of the above, the candidate must:

- distinguish individual responsibilities from workgroup responsibilities
- demonstrate the ability to:
  - support team members
  - communicate according to the cultural and linguistic requirements of the individual
  - act on constructive feedback
  - use communication channels to share information
  - cooperate and contribute to team goals
  - identify improvement opportunities
- identify problems and conflicts and address them according to organisational and ethical policies and procedures.

## Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- organisational and ethical standards, policies and procedures that relate to own work role
- team responsibilities and duties and their relationship to individual responsibilities and duties
- organisational policies and procedures relating to workplace discrimination and bullying
- personal values and beliefs including their importance in the development of relationships
- communication channels used to communicate in work teams including:
  - team meetings

- one-on-one interactions with individual team members
- emails
- instant messaging
- calls
- key problems and conflicts arising in workgroup contexts
- methods of resolving team problems including referral to relevant organisational personnel
- conflict resolution techniques.

## Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- workplace discrimination and bullying legislation
- organisational and ethical standards, policies and procedures for working with others.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

## Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBWHS401 Implement and monitor WHS policies, procedures and programs to meet legislative requirements

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package release 1.0

### Application

This unit describes the skills and knowledge required to implement and monitor an organisation's work health and safety (WHS) policies, procedures and programs in the relevant work area in order to meet legislative requirements.

It applies to individuals with supervisory responsibilities for implementing and monitoring the organisation's WHS policies, procedures and programs in a work area. These individuals have a broad knowledge of WHS policies and contribute well developed skills in creating solutions to unpredictable problems through analysis and evaluation of information from a variety of sources. They provide supervision and guidance to others and have limited responsibility for the output of others.

NOTE: The terms 'occupational health and safety' (OHS) and 'work health and safety' (WHS) are equivalent and generally either can be used in the workplace. In jurisdictions where the Model WHS Legislation has not been implemented RTOs are advised to contextualise the unit of competency by referring to the existing State/Territory OHS legislative requirements.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Regulation, Licensing and Risk – Work Health and Safety

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the</i>	<i>Performance criteria describe the performance needed to</i>

ELEMENT	PERFORMANCE CRITERIA
<i>essential outcomes.</i>	<i>demonstrate achievement of the element.</i>
1. Provide information to the work team about WHS policies and procedures	<p>1.1 Accurately explain to the work team relevant provisions of WHS Acts, regulations and codes of practice</p> <p>1.2 Provide information about the organisation's WHS policies, procedures and programs, and ensure it is readily accessible to, and understandable by the work team</p> <p>1.3 Regularly provide and clearly explain to the work team information about identified hazards and the outcomes of risk assessment and control</p>
2. Implement and monitor participation arrangements for managing WHS	<p>2.1 Communicate to workplace parties the importance of effective consultation mechanisms in managing health and safety risks in the workplace</p> <p>2.2 Apply consultation procedures to facilitate participation of the work team in managing work area hazards</p> <p>2.3 Promptly deal with issues raised through consultation, according to organisational consultation procedures and WHS legislative and regulatory requirements</p> <p>2.4 Promptly record and communicate to the work team the outcomes of consultation over WHS issues</p>
3. Implement and monitor organisational procedures for providing WHS training	<p>3.1 Identify WHS training needs according to organisational requirements and WHS legislative and regulatory requirements</p> <p>3.2 Make arrangements to meet WHS training needs of team members in consultation with relevant individuals</p> <p>3.3 Provide workplace learning opportunities and coaching and mentoring assistance to facilitate team and individual achievement of identified WHS training needs</p> <p>3.4 Identify and report to management the costs associated with providing training for work team, for inclusion in financial and management plans</p>
4. Implement and monitor organisational procedures and legal requirements for identifying hazards and assessing and controlling risks	<p>4.1 Identify and report on hazards in work area according to WHS policies and procedures and WHS legislative and regulatory requirements</p> <p>4.2 Promptly action team member hazard reports according to organisational procedures and WHS legislative and regulatory requirements</p> <p>4.3 Implement procedures to control risks using the hierarchy of control, according to organisational and WHS legislative requirements</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>4.4 Identify and report inadequacies in existing risk controls according to hierarchy of control and WHS legislative requirements</p> <p>4.5 Monitor outcomes of reports on inadequacies, where appropriate, to ensure a prompt organisational response</p>
5. Implement and monitor organisational procedures for maintaining WHS records for the team	<p>5.1 Accurately complete and maintain WHS records of incidents of occupational injury and disease in work area, according to WHS policies, procedures and legislative requirements</p> <p>5.2 Use aggregate information and data from work area records to identify hazards and monitor risk control procedures in work area</p>

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	1.1-1.3, 5.2	<ul style="list-style-type: none"> <li>Interprets and analyses complex WHS legislative and organisational texts</li> </ul>
Writing	1.1-1.3, 2.3, 2.4, 3.1, 3.2, 3.4, 4.1, 4.4, 5.1	<ul style="list-style-type: none"> <li>Documents WHS legislative and organisational information using structure, layout and language suitable for audience</li> <li>Records WHS issues and actions taken according to reporting requirements</li> <li>Prepares and maintains required records using appropriate structure and vocabulary</li> </ul>
Oral communication	1.1-1.3, 2.1, 2.4, 3.2, 3.3, 4.1, 4.4	<ul style="list-style-type: none"> <li>Provides WHS legislative and organisational information and advice using structure and language suitable for audience</li> </ul>
Numeracy	3.4, 5.2	<ul style="list-style-type: none"> <li>Extracts, interprets and comprehends mathematical information in relation to training costs and risk management data</li> </ul>
Navigate the world of work	1.1, 1.2, 2.3, 3.1, 4.1-4.5, 5.1	<ul style="list-style-type: none"> <li>Takes responsibility for adherence to legal and regulatory responsibilities and organisational policies and procedures in relation to WHS</li> <li>Keeps up to date on changes to WHS legislation or regulations and organisational policies and procedures</li> </ul>
Interact with	2.2, 3.2, 3.3	<ul style="list-style-type: none"> <li>Selects and uses appropriate conventions and protocols to facilitate consultation or provide feedback</li> </ul>



others		<ul style="list-style-type: none"> <li>Initiates and contributes to facilitating consultative role, responding, explaining, clarifying and expanding on ideas and information as required</li> <li>Collaborates with others to achieve individual and team outcomes</li> </ul>
Get the work done	2.2, 3.2, 3.3, 4.1-4.5, 5.1	<ul style="list-style-type: none"> <li>Uses combination of formal, logical planning and intuitive understanding of context to identify relevant information and risks, and identify and evaluate alternative strategies</li> <li>Uses formal decision-making processes, setting or clarifying goals, gathering information and identifying and evaluating choices against a set of criteria</li> <li>Recognises and takes responsibility for reporting WHS risk control inadequacies</li> <li>Uses formal and informal processes to monitor implementations of WHS solutions and reflect on outcomes</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBWHS401 Implement and monitor WHS policies, procedures and programs to meet legislative requirements	BSBWHS401A Implement and monitor WHS policies, procedures and programs to meet legislative requirements	<p>Updated to meet Standards for Training Packages</p> <p>Minor edits to clarify intent of performance criteria</p>	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBWHS401 Implement and monitor WHS policies, procedures and programs to meet legislative requirements

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

## Performance Evidence

Evidence of the ability to:

- explain clearly and accurately to work team the relevant work health and safety (WHS) information including:
  - WHS legislative and organisational requirements
  - identified hazards and outcomes of risk assessment and control
- ensure that the team has access to information about WHS policies, procedures and programs in appropriate structure and language
- implement and monitor procedures according to organisational and legislative WHS requirements including:
  - consultation and communications to enable team members to participate in managing WHS risks and hazards
  - identifying WHS training needs and providing learning opportunities, coaching and mentoring as appropriate to needs
  - identifying, reporting and taking action on WHS hazards and risks
  - identifying and reporting inadequacies in existing risk controls and monitoring outcomes to ensure a prompt organisational response
  - reporting on the cost of WHS training
  - keeping WHS records
  - analysing aggregate WHS data to identify hazards and monitor risk control procedures in work area.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

## Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- outline the legal responsibilities and duties of managers, supervisors, persons conducting businesses or undertakings (PCBUs) and workers in relation to WHS risk management in the workplace
- identify key provisions of relevant WHS Acts, regulations and codes of practice that apply to the business and outline how they apply in the work area
- explain organisational policies and procedures relating to hazard identification, risk management, fire, emergency and evacuation, incident investigation and reporting
- explain the importance of effective consultation mechanisms in managing health and safety risks in the workplace
- explain how the hierarchy of control applies in the work area.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced by individuals carrying out work health and safety duties in the workplace and include access to:

- an actual workplace or simulated environment
- workplace equipment and resources
- examples of documents relating to workplace safety, hazard identification and risk assessment
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# BSBWHS411 Implement and monitor WHS policies, procedures and programs

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Application

This unit describes the skills and knowledge required to implement and monitor an organisation's work health and safety (WHS) policies, procedures and programs in the relevant work area in order to meet legislative requirements.

The unit applies to those with supervisory responsibilities in a work area who have a broad knowledge of WHS policies and contribute well-developed skills in creating solutions to problems through analysis and evaluation of information from a variety of sources. They provide supervision and guidance to others and have limited responsibility for the output of others.

## NOTES

1. The terms 'occupational health and safety' (OHS) and 'work health and safety' (WHS) are equivalent, and generally either can be used in the workplace. In jurisdictions where *model WHS laws* have not been implemented, registered training organisations (RTOs) are advised to contextualise this unit of competency by referring to existing WHS legislative requirements.

2. The *model WHS laws* include the model WHS Act, model WHS Regulations and model WHS Codes of Practice. See Safe Work Australia for further information.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Unit Sector

Regulation, Licensing and Risk – Work Health and Safety

## Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Provide information to work team about WHS policies and procedures	1.1 Identify and communicate relevant provisions about WHS laws to work team 1.2 Provide information about organisation's WHS policies, procedures and programs, and ensure it is readily accessible to work team 1.3 Communicate information about identified hazards and outcomes of risk assessment and control to work team
2. Implement and monitor work team consultative arrangements for managing WHS	2.1 Communicate importance of consultation mechanisms in managing WHS risks to work team 2.2 Apply consultation mechanisms to facilitate work team participation in managing work area hazards, according to organisational policies and procedures 2.3 Contribute to managing issues raised through consultation mechanisms, according to organisational consultation procedures and WHS legislative requirements 2.4 Communicate outcomes of consultation about WHS issues to work team
3. Implement and monitor organisational procedures for providing WHS training to work team	3.1 Identify and document team WHS training needs according to organisational requirements and WHS laws 3.2 Make arrangements to meet WHS training needs of team members in consultation with relevant stakeholders 3.3 Provide workplace learning opportunities to facilitate team and individual achievement of identified WHS training needs
4. Implement and monitor organisational procedures and legal requirements for identifying hazards, and assessing and controlling risks	4.1 Identify and report on hazards in work area according to organisational policies and procedures, and WHS legislative requirements 4.2 Contribute to managing and implementing hazard reports according to organisational policies and procedures, and WHS legislative requirements 4.3 Implement procedures to control risks using the hierarchy of control measures according to organisational policies and procedures, and WHS legislative requirements 4.4 Identify and report inadequacies in existing risk controls according to the hierarchy of control measures, and WHS legislative requirements 4.5 Monitor outcomes of reports on inadequacies, as required, to ensure prompt organisational response

ELEMENTS	PERFORMANCE CRITERIA
5. Implement and monitor organisational procedures for maintaining WHS records	<p>5.1 Complete and maintain WHS incident records of occupational injury and disease in work area according to organisational policies and procedures, and WHS legislative requirements</p> <p>5.2 Use aggregate information and data from work area records to meet organisational recordkeeping requirements</p>

## Foundation Skills

*This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.*

Skill	Description
Reading	<ul style="list-style-type: none"> <li>Interprets and analyses WHS laws and organisational texts</li> </ul>
Writing	<ul style="list-style-type: none"> <li>Documents organisational WHS policies, procedures and programs according to WHS laws, using structure, layout and language suitable for audience</li> <li>Records WHS issues and actions taken according to reporting requirements</li> <li>Prepares and maintains required records using appropriate structure and vocabulary</li> </ul>
Oral communication	<ul style="list-style-type: none"> <li>Provides WHS organisational information and advice using structure and language suitable for audience</li> <li>Uses questioning and active listening to clarify understanding</li> </ul>
Navigate the world of work	<ul style="list-style-type: none"> <li>Adheres to legal and regulatory responsibilities, and organisational policies and procedures in relation to own WHS role and responsibilities</li> <li>Keeps up to date on changes to WHS laws, and related organisational policies and procedures relevant to own role</li> </ul>
Interact with others	<ul style="list-style-type: none"> <li>Selects and uses appropriate conventions and protocols to facilitate consultation and provide feedback</li> <li>Initiates and contributes to facilitating consultative role: responding, explaining, clarifying and expanding on ideas and information as required</li> <li>Collaborates with others to achieve individual team member and team outcomes</li> </ul>
Get the work done	<ul style="list-style-type: none"> <li>Uses combination of logical planning and intuitive understanding of context to identify relevant information and risks, and to identify and evaluate alternative strategies</li> <li>Uses decision-making processes: sets and clarifies goals, gathers</li> </ul>

Skill	Description
	<p>information, and identifies and evaluates choices against a set of criteria</p> <ul style="list-style-type: none"><li>• Takes responsibility for reporting WHS risk control inadequacies</li><li>• Uses processes to monitor implementation of WHS organisational procedures</li></ul>

## Unit Mapping Information

Supersedes and is equivalent to BSBWHS401 Implement and monitor WHS policies, procedures and programs to meet legislative requirements.

## Links

Companion Volume Implementation Guide is found on VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBWHS411 Implement and monitor WHS policies, procedures and programs

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 7.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, and to:

- implement and monitor the work health and safety (WHS) policies, procedures and programs for one work area in an organisation.

During the above, the candidate must:

- explain relevant WHS information clearly and accurately to work team
- provide work team with access to WHS policies, procedures and programs in appropriate structure and language
- implement and monitor procedures, according to WHS legislative and organisational requirements, for:
  - consultation on and communication about WHS hazards and risks
  - WHS training needs and learning opportunities
  - WHS records
  - using WHS aggregate data relating to hazards and risk control.

## Knowledge Evidence

The candidate must demonstrate the knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit. This includes knowledge of:

- key provisions of commonwealth and state/territory WHS laws that apply to the business, and procedures for their application in the work area
- organisational policies and procedures for:
  - consulting during WHS issue management
  - identifying hazards and managing risks, including using aggregate information and work area data
  - incident response, investigation and reporting



- legal responsibilities and duties of managers, supervisors, persons conducting a business or undertaking (PCBUs) and workers in relation to WHS risk management in the workplace
- procedures for assessing implications of near misses in relation to incidents, injuries and illnesses in the work area
- effective consultation mechanisms in managing health and safety risks in the workplace
- features of effective workplace learning opportunities, including coaching and mentoring assistance that facilitates team and individual achievement of WHS training needs
- key principles and components of the hierarchy of control measures
- procedures for applying the hierarchy of control measures in own work area.

## Assessment Conditions

Assessment must comply with WHS laws, legal responsibilities and duty of care required for this unit. It must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities undertaken by individuals carrying out WHS duties in the workplace, and must include access to:

- actual workplace or simulated environment
- workplace equipment and resources
- examples of documents about workplace safety, hazard identification and risk assessment
- WHS laws and organisational documentation required to demonstrate the performance evidence
- opportunities for interaction with others.

Assessors of this unit must satisfy the assessor requirements in applicable vocational education and training legislation, frameworks and/or standards.

## Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## BSBWOR203 Work effectively with others

### Modification History

Release	Comments
Release 2	This version first released with BSB Business Services Training Package Version 1.1. Version created to correct mapping table information
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Application

This unit describes the skills and knowledge required to work cooperatively with others and deal effectively with issues, problems and conflict.

It applies to individuals who perform a range of routine tasks using a limited range of practical skills, and a fundamental knowledge of teamwork in a defined context under direct supervision or with limited individual responsibility.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

### Unit Sector

Industry Capability – Workplace Effectiveness

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Develop effective workplace relationships	1.1 Identify own responsibilities and duties in relation to workgroup members and undertake activities in a manner that promotes cooperation and good relationships 1.2 Take time and resource constraints into account in fulfilling

ELEMENT	PERFORMANCE CRITERIA
	work requirements of self and others 1.3 Encourage, acknowledge and act on constructive feedback provided by others in the workgroup
2. Contribute to workgroup activities	2.1 Provide support to team members to ensure workgroup goals are met 2.2 Contribute constructively to workgroup goals and tasks according to organisational requirements 2.3 Share information relevant to work with workgroup to ensure designated goals are met 2.4 Identify and plan strategies/opportunities for improvement of workgroup in liaison with workgroup
3. Deal effectively with issues, problems and conflict	3.1 Respect differences in personal values and beliefs and their importance in the development of relationships 3.2 Identify any linguistic and cultural differences in communication styles and respond appropriately 3.3 Identify issues, problems and conflict encountered in the workplace 3.4 Seek assistance from workgroup members when issues, problems and conflict arise and suggest possible ways of dealing with them as appropriate or refer them to the appropriate person

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	1.1	<ul style="list-style-type: none"> <li>Identifies and interprets information to determine task requirements</li> </ul>
Writing	2.3, 2.4	<ul style="list-style-type: none"> <li>Completes required documentation using organisational formats</li> <li>Composes simple documents for others to read</li> </ul>
Oral Communication	1.3, 3.2, 3.4	<ul style="list-style-type: none"> <li>Presents information and seeks advice using language and features appropriate to audience</li> <li>Participates in discussions using listening and questioning to elicit views of others and to clarify or</li> </ul>

		confirm understanding
Numeracy	1.2	<ul style="list-style-type: none"> <li>Interprets information related to timeframes and resource quantities</li> </ul>
Navigate the world of work	1.1, 2.2	<ul style="list-style-type: none"> <li>Understands responsibilities of own role and follows explicit and implicit organisational protocols and procedures</li> </ul>
Interact with others	1.1, 1.3, 2.1-2.4, 3.1, 3.2, 3.4	<ul style="list-style-type: none"> <li>Selects and uses appropriate communication practices when seeking or sharing information Establishes and builds rapport and relationships with others to foster a culture of respect and cooperation in communications</li> </ul>
Get the work done	1.2, 2.4, 3.3, 3.4	<ul style="list-style-type: none"> <li>Plans and organises work commitments to ensure deadlines and objectives are met</li> <li>Uses formal analytical thinking techniques to recognise and respond to routine problems</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBWOR203 Work effectively with others	BSBWOR203B Work effectively with others	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# Assessment Requirements for BSBWOR203 Work effectively with others

## Modification History

Release	Comments
Release 2	This version first released with BSB Business Services Training Package Version 1.1.  Version created to correct mapping table information
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

## Performance Evidence

Evidence of the ability to:

- identify own responsibilities in relation to the team and the organisation's requirements
- work effectively in a workgroup including:
  - supporting team members
  - using culturally appropriate communication skills
  - acting on constructive feedback
  - cooperating and contributing to team goals
  - identifying improvement opportunities
- identify problems and conflicts and address them appropriately.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

## Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- outline the organisational standards, policies and procedures that relate to own work role
- outline team responsibilities and duties and their relationship to individual responsibilities and duties.
- summarise conflict resolution techniques.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced in the industry capability – workplace effectiveness field of work and include access to:

- office equipment and resources
- workplace documentation
- case studies and, where possible, real situations
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

# BSBWOR301 Organise personal work priorities and development

## Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

## Application

This unit describes the skills and knowledge required to organise own work schedules, to monitor and obtain feedback on work performance and to maintain required levels of competence.

This unit applies to individuals who exercise discretion and judgement and apply a broad range of competencies in various work contexts.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

## Unit Sector

Industry Capability – Workplace Effectiveness

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Organise and complete own work schedule	<p>1.1 Ensure that work goals, objectives or Key Performance Indicators (KPIs) are understood, negotiated and agreed in accordance with organisational requirements</p> <p>1.2 Assess and prioritise workload to ensure tasks are completed within identified timeframes</p> <p>1.3 Identify factors affecting the achievement of work objectives and incorporate contingencies into work plans</p> <p>1.4 Use business technology efficiently and effectively to manage</p>

ELEMENT	PERFORMANCE CRITERIA
	and monitor scheduling and completion of tasks
2. Monitor own work performance	<p>2.1 Accurately monitor and adjust personal work performance through self assessment to ensure achievement of tasks and compliance with legislation and work processes or KPIs</p> <p>2.2 Ensure that feedback on performance is actively sought and evaluated from colleagues and clients in the context of individual and group requirements</p> <p>2.3 Routinely identify and report on variations in the quality of products and services according to organisational requirements</p> <p>2.4 Identify signs of stress and effects on personal wellbeing</p> <p>2.5 Identify sources of stress and access appropriate supports and resolution strategies</p>
3. Co-ordinate personal skill development and learning	<p>3.1 Identify personal learning and professional development needs and skill gaps using self assessment and advice from colleagues and clients in relation to role and organisational requirements</p> <p>3.2 Identify, prioritise and plan opportunities for undertaking personal skill development activities in liaison with work groups and relevant personnel</p> <p>3.3 Access, complete and record professional development opportunities to facilitate continuous learning and career development</p> <p>3.4 Incorporate formal and informal feedback into review of further learning needs</p>

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Learning	3.1-3.4	<ul style="list-style-type: none"> <li>Employs a range of approaches and investigative techniques to source the knowledge necessary to arrange personal learning experiences</li> </ul>
Reading	1.1, 1.2, 2.1	<ul style="list-style-type: none"> <li>Interprets textual information to determine organisation's procedures, own work performance and objectives</li> </ul>



Writing	1.3, 1.4, 2.3, 3.1, 3.2, 3.3	<ul style="list-style-type: none"> <li>Prepares written reports and workplace documents that communicate information clearly and effectively</li> </ul>
Oral Communication	2.2, 2.3, 3.1, 3.2	<ul style="list-style-type: none"> <li>Clearly gives and receives feedback using specific and relevant language</li> <li>Uses listening and questioning techniques to confirm understanding</li> </ul>
Numeracy	1.1, 1.3	<ul style="list-style-type: none"> <li>Understands responsibilities and scope of role and complies with organisational policies, procedures and protocols</li> </ul>
Interact with others	1.1, 2.2, 2.3, 3.1, 3.2	<ul style="list-style-type: none"> <li>Selects the appropriate form, channel and mode of communication for a specific purpose relevant to own role</li> <li>Fosters and nurtures a culture of constructive and respectful feedback</li> <li>Proactively collaborates with others to achieve specific goals</li> </ul>
Get the work done	1.2, 1.3, 1.4, 2.4, 2.5, 3.2	<ul style="list-style-type: none"> <li>Plans and organises work commitments to ensure deadlines and objectives are met</li> <li>Uses formal analytical thinking techniques to recognise and respond to routine problems</li> <li>Uses digital systems and tools to enter, store and monitor information</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBWOR301 Organise personal work priorities and development	BSBWOR301B Organise personal work priorities and development	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## Assessment Requirements for BSBWOR301 Organise personal work priorities and development

### Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

### Performance Evidence

Evidence of the ability to:

- prepare a work plan according to organisational requirements and work objectives
- use business technology to schedule, prioritise and monitor completion of tasks in a work plan
- assess and prioritise own work load and deal with contingencies
- monitor and assess personal performance against job role requirements by seeking feedback from colleagues and clients
- identify personal development needs and access, complete and record skill development and learning.

Note: if a specific volume or frequency is not stated, then evidence must be provided at least once.

### Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- outline key provisions of legislation that relate to own work role
- describe goals, objectives or key performance indicators of own work role
- explain ways to elicit, analyse and interpret feedback when communicating with other people in the workplace
- explain the principles and techniques of goal setting, measuring performance, time management and personal assessment of learning and development needs
- explain signs and sources of stress and strategies to deal with stress in the workplace
- identify methods to identify and prioritise personal learning needs.

## Assessment Conditions

Assessment must be conducted in a safe environment where evidence gathered demonstrates consistent performance of typical activities experienced in the industry capability - workplace effectiveness field of work and include access to:

- office equipment and resources
- work schedules and performance improvement plans
- workplace documentation and resources
- case studies and, where possible, real situations
- interaction with others.

Assessors must satisfy NVR/AQTF assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=11ef6853-ceed-4ba7-9d87-4da407e23c10>

## CHCCOM002 Use communication to build relationships

### Modification History

Release	Comments
Release 2	This version was released in <i>CHC Community Services Training Package release 3.0</i> . Amended modification history and mapping. Equivalent outcome.
Release 1	This version was released in <i>CHC Community Services Training Package release 2.0</i> and meets the requirements of the 2012 Standards for Training Packages. Significant changes to performance criteria. New evidence requirements for assessment including volume and frequency requirements. Significant changes to knowledge evidence.

### Application

This unit describes the skills and knowledge to apply specific communication techniques to establish, build and maintain relationships with clients, colleagues and other stakeholders based on respect and trust.

This unit applies to work across a range of workplace contexts where workers at all levels may communicate with individuals and/or groups both in person and in writing.

*The skills in this unit must be applied in accordance with Commonwealth and State/Territory legislation, Australian/New Zealand standards and industry codes of practice.*

### Elements and Performance Criteria

#### ELEMENT

#### PERFORMANCE CRITERIA

*Elements define the essential outcomes*

*Performance criteria describe the performance needed to demonstrate achievement of the element*

1. Communicate with clients and co-workers

- 1.1 Identify and use appropriate communication techniques to communicate with clients and colleagues
- 1.2 Communicate in a manner that demonstrates respect,

**ELEMENT****PERFORMANCE CRITERIA**

*Elements define the essential outcomes*

*Performance criteria describe the performance needed to demonstrate achievement of the element*

accepts individual differences and upholds rights

1.3 Represent the organisation appropriately and in accordance with communication policies and protocols

1.4 Provide information to clients and service providers in accordance with communication policies and protocols

2. Address communication needs

2.1 Recognise and support communication needs of clients, colleagues and external networks

2.2 Facilitate access to interpreter and translation services as required

2.3 Identify and address problems and communication barriers

2.4 Defuse conflict or potentially difficult situations with clients and colleagues and refer in accordance with organisational requirements

2.5 Seek and respond to feedback on the effectiveness of communication with clients, colleagues and external networks

3. Facilitate meetings

3.1 Develop an agenda and list of invited participants in consultation with appropriate people

3.2 Communicate details of the meeting to the participants and other stakeholders in accordance with organisation communication protocols

3.3 Contribute to and follow objectives and agendas for meeting

3.4 Provide opportunities to fully explore all relevant issues and provide relevant information

3.5 Use strategies that encourage all members to participate equally, including seeking and acknowledging contributions from all members

3.6 Implement strategies to ensure the specific communication needs of individuals within the meeting are identified and addressed

3.7 Facilitate the resolution of conflict between

**ELEMENT**

*Elements define the essential outcomes*

**PERFORMANCE CRITERIA**

*Performance criteria describe the performance needed to demonstrate achievement of the element*

participants

3.8 Minute or record meeting in accordance with organisation requirements

3.9 Evaluate meeting processes and identify lessons learned or opportunities for improvement

**Foundation Skills**

The Foundation Skills describe those required skills (language, literacy, numeracy and employment skills) that are essential to performance.

*Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.*

**Unit Mapping Information**

No equivalent unit.

**Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5e0c25cc-3d9d-4b43-80d3-bd22cc4f1e53>

## Assessment Requirements for CHCCOM002 Use communication to build relationships

### Modification History

Release	Comments
Release 2	This version was released in <i>CHC Community Services Training Package release 3.0</i> .  Amended modification history and mapping. Equivalent outcome.
Release 1	This version was released in <i>CHC Community Services Training Package release 2.0</i> and meets the requirements of the 2012 Standards for Training Packages.  Significant changes to performance criteria. New evidence requirements for assessment including volume and frequency requirements. Significant changes to knowledge evidence.

### Performance Evidence

The candidate must show evidence of the ability to complete tasks outlined in elements and performance criteria of this unit, manage tasks and manage contingencies in the context of the job role. There must be demonstrated evidence that the candidate has:

- obtained feedback from 3 clients or colleagues on effectiveness of communication and responded appropriately
- prepared 3 types of written correspondence in accordance with organisation communication protocols
- facilitated resolution of 1 difficult situation with a client, colleague or service provider
- facilitated 1 meeting around a workplace issue

### Knowledge Evidence

The candidate must be able to demonstrate essential knowledge required to effectively complete tasks outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the work role. This includes knowledge of:

- organisation communication policies and protocols
- different communication styles and techniques, and how they impact on interpersonal communication, including:
  - strategies for effective interpersonal communication

- person centred and rights based approaches
- cross-cultural communication protocols
- non-verbal communication cues
- group processes and dynamics
- motivational interviewing versus coercive approach
- collaboration versus confrontation
- communication strategies to:
  - build and maintain relationships and trust
  - facilitate workplace meetings
  - negotiate for optimal outcomes
  - deliver business presentations
  - address barriers
  - solve problems and resolve conflict
- types of interpretation and translation services specific to the client group, and how to access them
- factors that commonly contribute to the development of communication barriers including high emotions, mistrust or misunderstandings
- professional relationship boundaries
- digital media and use in community services and health sector, including:
  - web
  - email
  - social media
  - podcast and videos
  - tablets and applications
  - newsletters and broadcasts
  - intranet
- written correspondence protocols and style guides, including letters, emails, minutes, case notes, reports

## Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including use of real workplace policies and procedures
- modelling typical workplace conditions, including:
  - interactions with clients and co-workers from a range of diverse backgrounds
  - facilitation of groups of at least 3 people
  - typical workplace reporting processes
  - interpreter and translation services where required
  - use of digital media



Assessors must satisfy the Standards for Registered Training Organisations (RTOs) 2015/AQTF mandatory competency requirements for assessors.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5e0c25cc-3d9d-4b43-80d3-bd22cc4f1e53>

# **MARAO01 Contribute to safe cargo operations on liquefied gas tankers**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to recognise hazards associated with liquefied gas tankers and to apply appropriate hazard control measures to ensure safe cargo operation.

This unit applies to seafarers required to assist in the safe operation of a liquefied gas tanker.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

A – Handling Cargo and Vessel Stability

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Determine characteristics of tanker cargo and tankers to ensure safe transfer and transport of cargo**

- 1.1 Features of various types of liquefied gas tankers are outlined
- 1.2 Cargo operations of tankers are identified
- 1.3 Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations are outlined

- |  |     |  |
|--|-----|--|
|  | 1.4 | Hazards associated with the transport of cargo are clarified according to emergency response documentation   |
|  | 1.5 | Hazard controls associated with tanker cargo are employed according to organisational procedures   |
| <b>2 Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo</b> | 2.1 | Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified |
|  | 2.2 | SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel   |
|  | 2.3 | Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo                             |
| <b>3 Take precautions to prevent hazards</b>   | 3.1 | Organisational policies and procedures to minimise hazards are identified  |
|  | 3.2 | Type and severity of the hazard posed by cargo is recognised   |
|  | 3.3 | Transfer and transport of cargo is monitored to prevent hazards  |
|  | 3.4 | Gas monitoring equipment is regularly inspected and used according to organisational procedures  |
| <b>4 Act on becoming aware of a hazardous situation</b>  | 4.1 | Source of hazard is identified according to organisational procedures  |
|  | 4.2 | Risk is assessed considering severity and likelihood of consequences   |
|  | 4.3 | Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for further action                                |
|  | 4.4 | Containment procedures are applied where appropriate   |
|  | 4.5 | Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures                                      |
|  | 4.6 | Risk is eliminated where possible, and if not practical, actions are taken to control risk   |
| <b>5 Take precautions to prevent pollution of</b>  | 5.1 | Procedures to prevent pollution are identified and observed at all times   |

**the environment  
from release of  
liquefied gases**

- 5.2 Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
- 5.3 All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud
- 5.4 Shore-based response personnel are promptly notified when a vapour leak or cloud occurs

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Cargo operations must include:

- cargo handling equipment
- emergency shut-down system (ESS)
- loading, unloading and care in transit
- piping systems and valves
- tank cleaning, purging, gas-freeing and inerting

Properties must include:

- chemical symbols
- pressure and temperature including vapour pressure/temperature relationship
- types of electrostatic charge generation

- Cargo must include:
- ammonia
  - butadiene
  - ethylene
  - liquefied natural gas (LNG)
  - liquefied petroleum gas (LPG)
  - propylene
  - vinyl chloride
- Hazards must include:
- corrosion hazards
  - electrostatic hazards
  - environmental hazards
  - explosion and flammability hazards
  - extremely low temperatures
  - health hazards
  - pressure hazards
  - reactivity hazards
  - sources of ignition
  - toxicity hazards
  - vapour leaks and clouds
- Hazard controls must include:
- anti-static measures
  - atmospheric control
  - cargo inhibition
  - gas testing
  - importance of cargo compatibility
  - inerting, drying and monitoring techniques
  - segregation
  - ventilation
- Gas monitoring equipment must include:
- gas monitoring instruments
  - oxygen indicators
- Firefighting equipment must include:
- firefighting agents
  - fixed dry chemical systems
  - fixed foam systems
  - portable foam systems

- Measures must include:
- assisting in implementing shipboard spill containment procedures
  - reporting relevant information to the responsible person

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARA3001A Contribute to safe cargo operations on liquefied gas tankers.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA001 Contribute to safe cargo operations on liquefied gas tankers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating clearly and effectively
- correctly identifying safety data sheets (SDS)/material safety data sheets (MSDS), relevant cargo-related hazards to vessel and to personnel, and taking appropriate action according to organisational procedures
- ensuring cargo operations are carried out according to accepted principles and procedures to ensure safety of operations
- identifying and acting on becoming aware of a hazardous situation, according to organisational procedures
- interpreting and applying knowledge of liquefied gas tanker layouts, tanker cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of liquefied gas tankers
- reading and interpreting SDS/MSDS
- recognising problems and hazards that can arise when managing safety on a liquefied gas tanker, taking appropriate remedial action and initiating appropriate solutions.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anti-static measures in hazard control
- atmospheric control
- cargo handling equipment
- cargo inhibition in hazard control
- corrosion hazards associated with tanker operations
- emergency shut-down system (ESD)
- environmental hazards associated with tanker operations
- explosion and flammability hazards associated with tanker operations
- extremely low temperatures associated with tanker operations
- gas testing

- general arrangement and construction of liquefied gas tankers
- health hazards associated with tanker operations
- importance of cargo compatibility
- inerting, drying and monitoring techniques in hazard control
- information on a SDS/MSDS
- loading, unloading and care in transit
- piping systems and valves
- pressure and temperature, including vapour pressure/temperature relationship
- pressure hazards associated with tanker operations
- properties and characteristics of liquefied gas
- reactivity hazards associated with tanker operations
- relevant chemical symbols
- relevant firefighting operations and the use of firefighting installations
- segregation in hazard control
- sources of ignition associated with tanker operations
- tanker cleaning, purging, gas-freeing and inerting
- tanker safety culture and safety management
- types of electrostatic charge generation
- types of liquefied gas tankers
- vapour leaks and clouds associated with tanker operations
- ventilation in hazard control
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals



- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARA002 Contribute to safe cargo operations on oil and chemical tankers

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to recognise hazards associated with oil and chemical tankers and apply appropriate hazard control measures to ensure safe cargo operation.

This unit applies to seafarers required to assist in the safe operation of oil and chemical tankers.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |     |  |     |  |     |   |
|---|--|-----|--|-----|--|-----|---|
| <b>1 Recognise characteristics of tanker cargo and tankers to ensure the safe transfer and transport of cargo</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Features of various types of oil and chemical tankers are outlined</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Cargo operations of tankers are identified</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is</td></tr></table> | 1.1 | Features of various types of oil and chemical tankers are outlined | 1.2 | Cargo operations of tankers are identified | 1.3 | Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is |
| 1.1   | Features of various types of oil and chemical tankers are outlined   |     |  |     |  |     |   |
| 1.2   | Cargo operations of tankers are identified   |     |  |     |  |     |   |
| 1.3   | Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is  |     |  |     |  |     |   |

		recognised
	1.4	Hazards associated with the transport of cargo are clarified according to emergency response documentation
	1.5	Hazard controls associated with tanker cargo are employed according to organisational procedures
<b>2</b>	<b>Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo</b>	
	2.1	Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified
	2.2	SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel
	2.3	Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo
<b>3</b>	<b>Take precautions to prevent hazards</b>	
	3.1	Organisational policies and procedures to minimise hazards are identified
	3.2	Type and severity of hazard posed by cargo is recognised
	3.3	Transfer and transport of cargo is monitored to prevent hazards
	3.4	Monitoring equipment, where installed, is regularly inspected and used according to organisational procedures
<b>4</b>	<b>Act on becoming aware of a hazardous situation</b>	
	4.1	Source of hazard is identified according to organisational procedures
	4.2	Risk is assessed considering severity and likelihood of consequences
	4.3	Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for permission or further action
	4.4	Containment procedures are applied where appropriate
	4.5	Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures
	4.6	Risk is eliminated where possible, and if not practical, actions are taken to control risk
	4.7	Appropriate firefighting equipment is identified to carry out

### firefighting operations

- |  |     |   |
|--|-----|---|
| <b>5 Take precautions to prevent pollution of the environment from the release of oil or chemicals</b> | 5.1 | Procedures to prevent pollution are identified and observed at all times  |
|  | 5.2 | Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures         |
|  | 5.3 | All relevant information is immediately reported to appropriate persons when a spill is detected or a malfunction has occurred that poses a risk of a spill |
|  | 5.4 | All required spill containment procedures are correctly implemented according to regulatory requirements and organisational procedures                      |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Features of various types of oil and chemical tankers must include:

- general arrangement and construction
- types of oil and chemical tankers

Cargo operations must include:

- cargo handling equipment
- loading, unloading and care in transit
- piping systems and valves

	<ul style="list-style-type: none"><li>• tank cleaning, purging, gas-freeing and inerting</li></ul>
Properties must include:	<ul style="list-style-type: none"><li>• chemical symbols</li><li>• pressure and temperature including vapour pressure/temperature relationship</li><li>• types of electrostatic charge generation</li></ul>
Cargo must include:	<ul style="list-style-type: none"><li>• chemicals</li><li>• oil</li></ul>
Hazards must include:	<ul style="list-style-type: none"><li>• corrosion hazards</li><li>• electrostatic hazards</li><li>• environmental hazards</li><li>• explosion and flammability hazards</li><li>• health hazards</li><li>• pressure hazards</li><li>• reactivity hazards</li><li>• sources of ignition</li><li>• toxicity hazards</li><li>• vapour leaks and clouds</li></ul>
Hazard controls must include:	<ul style="list-style-type: none"><li>• anti-static measures</li><li>• atmospheric control</li><li>• cargo inhibition</li><li>• gas testing</li><li>• importance of cargo compatibility</li><li>• inerting, drying and monitoring techniques</li><li>• segregation</li><li>• ventilation</li></ul>
Firefighting equipment must include:	<ul style="list-style-type: none"><li>• firefighting agents</li><li>• fixed dry chemical systems</li><li>• fixed foam systems</li><li>• portable foam systems</li></ul>
Measures must include:	<ul style="list-style-type: none"><li>• assisting in implementing shipboard spill containment procedures</li><li>• reporting relevant information to the responsible person</li></ul>

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARA3002A Contribute to safe cargo operations on oil and chemical tankers.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA002 Contribute to safe cargo operations on oil and chemical tankers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating clearly and effectively
- correctly identifying safety data sheets (SDS)/material safety data sheets (MSDS), relevant cargo-related hazards to vessel and to personnel, and taking appropriate action
- ensuring cargo operations are carried out according to accepted principles and procedures to ensure safety of operations
- identifying and acting on becoming aware of hazardous situation
- interpreting and applying knowledge of tanker layouts, tanker cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of tankers and gas carriers
- reading and interpreting SDS/MSDS
- recognising problems and hazards that can arise when managing safety on a tanker, taking appropriate remedial action and initiating appropriate solutions.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- actions to be taken in the event of spillage
- cargo pumps
- corrosion hazards
- effects of oil and chemical pollution on human and marine life
- features and characteristics of various types of tanker cargo
- functions and processes for the calibration of various types of measuring instruments and devices used to test environments on tankers and gas carriers
- general arrangement and construction of tankers
- hazard controls
- hazard control procedures on tankers and gas carriers
- hazards and control measures associated with tanker cargo operations
- hazards associated with:
  - tanker operations

- carriage of bulk liquids and gases
- hazards to the environment
- information on SDS/MSDS
- Loading and unloading
- measures to be taken in the event of spillage
- physical properties of oil and chemicals
- piping systems and valves
- principles of chemistry as they relate to tanker operations
- procedures for the safe use of personal protective equipment
- procedures to prevent air and water pollution
- reactivity hazards
- shipboard procedures to prevent pollution
- tanker cleaning, purging, gas-freeing and inerting
- tanker safety culture and safety management
- terminology relating to the structure capacities and operations of various types of tankers and gas carriers
- types of oil and chemical tankers
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARAO03 Manage loading, discharging and stowing of cargo

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to manage the loading, discharging and stowage of cargo to prevent damage or deterioration and to deliver it, as far as is possible, in as good a condition and order as it was when received aboard.

This unit applies to people working in the maritime industry in the capacity of Master on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Plan the stow

- 1.1 Loading manual is interpreted to determine operational loading conditions
- 1.2 Still water shear forces and bending moments in any load or ballast condition are known and not exceeded
- 1.3 Load is planned to ensure stresses in vessel are minimised by evenly distributing cargo
- 1.4 Load is planned to avoid incompatible cargo stowage

- 1.5 Regulations relating to hazardous materials/dangerous goods are observed, where appropriate
- 1.6 Load is planned for unloading sequence
- 1.7 Vessel cargo carrying capacity is not exceeded for appropriate load line
- 1.8 Vessel trim is calculated to allow for optimum vessel performance at sea
- 2 Plan load/unload with stevedores**
  - 2.1 Available port/vessel cargo handling gear and equipment is determined
  - 2.2 Handling capacity of cargo handling gear and equipment is established
  - 2.3 Pumping capacity of cargo pumps is verified
  - 2.4 Availability and status of human resources is resolved
  - 2.5 Cargo manifest is made available
  - 2.6 Cargo stowage plan is completed and agreed with stevedores
  - 2.7 Stability calculation is made and checked against vessel stability information manual
  - 2.8 Notice of readiness to load/unload is provided
- 3 Prepare for loading**
  - 3.1 Holds are checked to ensure they are clean, dry and free of smell
  - 3.2 Safety arrangements in holds are verified to ensure they are operational
  - 3.3 Supplies of dunnage and mats are reviewed to ensure there are sufficient available
  - 3.4 Bilges are covered with tarpaulins/wrappers before loading
  - 3.5 Checks are made to ensure cargo is correctly identified, inspected and confirmed against documentation
  - 3.6 Preparations for loading are monitored according to stowage plan and organisational procedures
- 4 Control loading/unloading of**
  - 4.1 Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan

- |   |     |   |
|---|-----|---|
| <b>cargo</b>                                  | 4.2 | Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations   |
|   | 4.3 | Loading/unloading is monitored to ensure loading rate is not exceeded in the case of bulk or liquid cargo   |
|   | 4.4 | Vessel stability is observed during loading/unloading operations  |
|   | 4.5 | Loading/unloading operations are checked against stowage plan   |
|   | 4.6 | Cargo is secured and lashed according to lashing plan   |
|   | 4.7 | All cargo handling documentation is completed according to organisational procedures and regulatory requirements  |
| <b>5 Manage ballast management operations</b> | 5.1 | Ballast discharge requirements of port authority are complied with  |
|   | 5.2 | Ballast management activities are monitored according to organisational procedures and port authority requirements  |
|   | 5.3 | Ballast management problems are identified and appropriate action is taken to minimise risk to the environment  |
| <b>6 Monitor care of cargo during voyage</b>  | 6.1 | Vessel plan for care of cargo during the voyage is implemented according to organisational and customer requirements, and relevant regulations  |
|   | 6.2 | Ventilation and humidity control systems are checked  |
|   | 6.3 | Action required to maintain the wellbeing of cargo during the voyage is initiated according to customer requirements and organisational procedures  |
|   | 6.4 | Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain safety of personnel, cargo and vessel |
|   | 6.5 | Appropriate action is taken in the event of a cargo-related incident or emergency to rectify problem, secure cargo and maintain safety of vessel and personnel                              |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Cargo includes one or more of the following:

- bulk cargo
- containerised cargo
- deck cargo
- liquid cargo
- refrigerated cargo
- any other material, equipment or machinery that may be safely handled and stowed on the vessel

Hazardous materials/dangerous goods include one or more of the following:

- any cargo described in the International Maritime Dangerous Goods (IMDG) Code as hazardous or dangerous

Cargo handling gear and equipment includes one or more of the following:

- cargo pumps
- cranes
- derricks
- grabs
- hooks, wires and shackles
- slings

Cargo stowage plan must include:

- cargo weight
- correct description and stowage of hazardous and dangerous

goods

- description of cargo to be loaded
- load/discharge port
- segregation of non compatible cargo

Ballast management problems include one or more of the following:

- confirmation that the stowage plan conforms to stability requirements at all stages of loading and discharging
- contaminated ballast
- failure of ballast pumps

Cargo-related incidents or emergencies include one or more of the following:

- cargo handling gear failure
- cargo shift
- leakage
- spontaneous combustion

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARA4001A Manage loading, discharging and stowing of cargo.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA003 Manage loading, discharging and stowing of cargo**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- developing effective planning document
- identifying and solving problems related to loading, stowage, security and unloading of cargo
- interpreting stability manual and ensuring stability calculations are within appropriate parameters for proposed cargo operation
- monitoring use of equipment involved in loading, stowage, security and unloading of cargo
- producing reliable documentation
- reading, interpreting and applying instructions, regulations, procedures and information relevant to loading, stowage, security and unloading of cargo.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- ballast management issues and procedures
- cargo handling documentation requirements
- container position numbering
- design of vessel hold
- effects on cargo handling of sea conditions, wind and weather
- effects of different types of cargo operations on vessel trim and stability
- effects upon stability during loading and discharging operations including heeling moments from gear and loads
- homogenous loading
- main stresses set up by cargo, hogging, sagging and shearing
- methods of;
  - handling various types of cargo
  - caring for various types of cargo

- operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- principles of cargo care
- procedures for carrying out calculations involving weights, capacities, stowage factors, load densities
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) and cargo handling legislation, codes of practice, policies and procedures
- standard stowage position numbering systems used on container vessels
- static and dynamic loads
- survey and inspection requirements for cargo handling equipment
- types of lashing devices
- typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- typical types and sizes of shipping containers
- usual methods of packing, loading and discharging, stowage, dunnaging etc.
- use of cargo handling gear including purchases and tackles
- various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements; their hazards and problems, and appropriate preventative and remedial action and solutions
- ways of restricting vessel stress levels within permitted levels within permitted limits during loading/discharging cargo.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>





## MARAO04 Manage vessel stability

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to manage the dynamic factors affecting the stability of a vessel up to 80 metres.

This unit applies to people working in the capacity of Master on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

A - Handling Cargo and Vessel Stability

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                              |   |
|------------------------------|---|
| <b>1 Calculate stability</b> | 1.1 Vessel stability data book is made available and checked for endorsement                |
|                              | 1.2 Data is interpreted to determine safety parameters for vessel                           |
|                              | 1.3 Stability is accurately calculated using data extracted from vessel stability data book |
|                              | 1.4 Stability calculations are checked to ensure they correlate                             |

- with data set out in vessel stability book
- 1.5 Miscalculations or unsafe conditions are recognised and recalculated or checked
  - 1.6 Calculated stability data is recorded using appropriate units and correct number of significant figures
- 2 Control vessel stress and stability**
- 2.1 Information from vessel stability information is used to determine loading limits and displacement from draft
  - 2.2 Vessel weight distribution is managed to maintain stability condition within safe limits at all times and regulatory requirements are complied with under all conditions of loading
  - 2.3 Relevant stability information is correctly communicated to others as required
  - 2.4 Stability conditions of vessel are managed in adverse weather conditions
  - 2.5 Emergencies that may jeopardise vessel stability are recognised and appropriate action is taken
- 3 Maintain records of stability management**
- 3.1 Data and information related to stability management is accurately recorded
  - 3.2 Data and information related to stability management is filed and stored according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Stability calculations must include:

- correlation against stability book data
- draft
- final height of the centre of gravity above the keel of a vessel (KG)
- trim

Loading limits include one or more of the following:

- not exceeding allowable passenger carrying capacity and distribution
- not exceeding vessel designed cargo carrying capacity
- understanding the effect of fuel, fresh water and ballast on cargo capacity

Emergencies include one or more of the following:

- cargo shift
- damaged hull
- flooding of cargo spaces

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARA4002A Manage vessel stability.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARA004 Manage vessel stability

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- attending to appropriate level of detail in recordkeeping
- carrying out basic calculations associated with maintaining vessel stability
- managing loading and weight distribution of vessel to ensure assigned load line conditions are not exceeded
- managing stability of vessel in a range of conditions
- producing reliable documentation
- recognising problems affecting vessel stability.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bilging and permeability
- centroids and centre of gravity
- change of draught and trim (MCT)
- conditions of stable, neutral and unstable equilibrium and effects of disturbing vessel from upright
- construction features and stress characteristics for vessels
- density and specific gravity
- dockwater and freshwater allowance
- effects of free surface of liquids
- factors that affect the rolling period of vessel
- forces and moments
- information contained in stability data books
- loading and discharging weights
- principal stresses that act on the structure of a vessel
- principles of vessel stability
- procedures for carrying out basic calculations associated with vessel stability

- relationship between light displacement, loaded displacement and deadweight tonnage
- stability curves
- steps involved in bringing an unstable vessel to a stable condition
- tonnes per centimetre immersion (TPC)
- transverse and longitudinal dynamics
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARA005 Maintain vessel stability

### Modification History

Release 2. Application, Elements and Performance Criteria and other minor edits were corrected to include relevant information.

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to determine the stability and trim of a vessel to ensure that stability conditions of vessel comply with intact stability criteria under all conditions of loading.

This unit applies to the work of a Watchkeeper Deck, Master up to 500 gross tonnage and Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

A – Handling Cargo and Vessel Stability

### Unit Sector

Not applicable.

### Elements and Performance Criteria

- |                              |   |     |  |     |   |     |   |     |   |
|------------------------------|---|-----|--|-----|---|-----|---|-----|---|
| <b>1 Calculate stability</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Vessel stability data book is accessed and checked for endorsement</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Data is interpreted to determine vessel safety parameters</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Stability is accurately calculated using data extracted from vessel stability data book</td></tr><tr><td style="vertical-align: top;">1.4</td><td>Stability calculations are checked to ensure they correlate</td></tr></table> | 1.1 | Vessel stability data book is accessed and checked for endorsement | 1.2 | Data is interpreted to determine vessel safety parameters | 1.3 | Stability is accurately calculated using data extracted from vessel stability data book | 1.4 | Stability calculations are checked to ensure they correlate |
| 1.1                          | Vessel stability data book is accessed and checked for endorsement  |     |  |     |   |     |   |     |   |
| 1.2                          | Data is interpreted to determine vessel safety parameters   |     |  |     |   |     |   |     |   |
| 1.3                          | Stability is accurately calculated using data extracted from vessel stability data book   |     |  |     |   |     |   |     |   |
| 1.4                          | Stability calculations are checked to ensure they correlate   |     |  |     |   |     |   |     |   |

- with data set out in vessel stability book
- 1.5 Spurious or incorrect information is recognised and recalculated
  - 1.6 Trim, draughts and list are adjusted as required
  - 1.7 Stability calculations are conducted at a time, frequency and scope appropriate to voyage
- 2 Manage weight distribution**
- 2.1 Stability calculations are used to plan weight distribution to ensure assigned load line conditions are not exceeded
  - 2.2 Weight distribution is controlled to maintain vessel within acceptable stability and stress limits for loading operation and at all stages of voyage
  - 2.3 Appropriate action is taken when weight distribution is compromising vessel safety
- 3 Maintain records of stability management**
- 3.1 Data and information related to stability management is accurately recorded
  - 3.2 Data and information related to stability management is filed and stored according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Stability calculations must include:

- calculation of areas under the curve
- changes in draft and trim due to differing water densities
- correction for free surface effect
- draft and trim
- metacentric height
- moment of statical stability at small angles of heel
- transverse and longitudinal stability
- values for righting levers and construction of the curve of stability

Appropriate action includes one or more of the following:

- amending the vessel loading plan
- ballast management
- reduction of free surface

Data and information related to stability management includes one or more of the following:

- cargo stowage and loading plan
- records of stability calculations
- safety management system
- stability and trim booklet

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARA5001A Maintain vessel stability.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARA005 Maintain vessel stability

## Modification History

Release 2. Application, Elements and Performance Criteria and other minor edits were corrected to include relevant information.

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying knowledge of stability, trim and stress tables, diagrams and stress calculating equipment
- carrying out calculations required when determining vessel stability and trim
- managing the loading and weight distribution of a vessel to ensure assigned load line conditions are not exceeded
- managing vessel stability in a range of conditions
- reading and interpreting vessel specifications and design drawings
- recognising problems affecting vessel stability and trim.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- calculation of vessels stability using the inclining experiment
- effects of angle of loll
- effects of beam and form coefficient on the stability of a vessel
- effects of density of sea water on the draught and freeboard of a vessel
- effects of free surface on the stability of a vessel
- features of the load-line and draught marks of a vessel and methods for performing related calculations
- fundamental actions to be taken in the event of partial loss of intact buoyancy
- fundamentals of watertight integrity
- principal stresses that act on the structure of a vessel
- principal structural members of a vessel and the proper names for various parts
- problems related to the control of trim, stability and stresses of vessels and appropriate action and solutions

- sections of the International Maritime Organization (IMO), Standards of Training, Certification & Watchkeeping (STCW) and Australian Maritime Safety Authority (AMSA) Marine Orders related to intact stability criteria
- stability, trim and stress tables, diagrams and stress calculating equipment
- theory and calculations of vessel stability and dynamics
- use of computer programs in calculating stability
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARA006 Monitor loading, unloading and stowage of cargo

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to monitor the loading, stowage, securing and care of cargo during the voyage and the unloading of cargo according to the cargo plan, organisational procedures and vessel stowage limitations.

This unit applies to the work of a Watchkeeper Deck, Master up to 500 gross tonnage and Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

A – Handling Cargo and Vessel Stability

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Review cargo plan

- 1.1 Cargo plan is interpreted to determine required cargo operations
- 1.2 Cargo plan is checked to ensure cargo is evenly distributed
- 1.3 Cargo plan is assessed to ensure incompatible cargo stowage is avoided

- 1.4 Cargo plan is evaluated to ensure regulations relating to hazardous materials/dangerous goods are observed, where appropriate
- 1.5 Cargo plan is checked to ensure unloading sequence is effective
- 2 Prepare for loading**
  - 2.1 Holds are checked to ensure they are clean, dry and free of smell
  - 2.2 Safety arrangements in holds are verified to ensure they are operational
  - 2.3 Supplies of cargo protection and securing material are reviewed to ensure there are sufficient available
  - 2.4 Bilge suction are protected before loading
  - 2.5 Checks are made to ensure cargo is correctly identified, inspected and confirmed against documentation
  - 2.6 Preparations for loading are monitored according to stowage plan and organisational procedures
  - 2.7 Ballast discharge plan is identified and understood and appropriate actions to support this plan are undertaken
- 3 Supervise loading/unloading of cargo**
  - 3.1 Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan
  - 3.2 Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations
  - 3.3 Loading/unloading is monitored to ensure the loading rate is not exceeded in the case of bulk or liquid cargo
  - 3.4 Vessel stability is observed during loading/unloading operations
  - 3.5 Loading/unloading operations are checked against stowage plan
  - 3.6 Cargo is secured and lashed according to lashing plan
  - 3.7 Cargo handling documentation is completed according to organisational procedures and regulatory requirements
- 4 Monitor care of**
  - 4.1 Vessel plan for care of cargo during voyage is implemented according to organisational and customer requirements, and

**cargo during voyage**

## relevant regulations

- 4.2 Ventilation and humidity control systems are checked
- 4.3 Actions required to maintain the wellbeing of cargo during the voyage are initiated according to customer requirements and organisational procedures
- 4.4 Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain the safety of personnel, cargo and vessel
- 4.5 Appropriate action is taken when defects or damage to cargo are detected

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Cargo plan must include:
- cargo weight
  - correct description and stowage of hazardous and dangerous goods
  - description of cargo to be loaded
  - load/discharge port
  - segregation of non compatible cargo
  - stowage of refrigerated containers

Incompatible cargo stowage includes one or more of the following:	<ul style="list-style-type: none"><li>• cargo liable to taint</li><li>• dangerous and hazardous goods</li></ul>
Hazardous materials/dangerous goods includes one or more of the following:	<ul style="list-style-type: none"><li>• any cargo described in the International Maritime Dangerous Goods (IMDG) Code as hazardous or dangerous</li></ul>
Cargo includes one or more of the following:	<ul style="list-style-type: none"><li>• bulk cargo</li><li>• containerised cargo</li><li>• deck cargo</li><li>• heavy lift cargo</li><li>• liquid cargo</li><li>• refrigerated cargo</li><li>• any other material, equipment or machinery that may be safely handled and stowed on vessel</li></ul>
Cargo handling documentation includes one or more of the following:	<ul style="list-style-type: none"><li>• cargo gear register</li><li>• cargo receipts</li><li>• Cargo Securing Manual</li><li>• logbook entries</li><li>• Note of Protest</li><li>• Notice of Readiness to load or discharge</li><li>• operation orders and instructions</li><li>• safety data sheets (SDS)/material safety data sheets (MSDS)</li><li>• safety management system relating to cargo carriage</li><li>• ship/shore safety checklists</li></ul>
Actions required to maintain the wellbeing of cargo include one or more of the following:	<ul style="list-style-type: none"><li>• maintaining adequate ventilation</li><li>• monitoring cargo spaces</li><li>• temperature control of refrigerated or cooled cargo</li></ul>
Defects or damage to cargo include one or more of the following:	<ul style="list-style-type: none"><li>• damage caused by cargo movement</li><li>• deterioration of perishable cargo</li><li>• water ingress</li></ul>

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARA5002A Monitor loading, unloading and stowage of cargo.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA006 Monitor loading, unloading and stowage of cargo**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out cargo operations according to cargo plan or other documents and established safety rule/regulations, equipment operating instructions and shipboard stowage limitations
- establishing and maintaining effective communications during loading and unloading
- handling dangerous, hazardous and harmful cargo to comply with international regulations, recognised standards and codes of safe practice
- identifying and solving problems associated with loading, unloading, stowage and care of cargo
- initiating timely action in response to defects or damage
- monitoring and anticipating problems and risks associated with loading, unloading, stowage and care of cargo
- monitoring use of equipment in loading, unloading, stowage and care of cargo
- reading, interpreting and applying instructions, regulations, procedures and information associated with loading, unloading, stowage and care of cargo.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- ballast management issues and procedures
- cargo handling documentation requirements
- cargo lifting equipment and safe working loads
- container position numbering
- effect of cargo, including heavy lifts, on the seaworthiness and stability of the vessel
- effects of different types of cargo operations on vessel trim and stability
- effects on cargo handling of sea conditions, wind and weather
- effects on stability during loading and discharging operations including heeling moments from gear and loads
- methods of caring for various types of cargo
- methods of handling various types of cargo



- operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- principles of cargo care
- procedures for carrying out calculations involving weights, capacities, stowage factors
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) and cargo handling legislation, codes of practice, policies and procedures
- safe handling, stowage and securing of cargo including dangerous, hazardous and harmful cargo, and their effect on the safety of life and the vessel
- standard stowage position numbering systems used on container vessels
- typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- typical types and sizes of shipping containers
- usual methods of container packing, loading and discharging, stowage, dunnaging
- various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements, hazards and problems; appropriate preventative and remedial action and solutions
- ways of restricting vessel stress levels within permitted levels within permitted limits during loading/discharging cargo.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARA007 Contribute to safe cargo operations on offshore support vessels**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to undertake a range of offshore activities on board an offshore support vessel (OSV). It includes deck preparation, transfer of deck cargoes, bulk cargo operations and operations with deck equipment within the limits of responsibility of an integrated rating and under the direction of the officer in charge or Master.

This unit applies to Integrated Ratings working in the offshore maritime industry assigned to specific activities and responsibilities.

No licencing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

A – Handling Cargo and Vessel Stability

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Recognise characteristics of**

1.1 Features of various offshore installation types, vessels rig types and operations are outlined

<b>OSV cargo and OSVs to ensure the safe transfer and transport of cargo</b>	1.2	Cargo operations of offshore support vessels are identified
	1.3	Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is recognised
	1.4	Hazards associated with the transport of cargo are clarified according to emergency response documentation
	1.5	Hazard controls associated with OSV cargo are employed according to organisational procedures
<b>2 Comply with legislative and organisational requirements for safe transfer and transport of OSV cargo</b>	2.1	Safety data sheets (SDS)/material safety data sheets (MSDS)/IMDG Code relevant to cargo are accessed and safety management procedures are identified
	2.2	SDS/MSDS/IMDG Code are interpreted to identify relevant cargo-related hazards to the vessel and to personnel
	2.3	Legislative, organisational and company specific requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo
	2.4	Transfer of cargo is undertaken under direction and within the limits of responsibility of an integrated rating
<b>3 Take precautions to prevent hazards</b>	3.1	Organisational policies and procedures to minimise hazards are identified
	3.2	Type and severity of hazards posed by OSV cargo is recognised
	3.3	Transfer and transport of cargo is monitored to prevent hazards
	3.4	Monitoring equipment, where installed, is regularly inspected and used according to organisational procedures
<b>4 Respond to hazardous situation</b>	4.1	Source of hazard is identified according to organisational procedures
	4.2	Risk is assessed considering severity and likelihood of consequences
	4.3	Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for permission or further action
	4.4	Containment procedures are applied where appropriate

- |  |     |   |
|--|-----|---|
|  | 4.5 | Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures                                 |
|  | 4.6 | Risk is eliminated where possible   |
| <b>5 Take precautions to prevent pollution of the environment from the release of liquid or dry bulk cargoes</b> | 5.1 | Procedures to prevent pollution are identified and observed at all times  |
|  | 5.2 | Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures         |
|  | 5.3 | All relevant information is immediately reported to appropriate persons when a spill is detected or a malfunction has occurred that poses a risk of a spill |
|  | 5.4 | All required spill containment procedures are correctly implemented according to regulatory requirements and organisational procedures                      |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |  |
|---|--|
| Features of various types of offshore support vessels must include: | <ul style="list-style-type: none"> <li>• general arrangement and construction</li> <li>• types of offshore support vessels</li> <li>• types of offshore installations, rigs and platforms</li> </ul>   |
| Cargo operations must include:                                      | <ul style="list-style-type: none"> <li>• loading, unloading and care in transit of deck cargo</li> <li>• loading and unloading of liquid cargo</li> <li>• loading and unloading dry bulk cargo</li> <li>• piping systems and deck valve arrangements</li> <li>• tubular cargo securing arrangements</li> </ul> |
| Properties must include:  | <ul style="list-style-type: none"> <li>• deck cargo types and characteristics</li> <li>• hazards of oil cargoes</li> </ul>   |

	<ul style="list-style-type: none"><li>• hazards of noxious liquid substances (NLS) cargo</li><li>• hazards of offshore cargo operations</li><li>• tubular cargo stability and securing</li></ul>
Cargo must include:	<ul style="list-style-type: none"><li>• containerised deck cargo</li><li>• drilling muds</li><li>• drilling brines</li><li>• dry bulk cargo</li><li>• heavy lifts and unusual lifts</li><li>• NLS</li><li>• oil</li><li>• tubular deck cargo</li></ul>
Hazards must include:	<ul style="list-style-type: none"><li>• electrostatic hazards</li><li>• environmental hazards</li><li>• explosion and flammability hazards</li><li>• health hazards</li><li>• pressure hazards</li><li>• sources of ignition</li><li>• toxicity hazards</li></ul>
Hazard controls must include:	<ul style="list-style-type: none"><li>• atmospheric control</li><li>• cargo securing arrangements including ensuring safe stowage or lashing of deck cargo</li><li>• cargo segregation</li><li>• equipment colour coding</li><li>• personal protective equipment</li></ul>
Cargo securing equipment must include:	<ul style="list-style-type: none"><li>• capstan winches and wires</li><li>• cargo securing manual</li><li>• cargo securing pins</li><li>• chocks</li><li>• tugger winches and wires</li><li>• dollies</li></ul>
Measures must include:	<ul style="list-style-type: none"><li>• assisting in implementing shipboard cargo securing arrangements</li><li>• reporting relevant information to the responsible person</li></ul>

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA007 Contribute to safe cargo operations on offshore support vessels**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- carrying out cargo operations safely and according to accepted policies and procedures
- correctly identifying safety data sheets (SDS), material safety data sheets (MSDS and/or IMDG Code, relevant cargo-related hazards to vessel and to personnel, and taking appropriate action for safe transfer and stowage of cargo
- ensuring safe stowage or lashing of deck cargo
- identifying and developing awareness of hazardous situations
- interpreting and applying knowledge of OSV layouts, OSV cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of offshore support vessels
- reading and interpreting SDS and/or MSDS and/or IMDG Code
- recognising hazards and other problems that can arise when managing safety on an OSV, taking appropriate remedial action and initiating appropriate solutions.
- using verbal and non-verbal means of communication in a clear and appropriate manner to effectively communicate with other crew members

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- actions and measures to be taken in the event of spillage
- features and characteristics of various types of offshore support vessels
- general arrangement and construction of offshore support vessels
- hazard control procedures on offshore support vessels
- hazard controls
- hazards associated with:
  - OSV deck cargo operations
  - OSV bulk and liquid



- below deck cargo operations
- hazards to the environment including the effects of oil and chemical pollution on human and marine life
- information on SDS and/or MSDS and/or IMDG Code
- loading and unloading cargo
- offshore support vessel safety culture and safety management systems
- piping systems, hoses and valves
- procedures for the safe use of personal protective equipment
- shipboard procedures to reflect current MARPOL regulations to prevent pollution
- terminology relating to the structure and operations of various types of offshore support vessels
- work health and safety/occupational health and safety (WHS/OHS) requirements and work practices

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment must occur in workplace operational situations on board an offshore support vessel (OSV) or where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant practical and written exercises, case studies and simulations that reflect typical ambient conditions found in the workplace
- tools, equipment, machinery, materials and personal protective equipment currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARA008 Contribute to safe anchor handling and towing operations

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to undertake a range of offshore anchor handling and towing activities on board an Anchor Handling Tug Supply (AHTS) vessel within the limits of responsibility of an integrated rating and under the direction of the officer in charge or Master.

This unit applies to Integrated Ratings working in the offshore maritime industry assigned to specific anchor handling and towing duties and responsibilities.

No licensing, legislative or certification requirements apply to this specific unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |            |  |
|---|------------|--|
| <b>1 Recognise types of anchor handling and towing equipment, vessels and towed</b> | <b>1.1</b> | Required safety precautions, including fatigue management are identified |
|   | <b>1.2</b> | Features of various AHTS are outlined                                    |

<b>objects</b>	1.3	Types of anchor handling and towing operations are identified
	1.4	Properties of towed objects are identified and their impact on safety, the environment and vessel operations is recognised
	1.5	Properties of anchor handling and towing equipment and tools are identified and their impact on safety and vessel operations is recognised
	1.6	Hazards associated with anchor handling and towing are identified
	1.7	Hazard controls associated with anchor handling and towing are employed according to organisational procedures
<b>2 Prepare anchor handling and towing deck equipment, tools and machinery for use</b>	2.1	Appropriate personal protective equipment and machinery is selected, used and stored according to work health and safety/occupational health and safety (WHS/OHS) requirements
	2.2	Routine pre-operational checks are carried out on anchor handling and towing deck equipment, tools and machinery according to manufacturer specifications, regulatory and organisational requirements
	2.3	Deviations from the norm are promptly identified and rectified
	2.4	Adjustments are made to achieve a safe and efficient operation
	2.5	Inability to start machinery is reported promptly and accurately to appropriate personnel
<b>3 Operate anchor handling and towing deck tools and equipment</b>	3.1	Deck equipment, tools and machinery is operated in a safe and controlled manner within defined operating limits when running, to achieve optimum safety and efficiency
	3.2	Deviations from normal operations are promptly identified
	3.3	Action is taken to rectify basic operational faults to maintain optimum safety and efficiency
	3.4	Appropriate action is taken in a malfunction or emergency
<b>4 Check and complete anchor handling and towing deck</b>	4.1	Equipment and machinery shut-down procedures are carried out according to manufacturer specifications and organisational procedures

**equipment , tools  
and machinery  
operations**

- 4.2 Equipment and machinery damage, malfunctions or irregular performance is recorded and reported according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Pre-operational checks must include:

- deck equipment
- equipment operational readiness
- inspecting safety guards
- pre-start and safety checks including:
  - oils, greases and lubricants
  - emergency stops

Anchor handling and towing equipment, tools and deck machinery must include:

- anchors
- buoys (surface and subsea)
- capstans
- capstan winches and wires
- chains
- connecting links (kenter, baldt, hinge, pear)
- fibre rope
- gob arrangements
- grapnels
- J hooks
- oil rig cranes
- shackles
- swivels
- towed rigs
- towed barges
- towing pins
- tugger winches and wires
- wire stoppers/shark jaws
- wires (towing and work)

Safe and controlled manner must include:

- maintaining safe workloads within ships specifications including:
  - safe working load (SWL)
  - working load limit (WLL)
- selecting and using appropriate machinery and equipment
- using operational techniques for specific location, operation and weather conditions

Basic operational faults must include one or more of the following:

- failure of deck tools and equipment
- breakage of wire
- machinery break downs

## Unit Mapping Information

This unit replaces and is equivalent to TDMMR5307B Carry out anchor handling, towage and supply duties at a rig.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA008 Contribute to safe anchor handling and towing operations**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- following manufacturer recommendations, regulations and vessel operating procedures
- implementing and working in a safe and controlled manner
- using anchor handling, towing and deck equipment
- using deck machinery
- using deck tools
- using verbal and non-verbal means of communication in a clear and appropriate manner to effectively communicate with other crew members

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- anchor handling and towing tools including:
  - anchors
  - buoys (surface and subsea)
  - capstans
  - capstan winches and wires
  - chains
  - connecting links (kenter, baldt, hinge, pear)
  - fibre rope
  - gob arrangements
  - grapnels
  - J hooks
  - oil rig cranes
  - shackles

- swivels
- towed rigs
- towed barges
- towing pins
- tugger winches and wires
- wire stoppers/shark jaws
- wires (towing and work)
- legislation and guidance affecting anchor handling and towing operations
- anchor handling and towing equipment including:
  - capstan winches
  - towing winches
  - tugger winches
  - towing pins
  - working winches
  - wire stoppers/shark jaws
- safe working procedures
- terminology and abbreviations used in the maritime industry specific to anchor handling and towing operations
- work health and safety/occupational health and safety (WHS/OHS) requirements and work practices

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment must occur in workplace operational situations on board an Anchor Handling Tug Supply (AHTS) vessel or where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals



range of relevant practical and written exercises, case studies and simulations that reflect typical ambient conditions found in the workplace

tools, equipment, machinery, materials and personal protective equipment currently used in industry

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARA009 Manage stability of a vessel 500 gross tonnage or more

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to control trim, stability and stress within safe limits at all times on a vessel 500 gross tonnage or more.

This unit applies to people working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

A – Handling cargo and vessel stability

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Manage vessel trim under normal operating conditions

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Stability analysis and weight distribution planning are conducted at a time frequency and scope appropriate to the proposed nature of the voyage and vessel operation
- 1.2 Weight distribution is arranged to maintain vessel within acceptable stability limits for the anticipated operational situations likely to be experienced during the voyage

- 1.3 Calculations are made to determine the draught and centre of gravity of vessel after adding, removing or shifting weight
- 1.4 Factors affecting the stability and trim of vessel are identified and allowances are made in calculations
- 1.5 Trim, draughts and list of vessel are controlled as required to ensure they are suitable to progress all anticipated vessel operations
- 2 Control vessel stability when compartment is flooded**
  - 2.1 Damage to vessel and nature of flooding of compartments is assessed
  - 2.2 Effect upon vessel stability of flooded and flooding compartments is evaluated
  - 2.3 Suitable strategy for maintaining or restoring trim and stability is devised
  - 2.4 Where stress limits of the vessel are exceeded as a consequence of damage and/or flooding, appropriate action is initiated to ensure safety of personnel, including abandoning the vessel as required
- 3 Manage stress conditions of the vessel**
  - 3.1 Stress levels of the vessel are assessed according to manufacturer specifications
  - 3.2 Stability of the vessel is monitored at a frequency and scope relevant to vessel operations, sufficient to enable stress and stability to be maintained within acceptable limits at all times
  - 3.3 Appropriate action is taken where weight distribution has or could exceed acceptable safety limits
- 4 Maintain records of stability management**
  - 4.1 Data and information related to stability management is accurately recorded
  - 4.2 Data and information related to stability management is filed and stored according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Calculations include:

- calculating required load distribution to achieve desired trim
- calculations for change of draught, trim and heel when entering different water densities and to bilging of compartments
- centre of gravity of a vessel using an inclining experiment and effect of suspended weights
- changes to draught, trim and heel due to adding or removing fuel, ballast or cargo
- determining required correction for height of centre of gravity (kg) for free surface effect
- determining values of righting lever and construction of righting lever curves
- displacement, wetted surface, form coefficients, tonne per centimetre immersion, application of Simpson's rules to first and second moments of area, centroids and centres of pressure
- effect on stability of dry docking and grounding
- hydrostatic stability of a vessel
- moment of statistical stability at small angles of heel
- shear force and bending moment calculations
- transverse and longitudinal stability using hydrostatic data
- vessel centre of gravity, centre of buoyancy and metacentre

Factors include one or more of the following:

- dry docking
- excessive trim
- free surface of a liquid
- grounding
- handling of heavy weights
- large swell conditions
- shift of cargo
- wind heel

Damage to vessel includes one or more of the following:

- damage caused by incorrectly lashed or secured cargo
- damage caused by incorrectly stowed cargo
- damage to cargo handling equipment by exceeding safe working limits

Nature of flooding includes one or more of the following:

- flooding due to collision or grounding
- ingress of sea water through hatch covers

Suitable strategy includes one of the following:

- addition of ballast
- temporary damage repairs

Data and information includes one or more of the following:

- cargo handling equipment
- instructions of relevant maritime authorities
- manufacturer instructions and procedures
- organisational cargo handling procedures
- relevant Australian and international standards and regulatory requirements
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation
- vessel and shore safety checklists
- vessel Cargo Securing Manual
- vessel log
- vessel Register of Materials Handling Equipment

## Unit Mapping Information

This unit replaces and is equivalent to MARA6001A Manage stability of a vessel 500 gross tonnage or more.

MARA6001A replaces and is equivalent to TDMMA1007B Control trim, stability and stress.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA009 Manage stability of a vessel 500 gross tonnage or more**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying International Maritime Organization (IMO) recommendations concerning vessel stability
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to appropriate level of detail in recordkeeping
- determining stability and trim requirements for docking or slipping the vessel
- determining the effect on trim and stability of vessel in the event of damage to and consequent flooding of a compartment, and countermeasures to be taken
- interpreting and applying information on the fundamental principles of vessel construction and the theories and factors affecting trim and stability, and measures necessary to preserve trim and stability
- maintaining stability and stress conditions within safe limits at all times
- producing accurate and reliable documentation
- using automatic data-based equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- causes and repercussions of a heeling vessel
- effects of angle of loll including centre of buoyancy, how a ship behaves at the angle of loll, inherent dangers, corrective action and the difference between a loll and a list
- effects of density of sea water on the draught and freeboard of a vessel
- features of the load-line and draught marks of a vessel and procedures for carrying out related calculations

- fundamental principles of ship construction and the theories and factors that impact on trim and stability, and measures necessary to preserve trim and stability
- IMO recommendations concerning vessel stability
- levelling arrangements for damaged side compartments
- principle stresses that act on the structure of a vessel, including panting and pounding
- principles of parametric rolling and control methods
- principles of synchronous rolling and methods for its control
- procedures for calculating the required load distribution to achieve the desired trim
- typical problems related to the control of trim and stability for vessels of 500 gross tonnage and more
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in an industry-approved marine operations site or simulation where managing stability of a vessel of 500 gross tonnage or more may be demonstrated.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARA010 Manage loading, unloading and stowage of cargo

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to manage the loading, stowage, securing and care of cargo during the voyage and the unloading of cargo, according to the cargo plan, organisational procedures and vessel stowage limitations.

This unit applies to the work of a Watchkeeper Deck and Master up to 500 gross tonnage.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

A – Handling Cargo and Vessel Stability

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Review cargo plan

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Cargo plan is interpreted to determine required cargo operations

1.2 Characteristics of cargo being transported are identified and the type, severity and impact of the hazard posed by cargo on safety, the environment, vessel operations and personnel are



established

- 1.3 Cargo plan is evaluated to ensure regulations relating to hazardous materials/dangerous goods are observed
- 1.4 Cargo plan is assessed to ensure incompatible cargo stowage is avoided
- 1.5 Cargo plan is checked to ensure unloading sequence is effective

## **2 Prepare for loading**

- 2.1 Holds are checked to ensure they are clean, dry and free of smell
- 2.2 Safety arrangements are verified to ensure they are operational
- 2.3 Supplies of cargo protection and securing material are reviewed to ensure there are sufficient available
- 2.4 Bilge suction are protected before loading
- 2.5 Checks are made to ensure cargo is correctly identified, inspected and confirmed against documentation
- 2.6 Preparations for loading are monitored according to stowage plan and organisational procedures
- 2.7 Ballast discharge plan is identified and confirmed and appropriate actions to support this plan are undertaken

## **3 Supervise loading/unloading of cargo**

- 3.1 Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan
- 3.2 Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations
- 3.3 Loading/unloading is monitored to ensure loading rate is not exceeded
- 3.4 Vessel stability is observed during loading/unloading operations
- 3.5 Loading/unloading operations are checked against cargo plan
- 3.6 Cargo is secured according to cargo plan
- 3.7 Cargo handling documentation is completed according to organisational procedures and regulatory requirements

- 3.8 Transfer of cargo is monitored to prevent hazards
- 3.9 Gas monitoring equipment is regularly inspected and used according to organisational procedures, as required
- 4 Monitor care of cargo during voyage**
  - 4.1 Plan for care of cargo during voyage is implemented according to organisational and customer requirements, and relevant regulations
  - 4.2 Ventilation and humidity control systems are checked
  - 4.3 Actions required to maintain the safety and security of cargo during the voyage are initiated according to customer requirements and organisational procedures
  - 4.4 Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain the safety of personnel, cargo and vessel
  - 4.5 Safety procedures are followed and appropriate action is taken when defects or damage to cargo are detected
- 5 Take precautions to prevent pollution of the environment**
  - 5.1 Procedures to prevent pollution are identified and observed at all times
  - 5.2 Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
  - 5.3 All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud
  - 5.4 Shore-based response personnel are promptly notified when a vapour leak or cloud occurs

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Cargo plan includes:

- cargo weight
- correct description and stowage of hazardous and dangerous goods
- description of cargo to be loaded
- load/discharge port
- segregation of non compatible cargo
- stowage of refrigerated containers

Cargo includes one or more of the following:

- bulk cargo
- chemicals and oils
- containerised cargo
- deck cargo
- heavy lift cargo
- liquefied gas
- liquid cargo
- material, equipment or machinery that may be safely handled and stowed on vessel
- refrigerated cargo

Hazardous materials/dangerous goods include:

- any cargo described in the International Maritime Dangerous Goods (IMDG) Code as hazardous or dangerous

Incompatible cargo stowage includes one or more of the following:

- cargo liable to taint
- dangerous and hazardous goods

Cargo handling documentation includes one or more of the following:

- cargo gear register
- cargo receipts
- Cargo Securing Manual
- logbook entries
- Note of Protest
- Notice of Readiness to load or discharge
- operation orders and instructions
- safety data sheets (SDSs)/material safety data sheets (MSDSs)
- safety management system relating to cargo carriage
- ship/shore safety checklists

Actions required to maintain the wellbeing of cargo include one or more of the following:

- maintaining adequate ventilation
- monitoring cargo spaces
- temperature control of refrigerated or cooled cargo

Defects or damage to cargo include one or more of the following:

- damage caused by cargo movement
- deterioration of perishable cargo
- water ingress

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARA010 Manage loading, unloading and stowage of cargo**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying international regulations, codes and standards concerning the safe handling, stowage, securing and transport of bulk cargo and dangerous, hazardous, and harmful cargo
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- carrying out cargo operations according to cargo plan or other documents and established safety rule/regulations, equipment operating instructions and shipboard stowage limitations
- establishing and maintaining effective communications during loading, stowage, transportation and unloading
- initiating timely action in response to defects or damage
- monitoring and anticipating problems and risks associated with loading, unloading, stowage and care of cargo
- monitoring use of equipment in loading, unloading, stowage and care of cargo
- reading, interpreting and applying instructions, regulations, procedures and information associated with loading, unloading, stowage and care of cargo
- reading and interpreting safety data sheets (SDSs)/material safety data sheets (MSDSs), relevant cargo-related hazards to vessel and to personnel, and taking appropriate action according to organisational procedures
- interpreting and applying knowledge of bulk ship, chemical and oil tanker, and liquefied gas tanker layouts, cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of vessel
- recognising problems and hazards that can arise when managing safety on a liquefied gas tanker, taking appropriate remedial action and initiating appropriate solutions.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- ballast management issues and procedures
- bulk ships, chemical and oil tanker layouts, liquefied gas tanker layouts, cargo features and characteristics
- dangerous goods classification, signage, stowage and segregation requirements under the International Maritime Dangerous Goods (IMDG) Code and relevant Marine Orders
- cargo handling documentation requirements
- cargo lifting equipment and safe working loads
- hazards and control measures associated with bulk ships, chemical and oil tanker cargo loading, and liquefied gas tanker cargo loading, stowage and unloading
- relevant firefighting operations and the use of firefighting equipment
- effect of cargo, including heavy lifts, on the seaworthiness and stability of the vessel
- effects of different types of cargo operations on vessel trim and stability
- effects on cargo handling of sea conditions, wind and weather
- effects on stability during loading and discharging operations including heeling moments from gear and loads
- methods of caring for various types of cargo
- operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- procedures for carrying out calculations involving weights, capacities, stowage factors
- relevant firefighting operations and the use of firefighting equipment
- relevant sections of maritime regulations, codes and conventions related to chemical and oil tankers, and liquefied gas tankers
- relevant WHS/OHS and cargo handling legislation, codes of practice, policies and procedures
- safe handling, stowage and securing of cargo including dangerous, hazardous and harmful cargo, and their effect on the safety of life and the vessel
- standard stowage position numbering systems used on container vessels
- typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- typical types and sizes of shipping containers
- usual methods of container packing, loading and discharging, stowage, dunnaging
- various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements, hazards and problems; appropriate preventative and remedial action and solutions
- ways of restricting vessel stress levels within permitted levels within permitted limits during loading/discharging cargo.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site.

Resources for assessment must include access to:

- gas monitoring equipment including:
  - gas monitoring instruments
  - oxygen indicators
- firefighting equipment including:
  - firefighting agents
  - fixed dry chemical systems
  - fixed foam systems
  - portable foam systems
- tools, cargo handling equipment, piping systems and valves and personal protective equipment currently used in industry
- documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including SDSs/MSDSs.
- 

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB001 Assist with routine maintenance of a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to carry out general routine maintenance on a vessel up to 80 metres.

This unit applies to general purpose hands working in the maritime industry on vessels up to 80 metres in near coastal waters as part of a vessel crew.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Select and set up equipment and materials for cleaning**

- 1.1 Equipment is selected according to type of cleaning to be undertaken
- 1.2 Equipment is checked to ensure it is clean and serviceable
- 1.3 Suitable dry and wet cleaning agents and chemicals are selected and prepared according to manufacturer instructions and work health and safety(WHS)/occupational health and safety (OHS) requirements



- 1.4 Suitable personal protective clothing and equipment is selected and used where necessary
- 2 Clean work area**
  - 2.1 Work area to be cleaned is prepared and hazards are identified
  - 2.2 Work area is barricaded or warning signs are provided, as appropriate, to reduce risk to self and other crew members
  - 2.3 Correct cleaning agents are selected and applied according to manufacturer instructions and WHS/OHS requirements
  - 2.4 Equipment is used correctly and safely
- 3 Follow instructions to carry out routine maintenance of vessel machinery**
  - 3.1 Suitable personal protective clothing is selected and used according to WHS/OHS safety requirements
  - 3.2 Greasing, lubrication and other routine servicing of vessel machinery and equipment is carried out according to supervisor and manufacturer instructions
  - 3.3 Routine adjustments and repairs are made to vessel machinery and equipment according to supervisor and manufacturer instructions
  - 3.4 Faulty vessel machinery and equipment is identified and reported according to workplace procedures
- 4 Prepare and paint surfaces**
  - 4.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements
  - 4.2 Surfaces are prepared using correct equipment
  - 4.3 Rust remover, rust converter and undercoats are applied according to manufacturer specifications
  - 4.4 Paints are mixed in correct proportions according to manufacturer specifications
  - 4.5 Finishing coat is applied using brush, roller or spray gun
- 5 Maintain and store tools, equipment and chemicals**
  - 5.1 Equipment and tools are cleaned, returned to operating order and stored according to supervisor and manufacturer instructions
  - 5.2 Environmental procedures are followed and waste from cleaning and maintenance tasks is collected, treated and disposed of or recycled, according to workplace procedures

- 5.3 Work area is cleaned and maintained according to workplace requirements
- 5.4 Malfunctions, faults, wear or damage to tools are reported according to workplace procedures
- 5.5 Chemicals are stored according to supervisor and manufacturer instructions

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Equipment includes one or more of the following:

- cleaning supplies
- hand held power tools
- hand tools
- grease guns
- paint and rust prevention material
- personal protective equipment

Personal protective clothing and equipment includes one or more of the following:

- boots
- gloves
- hat/hard hat
- hearing protection
- overalls
- protective eyewear

- respirator or face mask
- safety harness
- sun protection
- wet weather gear

Work area includes one or more of the following:

- battery room
- engine room
- exposed deck area
- firefighting equipment spaces
- store room
- wheelhouse and accommodation area

Routine adjustments and repairs includes one or more of the following:

- checking cooling system, fuel, grease and oil, battery levels
- dismantling and assembling
- inspecting fan belts, leads, lines, connections, air filters, hydraulics, lighting
- making minor adjustments
- testing

Surfaces include one or more of the following:

- external and internal bulkhead
- funnel
- hatches and coamings
- hull
- masts

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB1001A Assist with routine maintenance of a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB001 Assist with routine maintenance of a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing maintenance records
- implementing safe and environmentally responsible work practices
- reading, interpreting and applying manufacturer instructions including all WHS/OHS requirements and data safety sheets (SDS)/material safety data sheets (MSDS)
- recognising faulty equipment
- selecting and using correct tools and equipment for cleaning or maintenance task.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- component parts, operation and routine maintenance requirements of vessel machinery
- environmental and waste management procedures:
  - preventative measures with regard to damage to natural areas caused by servicing, maintenance and cleaning activities
  - safely using and disposing of cleaning and maintenance debris including oil containers, fuel and chemical residues, paint
- equipment cleaning and preservation techniques
- maintenance hazards and problems
- paint types and applications
- principles and procedures of machinery lubrication as they relate to vessel machinery
- procedures for using hand tools for routine maintenance operations
- relevant WHS/OHS and pollution control legislation
- rust treatment
- techniques for maintenance of surfaces including paint, timber, fibre glass, steel and aluminium
- types, characteristics and functions of:
  - equipment/tools used in cleaning and maintenance
  - vessel machinery and equipment
- workplace cleaning and maintenance procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB008 Carry out basic welding, brazing, cutting and machining operations on a coastal vessel**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to carry out basic welding, brazing, cutting and machining tasks.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B - Equipment Checking and Maintenance

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Carry out basic welding tasks**

- 1.1 Requirements for welding tasks are correctly interpreted from work instructions
- 1.2 Parts are prepared for welding according to established practice
- 1.3 Parts are welded according to established practice and work requirements

- 1.4 Weld defects are identified and appropriate action is taken according to established practice and standard operating procedures
- 1.5 Flame gouging methods are used to remove plate and weld material according to established practice and standard operating procedures
- 1.6 Finished work is checked against work instructions for accuracy and quality
- 2 Carry out basic brazing tasks**
  - 2.1 Requirements for brazing tasks are correctly interpreted from work instructions
  - 2.2 Parts are prepared for brazing according to established practice and work requirements
  - 2.3 Brazing equipment is prepared for brazing operations according to established procedures
  - 2.4 Parts are brazed using established procedures
  - 2.5 Finished work is checked against work instructions for accuracy and quality
- 3 Carry out basic cutting tasks**
  - 3.1 Instructions are reviewed, and required size and shape of cut work is correctly identified and interpreted
  - 3.2 Work is correctly marked out in preparation for cutting according to established practice and standard operating procedures
  - 3.3 Thermal cutting plant and equipment is set up according to established procedures
  - 3.4 Steel plate and/or rolled sections are cut to shape and size according to established practice and standard operating procedures
  - 3.5 Finished work is checked against work instructions for accuracy and quality according to standard operating procedures
- 4 Carry out basic machining tasks**
  - 4.1 Requirements for basic machining tasks are correctly interpreted from work instructions according to standard operating procedures
  - 4.2 Work is correctly marked out in preparation for basic machining according to established practice and standard

		operating procedures
	4.3	Machine is set up according to established procedures
	4.4	Machining is carried out according to established procedures
	4.5	Finished work is checked against work instructions for accuracy and quality according to standard operating procedures
<b>5</b>	<b>Follow safety and hazard control procedures</b>	
	5.1	Required safety precautions and regulations are followed when carrying out basic welding
	5.2	Operational hazards are identified and action is taken to eliminate, or where elimination is not possible to minimise, risk to personnel

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Operational hazards include one or more of the following:	<ul style="list-style-type: none"> <li>• moving and rotating machinery</li> <li>• moving heavy loads using unsafe procedures</li> <li>• non-compliance with safe working procedures</li> <li>• poor housekeeping procedures</li> <li>• power tools</li> <li>• sharp tools and implements</li> <li>• unsecured machinery, components or equipment</li> <li>• using equipment beyond safe working limits</li> </ul>
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- using welding equipment near explosive/flammable liquids and gases

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB4001A Carry out basic welding, brazing, cutting and machining operations on a coastal vessel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB008 Carry out basic welding, brazing, cutting and machining operations on a coastal vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out basic welding, brazing, cutting and machining tasks while underway, in port and moored or at anchor
- cleaning, sharpening or adjusting tools according to standard operating procedures
- dressing and truing a grinding wheel
- following required work schedule according to company requirements
- identifying a glazed, loaded or untrue grinding wheel condition and taking appropriate action
- marking out work to specifications, and measuring and checking the quality of finished work
- performing basic calculations required to carry out basic welding, brazing, cutting and machining operations
- reading and interpreting work specifications and drawings
- reading, interpreting and applying instructions and standard operating procedures relevant to basic welding, brazing, cutting and machining operations required on a coastal vessel
- recognising routine problems that may occur when performing basic welding, brazing, cutting and machining operations on a vessel and taking appropriate action
- selecting and safely using welding, brazing, cutting and machining tools and equipment according to operating procedures
- storing welding, brazing, cutting and machining tools and equipment after use according to standard procedures
- taking action promptly to report operational incidents and problems according to regulations and shipboard procedures
- using effective verbal and other communication skills required when carrying out basic welding, brazing, cutting and machining operations on a vessel
- working safely and collaboratively with others when carrying out basic welding, brazing, cutting and machining operations on a vessel.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable sections of relevant maritime regulations
- applicable legislation, regulations and codes of practice:
  - National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
  - relevant Australian engineering standards
  - relevant state and territory marine regulations
  - relevant work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation and policies
- basic operations within area of own responsibility:
  - basic fillet welds
  - basic butt welds
  - basic pad welds
  - manual metal arc welding
  - oxygen acetylene welding
  - basic machining operation
- characteristics and identifying features of common engineering drill bits
- documentation and records:
  - maintenance records
  - manufacturer instructions for tools and equipment
  - relevant safety data sheets (SDS)/material safety data sheets (MSDS)
  - safety management system plans, procedures, checklists and instructions
  - work instructions
  - vessel and company procedures
- environmental protection measures when carrying out basic engineering tasks
- hazards and related safety precautions when carrying out basic welding, brazing, cutting and machining tasks
- procedures for:
  - identifying a glazed, loaded or untrue grinding wheel condition
  - dressing and/or truing a grinding wheel
- safety management system and procedures
- standard operating procedures for basic welding, brazing, cutting and machining tasks required of a Marine Engine Driver Grade 1
- standard procedures for marking out work to specifications and measuring and checking the quality of finished work, including the correct use of:
  - adjustable gauge
  - callipers
  - centre punch hammers
  - dividers
  - rules and tapes
  - scribes
  - squares

- trammels
- vernier callipers and micrometer
- techniques for identifying defective welds within limits of responsibility
- types, names and identifying features of drilling machines used on coastal maritime vessels
- typical work specifications and drawings used on a coastal vessel.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARB009 Manage refuelling

### Modification History

Release 2. ISC upgrade. Correction to typographical error in Performance Criteria 2.9.

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to manage refuelling and fuel transfer operations.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

B - Equipment Checking and Maintenance

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan refuelling or fuel transfer operations**

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Fuel tanks are dipped to establish current level of fuel
- 1.2 Fuel is ordered according to organisational procedures
- 1.3 Amount and positioning of fuel on board vessel is calculated with reference to tank tables

- |  |     |  |
|--|-----|--|
|  | 1.4 | Impact of refuelling on safety and operation of vessel is determined and appropriate strategies are implemented  |
|  | 1.5 | Local port authorities are informed of vessel location for bunkering operations and duration of bunkering  |
| <b>2 Prepare vessel for refuelling or fuel transfer operations</b> | 2.1 | Vessel is positioned and secured for refuelling  |
|  | 2.2 | All personal protective equipment is accessed and used   |
|  | 2.3 | Bunkering equipment is correctly deployed according to organisational procedures   |
|  | 2.4 | Safety zone for refuelling process is established and maintained for full duration of operation  |
|  | 2.5 | Procedures for refuelling are established with bunker operator and completed lists are checked according to organisation and safety management system (SMS) requirements |
|  | 2.6 | Bunker hose is securely connected to vessel fuel manifold  |
|  | 2.7 | Tank valves are opened as necessary and refuelling operations are performed safely according to SMS and regulatory requirements  |
|  | 2.8 | Tanks are dipped to ensure correct amount of fuel has been received  |
|  | 2.9 | Fuel samples are taken to check quality of fuel received and appropriate action is taken if fuel sample is not to specification  |
| <b>3 Complete refuelling operations</b>                            | 3.1 | Shut-down procedures are conducted according to organisational procedures  |
|  | 3.2 | Malfunctions, faults, irregular performance or damage to refuelling equipment are recorded and repairs are organised, according to organisational procedures             |
|  | 3.3 | Refuelling equipment is maintained and secured according to organisational procedures  |
|  | 3.4 | Refuelling records are completed according to organisational procedures and regulatory requirements  |
| <b>4 Manage an emergency</b>                                       | 4.1 | Appropriate response is made to an emergency situation according to organisational procedures  |

- 4.2 Safety zone is closed off and isolated according to organisational procedures
- 4.3 All persons in the safety zone are correctly notified and their activities are managed to ensure safety according to organisational procedures
- 4.4 Appropriate authorities are notified and actions are taken as directed according to emergency procedures and regulatory requirements
- 4.5 Documentation of emergency is completed according to organisational procedures and relevant maritime authority

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Impact of refuelling on safety and operation of vessel include one or more of the following:

- hot work
- increase in the potential for fire
- loading and discharging operations
- stability including the effect of free surface
- toxic fumes
- work being conducted by shore contractors

Personal protective equipment must include:

- gloves
- overalls

- work boots
- Bunkering equipment includes one or more of the following :
- bunding
  - bunker flag
  - fire extinguishers
  - no smoking signs
  - radios
  - sample containers
  - scupper plugs
  - sounding tape
  - spill kit
- Safety zone includes one or more of the following:
- area where no smoking or hot work is permitted
  - area that can contain a spill
- Procedures for refuelling includes one or more of the following:
- establishing:
  - flow rates
  - system of communication with supplier in relation to starting and shut-down procedures
  - emergency disconnection procedures
- Shut-down procedures include one or more of the following:
- blowing through of bunker hoses
  - disconnecting bunker hose
  - isolating fuel valves
  - stowing equipment
- Refuelling records include one or more of the following:
- bunker receipt
  - log book entry
  - oil record book
- Emergency situations include one or more of the following:
- broken mooring lines
  - fire
  - oil spill
- Documentation includes one or more of the
- incident report forms
  - logbook entry



following:

## **Unit Mapping Information**

This is a new unit. This unit is equivalent to MARB4003A Manage refuelling.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB009 Manage refuelling

## Modification History

Release 2. Correction to typographical error in Performance Criteria 2.9.

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing required records
- implementing procedures for dealing with an oil spill
- measuring tank levels
- recognising faulty equipment and taking appropriate action
- recognising problems and hazards during refuelling and fuel transfer operations, and taking appropriate action
- selecting and using relevant equipment required for refuelling and fuel transfer operations
- taking appropriate action in an accidental spillage, fire or safety incident during refuelling and fuel transfer operations.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- environmental protection measures to be applied during refuelling or transfer operations
- functions and responsibilities of crew during refuelling or transfer operations
- hazards and safety precautions to be observed during refuelling or transfer operations
- own ability and limits to rectify irregularities and faults
- refuelling and fuel transfer procedures applying to commercial vessels
- requirements for reporting incidents
- work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB010 Plan and supervise routine maintenance on a vessel up to 80 metres

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to implement a maintenance program for a vessel up to 80 metres.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Develop maintenance program**

- 1.1 Planned maintenance system is accessed to establish maintenance requirements for vessel
- 1.2 Maintenance program for vessel is developed to meet requirements of planned maintenance system
- 1.3 Maintenance schedules and budgets are identified

- 1.4 Suggestions that support effective implementation of maintenance program are offered according to organisational procedures
- 1.5 Strategies to minimise impact of maintenance activities on vessel operations are identified
- 2 Implement maintenance program**
  - 2.1 Routine maintenance activities are proposed and prioritised in conjunction with others involved in or affected by maintenance work
  - 2.2 Routine maintenance activities are allocated within scheduled timeframes and budgets according to organisational procedures
  - 2.3 Vessel operations are maintained where possible without interruption
  - 2.4 Safety of crew is maintained at all times according to relevant legislation and organisational procedures
  - 2.5 Requests for assistance from crew to complete maintenance activities are responded to promptly
- 3 Identify failed or unsafe machinery and equipment**
  - 3.1 Faulty machinery and equipment is identified and clear and noticeable warning signs are erected according to organisational procedures
  - 3.2 Failed or unsafe machinery and equipment is assessed according to organisational procedures
  - 3.3 Repairs are allocated to appropriate crew members according to organisational procedures
  - 3.4 Unsafe machinery and equipment which cannot be repaired is promptly tagged and isolated according to organisational procedures
  - 3.5 Unsafe machinery and equipment is promptly reported according to organisational procedures
  - 3.6 Reports on all repair work undertaken are completed according to organisational procedures
- 4 Monitor supplies**
  - 4.1 Supply and stock levels are maintained to ensure ongoing availability
  - 4.2 Management of supplies is undertaken according to organisational procedures

- 4.3 Supply and stock levels are reconciled and any discrepancies are rectified or reported
- 4.4 Supply records are maintained according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Planned maintenance system must include:

- anchoring equipment
- communications equipment
- compliance with applicable mandatory rules and regulations, including work health and safety (WHS)/occupational health and safety (OHS) and environment protection legislation
- continuous improvement and review procedures
- document control procedures
- firefighting equipment
- identifying hazards and risk management
- lifesaving equipment
- navigation equipment
- procedures for updating and correcting charts, publications and electronic chart information
- provision of safe practices in vessel operation and a safe working environment
- reference to applicable codes, guidelines and standards
- steering gear

	<ul style="list-style-type: none"><li>• systems for recording completed maintenance schedules, including identification of defective equipment and rectification of defects</li></ul>
Maintenance program must include:	<ul style="list-style-type: none"><li>• lines of communication and relationship between vessel and owner</li><li>• periodic survey requirements</li><li>• procedure for programmed maintenance of hull and machinery</li><li>• regular inspection of all equipment referred to in planned maintenance system</li><li>• routine maintenance as contained in manufacturer instruction manuals and drawings</li><li>• safety and environmental policy</li></ul>
Routine maintenance activities include one or more of the following:	<ul style="list-style-type: none"><li>• checking life saving appliances</li><li>• inspecting breathing apparatus</li><li>• navigational equipment</li><li>• operation of emergency firefighting equipment including fire hoses and nozzles</li><li>• servicing equipment as required by service manuals and manufacturer instructions relating to vessel equipment</li><li>• testing communication equipment, including distress calling</li><li>• testing lifting equipment</li></ul>
Machinery and equipment includes one or more of the following:	<ul style="list-style-type: none"><li>• fire pumps</li><li>• navigational equipment</li><li>• steering gear and emergency steering gear</li><li>• winches and windlasses</li></ul>
Management of supplies include one or more of the following:	<ul style="list-style-type: none"><li>• issue</li><li>• purchase</li><li>• receipt</li><li>• stock control</li><li>• storage</li></ul>

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB4005A Plan and supervise routine maintenance on a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB010 Plan and supervise routine maintenance on a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- effectively liaising with internal and external authorities/agencies
- initiating timely action in response to defects or damage
- interpreting planned maintenance system to determine maintenance requirements
- managing maintenance of vessel
- monitoring selection and use of supplies involved in maintenance of vessel
- preparing reports on outcomes of inspection and maintenance activities
- reading and interpreting safety data sheets (SDS)/material safety data sheets (MSDS)
- reading and interpreting vessel, equipment and machinery specifications, drawings, operational manuals and diagrams
- taking appropriate precautions to prevent pollution of marine environment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- elements of ship structure crucial to the safety of the ship
- fundamental principles of vessel construction
- maintenance records that must be maintained on vessel to meet organisational and statutory requirements
- nature and causes of corrosion of marine surfaces and structures, and available means for control
- principal structural components
- procedures for initiation and coordination of repair and/or replacement procedures on board vessel
- relevant laws and regulations including work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation
- slipping and docking procedures suitable for various types of hull forms
- typical problems related to maintenance of vessels and appropriate actions and solutions.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB011 Undertake maintenance of 240 to 440 voltage alternating current electrical systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to perform establish, organise and implement a preventative and reactive maintenance program and capabilities on 240 to 440 voltage alternating current (AC) electrical systems on a vessel.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

**WARNING:** Relevant state/territory qualification requirements apply to persons carrying out installation, maintenance and/or repair of refrigeration equipment, especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B - Equipment Checking and Maintenance

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Verify maintenance requirements**

- |     |  |
|-----|--|
| 1.1 | Regulatory and organisational requirements for electrical system maintenance program are identified and followed |
| 1.2 | Specifications, diagrams and organisational procedures for electrical systems are checked for recommended        |

## maintenance

- 1.3 Special requirements for electrical system maintenance are separated from adjustment and day-to-day maintenance schedules
- 1.4 Maintenance system goals for electrical systems are outlined
- 1.5 Maintenance plan and related work schedule for electrical systems are developed according to regulatory requirements and safety management system (SMS)
- 2 Establish maintenance systems**
  - 2.1 Maintenance costs are identified and quantified
  - 2.2 Interruptions, processes and procedures are documented
  - 2.3 Internal and external maintenance providers are specified
  - 2.4 Maintenance plan is prepared to minimise negative impacts on production, costs, waste and the environment
  - 2.5 Approvals for maintenance plan are negotiated and confirmed
  - 2.6 Recordkeeping systems are developed and maintained
- 3 Organise maintenance activities**
  - 3.1 Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shut down
  - 3.2 Agreement from Master is obtained for timing of maintenance tasks to optimise maintenance process and minimise operational disruptions
  - 3.3 Detailed work plans are developed in line with schedules, availability of expertise and scheduling of resource availability
  - 3.4 Team members with required competencies are allocated to maintenance activities
  - 3.5 Consumables and equipment are secured to meet work plan requirements
  - 3.6 Externally sourced equipment, consumables and expertise are located and procured
  - 3.7 Contingency plans are prepared
  - 3.8 Maintenance schedules and procedures are effectively

- communicated to team
- 4 Supervise maintenance tasks**
- 4.1 Job specifications and maintenance tasks are communicated effectively to team members
  - 4.2 Maintenance and repair tasks are monitored to ensure they satisfy system specifications
  - 4.3 Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times
  - 4.4 Emergency equipment is made available and working order of this equipment is ensured
  - 4.5 Contingencies are managed to ensure quality of work is maintained and work is completed within agreed timeframe
- 5 Perform planned maintenance activities**
- 5.1 WHS/OHS risk control measures and procedures for carrying out work are followed
  - 5.2 Maintenance schedule and process compliance requirements are confirmed and work is appropriately sequenced according to job specification
  - 5.3 Appropriate person/s are consulted to ensure work is coordinated effectively with others
  - 5.4 Resources needed to conduct maintenance are obtained according to organisational procedures and are checked against job requirements
  - 5.5 Tools, equipment and testing devices needed to conduct maintenance are obtained according to organisational procedures and checked for correct operation and safety
  - 5.6 Live and operating system is tested or measured strictly according to WHS/OHS requirements and within established safety procedures
  - 5.7 Electrical equipment is checked as being isolated where necessary, strictly according to WHS/OHS requirements and within established safety procedures
  - 5.8 Electrical equipment to be maintained is inspected and evaluated for compliance with system specifications
  - 5.9 Noncompliant electrical equipment components are rectified or repaired according to system specifications

- |   |  |
|---|--|
| <b>6 Perform breakdown maintenance</b>                                    | 6.1 Nature of breakdown is confirmed with appropriate personnel  |
|   | 6.2 Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques   |
|   | 6.3 Restrictions are applied to operations, if necessary, and agreed to with the Master  |
|   | 6.4 Electrical equipment is checked as being isolated where necessary, strictly according to WHS/OHS requirements and within established safety procedures |
|   | 6.5 Repair work is carried out according to system specifications  |
|   | 6.6 Master is notified of completion of repair work and details are documented   |
| <b>7 Monitor, adjust and report on implementation of maintenance plan</b> | 7.1 Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements                           |
|   | 7.2 Electrical systems are monitored to ensure achievement of planned outcomes   |
|   | 7.3 Costs are monitored and controlled   |
|   | 7.4 Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes  |
|   | 7.5 Reports are completed according to maintenance plan requirements and organisational procedures   |
|   | 7.6 Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of SMS                           |
|   | 7.7 Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements                           |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Electrical systems include one or more of the following:

- AC generators
- alarm systems
- batteries
- electrical motor starting circuits
- emergency electrical supply
- emergency generators
- generators
- power and lighting
- shore supply
- steering gear
- switchboards

Special requirements for electrical system maintenance include one or more of the following:

- breakdown maintenance
- periodic inspections and surveys

Maintenance tasks include one or more of the following:

- battery maintenance
- generator servicing
- replacing faulty wiring
- testing:
  - alarm systems
  - emergency generator
- power and lighting systems

Consumables and equipment include one or

- replacement parts
- testing equipment

more of the following:

- tools and equipment rated for electrical work

Emergency equipment includes one or more of the following:

- alarm systems
- emergency generator
- firefighting equipment
- lifesaving equipment
- pump operations

Nature of breakdown includes one or more of the following:

- failure of electricity generating systems
- generator failure

Restrictions include one or more of the following:

- stopping main engine
- stopping one generator
- switching to emergency power

Reports include one or more of the following:

- incident reports
- maintenance log
- operational orders from organisation SMS
- reports required under planned maintenance system
- survey reports

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB4006A Undertake maintenance of 240 to 440 voltage alternating current electrical systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB011 Undertake maintenance of 240 to 440 voltage alternating current electrical systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying safety requirements throughout work sequence including the use of personal protective equipment (PPE)
- completing all work to specification
- developing effective planning documents
- ensuring correct requirements and details of maintenance of electrical systems and equipment
- implementing safe and environmentally responsible work practices in testing and maintenance activities
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating AC systems and conducting operator preventive maintenance according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- operating electrical systems and equipment according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation providing high quality reports
- recognising electrical system faults and where necessary taking steps to make them immediately safe
- selecting and using appropriate processes, tools and equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- AC systems not exceeding 440 voltage AC
- batteries (types, care and maintenance, hazards)
- care of electrical systems and equipment in general (fault recognition)
- charging systems:
  - alarms/indicators
  - regulators

- connecting batteries
- electric systems (above 240 V AC and up to 440 V AC)
- fault identification, location and safety implications
- operation and maintenance of starter motors, alternators and associated equipment
- personal safety
- protective devices on switchboards
- shore power connection
- use of fuses and circuit breakers (selection of correct capacity).

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB012 Undertake maintenance of machinery, machinery systems and structural components**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to establish, organise and implement a preventative and reactive maintenance program and capabilities for machinery, machinery systems and structural components to optimise vessel operational performance.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

B - Equipment Checking and Maintenance

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Verify maintenance requirements**

- 1.1 Maintenance program regulatory and organisational requirements for machinery, machinery systems and structural components are identified and followed
- 1.2 Technical specifications, service requirements and organisational procedures for machinery, machinery systems and structural components are checked for recommended

## maintenance requirements

- 1.3 Special requirements for maintenance of machinery, machinery systems and structural components are separated from normal lubrication, adjustment and day-to-day maintenance schedules
- 1.4 Maintenance system goals for machinery, machinery systems and structural components are outlined
- 1.5 Maintenance plan and related work schedule for machinery, machinery systems and structural components is developed
- 2 Establish maintenance systems**
  - 2.1 Maintenance costs are identified and quantified
  - 2.2 Processes, procedures and delays are documented
  - 2.3 Internal and external maintenance providers are specified
  - 2.4 Maintenance plan is prepared to minimise ship operation costs, waste and harm to the environment
  - 2.5 Approvals for maintenance plan are negotiated and confirmed
  - 2.6 Recordkeeping systems are developed and maintained
- 3 Organise maintenance activities**
  - 3.1 Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shut down
  - 3.2 Agreement with the Master is obtained for timing of maintenance tasks to optimise maintenance process and minimise operational disruptions
  - 3.3 Detailed work plans are developed in line with schedules, availability of expertise, scheduling of resource availability and environmental requirements
  - 3.4 Team members with required competencies are allocated to maintenance activities
  - 3.5 Consumables and equipment are secured to meet work plan requirements
  - 3.6 Externally sourced equipment, consumables and expertise are located and procured
  - 3.7 Contingency plans are prepared

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|   | 3.8 | Maintenance schedules and procedures are effectively communicated to the team  |
| <b>4 Supervise maintenance tasks</b>            | 4.1 | Job specifications and maintenance tasks are communicated effectively to team members  |
|   | 4.2 | Maintenance and repair tasks are monitored to ensure they satisfy technical specifications   |
|   | 4.3 | Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times                       |
|   | 4.4 | Emergency equipment is made available and working order of this equipment is ensured   |
|   | 4.5 | Contingencies are managed to ensure quality of work is maintained and work is completed within agreed time frame                             |
| <b>5 Perform planned maintenance activities</b> | 5.1 | WHS/OHS risk control measures and procedures for carrying out work are followed  |
|   | 5.2 | Preventative maintenance is carried out in compliance with technical specifications  |
|   | 5.3 | Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes                               |
|   | 5.4 | Ongoing quality checks of maintenance work are undertaken according to technical specifications  |
|   | 5.5 | Work is carried out efficiently without waste of materials and damage to equipment, machinery or other services                              |
|   | 5.6 | Work site is made safe according to organisational safety procedures   |
|   | 5.7 | Maintenance work is checked to verify that it conforms with technical specifications   |
| <b>6 Perform breakdown maintenance</b>          | 6.1 | Nature of breakdown is ascertained and reported to appropriate personnel or authorities  |
|   | 6.2 | Maintenance records of machinery, machinery systems and structural components related to reported breakdown are reviewed for possible causes |
|   | 6.3 | Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques   |

- 6.4 Restrictions are applied to operations where necessary and agreed to with the Master
- 6.5 Extent of repair work is ascertained from available evidence
- 6.6 Limits of repair work that can be carried out are established
- 6.7 Machinery and equipment is isolated
- 6.8 Repair work is carried out according to technical specifications
- 6.9 Master is notified of completed repair work and details are documented
- 7 **Monitor, adjust and report on implementing the maintenance plan**
  - 7.1 Execution of maintenance tasks is monitored to ensure they are completed according to maintenance plan and statutory survey requirements
  - 7.2 Machinery, machinery systems and structural components are monitored to ensure achievement of planned outcomes
  - 7.3 Costs are monitored and controlled
  - 7.4 Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes
  - 7.5 Reports are completed according to maintenance plan requirements and organisational procedures
  - 7.6 Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of safety management system
  - 7.7 Machinery, machinery systems and structural components are maintained in a clean and safe operational condition
- 8 **Carry out damage control procedures**
  - 8.1 Damage to vessel hull and watertight integrity is ascertained and monitored according to established procedures and safety regulations
  - 8.2 After hull damage, appropriate damage control measures are implemented to maintain watertight integrity and to control flooding of vessel according to vessel emergency and safety management plans

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

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|--|---|
| Machinery, machinery systems and structural components include one or more of the following: | <ul style="list-style-type: none"><li>• electrohydraulic steering gear</li><li>• engine and gearbox:<ul style="list-style-type: none"><li>• cooling systems</li><li>• lubricating systems</li></ul></li><li>• engine fuel systems</li><li>• gearbox</li><li>• hydraulic systems including steering gear</li><li>• pumps and pumping systems for bilge, fuel oil, freshwater and seawater systems</li><li>• refrigeration plant and its operation</li><li>• refrigeration system components</li><li>• steering gear</li><li>• transmission systems from engine output shaft to propeller</li><li>• two- and four-stroke diesel engines</li></ul> |
| Special requirements for maintenance include one or more of the following:                   | <ul style="list-style-type: none"><li>• asbestos awareness</li><li>• awareness of confined and restricted space operations</li><li>• dry docking</li><li>• handling refrigerant gas within regulatory requirements</li></ul>  |
| Maintenance tasks include one or more of the following:                                      | <ul style="list-style-type: none"><li>• cleaning:<ul style="list-style-type: none"><li>• coolers</li><li>• filters</li></ul></li></ul>  |

- greasing
- maintaining:
  - emergency equipment
  - firefighting and lifesaving equipment
- oiling
- oily water separator
- overhauling and repairing pumps
- scheduled survey inspections
- topping up oils

- Consumables and equipment include one or more of the following:
- cleaning chemicals
  - coolants
  - hand and power tools
  - oils and grease
  - refrigerant gas
  - replacement parts
  - test equipment

- Emergency equipment includes one or more of the following:
- communication equipment
  - emergency lighting
  - firefighting equipment
  - first aid provisions
  - lifesaving equipment

- Nature of breakdown includes one or more of the following:
- cooling water system failure
  - engine failure
  - exhaust systems
  - fuel system failure
  - gearbox failure
  - loss of control systems
  - lubricating systems failure
  - power plant failure
  - propeller and shafting arrangements
  - pumping systems failure
  - refrigeration plant and its operation
  - steering gear failure

- Restrictions applied to operations include one or
- stopping or slowing main engine
  - switching to emergency power



more of the following:

- Reports include one or more of the following:
- incident reports
  - maintenance log
  - reports required under planned maintenance system
  - survey reports

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB4007A Undertake maintenance of machinery, machinery systems and structural components.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB012 Undertake maintenance of machinery, machinery systems and structural components**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing maintenance records
- developing effective planning documents
- implementing safe and environmentally responsible work practices
- managing legislative compliance and compliance records
- planning and organising application of control techniques for hull damage
- planning and preparing for maintenance including isolating equipment
- providing high quality report
- reading, interpreting and applying:
  - manufacturer instructions including all WHS/OHS requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
  - operating and service manuals
- recognising damage to hull of small vessel and taking appropriate action according to operating instructions
- recognising faulty equipment including:
  - cooling water system corrosion
  - fuel oil contamination
  - lubricating oil contamination
- repairing pipe work
- selecting and using correct tools and equipment for maintenance task
- servicing valves.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate mathematical procedures for estimating and measuring including calculating time to complete tasks
- back-flooding and down-flooding
- causes of vibrations and undue wear in power transmission system

- construction, layout and subdivision requirements of a typical vessel, including freeboard and bulkhead deck, watertight compartments, weather tight compartments and bulkheads of vessel
- costs of material, consumables and labour
- environmental protection requirements including safe disposal of waste material, safe use and storage of chemicals, and safe handling and storage of LPG
- environmental risks and hazards
- inspections to be undertaken on vessel hull during slipping or dry docking
- maintenance procedures and methodologies for:
  - batteries
  - cooling water systems including treatment
  - fuel systems including contamination
  - heat exchangers
  - hull maintenance including use of sacrificial anodes
  - hydraulic systems
  - lifesaving appliances
  - lubricating oil systems including contamination
  - power transmission systems
  - steering systems
  - starter motors, alternators and associated equipment
- material and stress characteristics in constructing a vessel
- methods of corrosion and how to prevent corrosion
- organisational requirements, policies and procedures for organising maintenance programs
- principal features of structure of a vessel
- procedures for recording and reporting workplace information
- types of tools and equipment, and procedures for their safe use and maintenance
- valve types and construction.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB013 Maintain and repair marine electrical and electronic equipment

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain and repair marine electrical and electronic equipment on a vessel. This includes carrying out routine maintenance of marine generators, switchboards, electric motors, motor starters, direct current (DC) electrical systems and electrical distribution systems; and identifying faults in automated control systems.

This unit applies to the work of a Marine Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Maintain marine generators**

- 1.1 Safety requirements associated with working on marine electrical generation systems are complied with
- 1.2 Marine generators are inspected using appropriate manuals and drawings according to regulatory, organisational and

- manufacturer requirements
- 1.3 Routine maintenance and testing of marine generators is performed according to regulatory, organisational and manufacturer requirements
  - 1.4 Alternators are synchronised according to organisational and manufacturer requirements
  - 1.5 Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements
- 2 Maintain marine switchboards**
- 2.1 Safety requirements associated with handling circuit breakers are complied with
  - 2.2 Routine maintenance is performed on main circuit breaker according to with regulatory, organisational and manufacturer requirements
  - 2.3 Faults in circuit breakers are detected and corrected according to regulatory, organisational and manufacturer requirements
  - 2.4 Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements
- 3 Maintain marine electrical motors**
- 3.1 Safety requirements associated with working on marine electrical motors are complied with
  - 3.2 Equipment required for maintenance of electrical motors is selected and checked for serviceability
  - 3.3 Routine maintenance procedures are applied on marine electrical motors according to regulatory, organisational and manufacturer requirements
- 4 Test marine electrical motor starters**
- 4.1 Safety requirements associated with working on marine electrical motor starters are complied with
  - 4.2 Faults in electrical motor starters are detected and rectified according to regulatory, organisational and manufacturer requirements
  - 4.3 Starting and running current load testing is performed on electrical motors according to regulatory, organisational and manufacturer requirements
  - 4.4 Procedures for finding start and finish of electrical motor windings are applied according to regulatory, organisational and manufacturer requirements

- 4.5 Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements
- 5 Maintain marine electrical distribution systems**
- 5.1 Safety requirements associated with working on marine electrical distribution systems are complied with
- 5.2 Causes and potential dangers associated with earth faults in multi earth neutral and floating neutral systems are identified
- 5.3 Earth faults are detected and repaired using correct equipment according to regulatory, organisational and manufacturer requirements
- 5.4 Hazards associated with working on fluorescent lamp circuits are identified
- 5.5 Fluorescent lamp circuit is constructed using appropriate manuals and drawings according to regulatory, organisational and manufacturer requirements
- 5.6 Components, function and operation of watertight and flame proof fittings are identified
- 5.7 Reasons for earthing high voltage systems via a resistor are outlined
- 5.8 Routine maintenance, inspection and testing of marine electrical distribution systems is performed according to regulatory, organisational and manufacturer requirements
- 5.9 Temporary repairs to insulation are performed according to regulatory, organisational and manufacturer requirements
- 5.10 Limitation of temporary repairs to insulation in terms of survey requirements are identified
- 6 Maintain DC electrical systems**
- 6.1 Safety requirements associated with working on marine DC electrical systems are complied with
- 6.2 Operation of a rectifier is identified
- 6.3 Single-phase full wave rectifier fitted with filters is built and operated
- 6.4 Routine battery maintenance is carried out according to organisational and manufacturer requirements
- 6.5 Correct procedures for checking specific gravity of electrolyte in lead acid and alkaline batteries are applied

		according to manufacturer requirements
	6.6	Methods for supplying back up power for remote/automatic control equipment are identified
	6.7	Procedure for testing back up power is identified and applied
<b>7 Identify faults in automated control systems</b>	7.1	Pneumatic, hydraulic, electronic/electrical control systems are compared and contrasted
	7.2	Function and operation of main components of automated control systems is outlined
	7.3	Faults in automated control systems are detected and rectified using standard fault finding procedures
	7.4	Testing procedures for identifying function and performance of automatic control systems in vessel operating systems are identified and applied
<b>8 Operate electrical testing and measuring equipment</b>	8.1	Insulation tester is operated safely according to manufacturer procedures
	8.2	Continuity testing on electrical circuits is performed according to organisational and manufacturer procedures
	8.3	Clamp meter is operated safely according to manufacturer procedures
	8.4	Multimeter is operated safely according to manufacturer procedures
<b>9 Test automatic control devices</b>	9.1	Operational functions are performed on a monitor
	9.2	Different types and operation of control valves are identified
	9.3	Control system control functions are applied using different control devices

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Testing of marine generators include one or more of the following:

- functional test of automatic voltage regulator (AVR)
- insulation
- reading of alternator:
  - excitation circuit
  - stator

Faults in circuit breakers include one or more of the following:

- alignment of contactors
- condition of:
  - closing and opening mechanisms
  - insulation barriers
- wear and tear on linkages

Faults in electrical motor starters include one or more of the following:

- earthing
- open circuit

Main components of automated control systems include one or more of the following:

- actuator
- control valve
- controller
- positioner
- regulator
- relay
- sensor
- servomotor
- transducer

Faults in automated control systems include

- failure of components
- intermittent functional faults

one or more of the following:

Vessel operating systems include one or more of the following:

- auxiliary machinery
- boilers
- main engine
- power generation and distribution

Operation of control valves include one or more of the following:

- electrical
- hydraulic
- manual
- pneumatic

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB5001A Maintain and repair marine electrical and electronic equipment.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB013 Maintain and repair marine electrical and electronic equipment**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant procedures
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- communicating procedures associated with maintaining and repairing marine electrical and electronic equipment verbally and in writing
- extracting information from basic electrical and electronic diagrams required to build electrical and electronic circuits
- identifying and interpreting numerical and graphical information in vessel electrical diagrams and specifications
- identifying and suggesting ways of rectifying faults and malfunctions in marine electrical and electronic systems on vessels
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine electrical and electronic systems on vessels
- initiating timely action in response to defects or damage
- reading and interpreting written information related to operating and maintaining marine electrical and electronic systems, including specifications, drawings, technical manuals, and electrical and electronic circuit diagrams
- using testing equipment to gather information on function and performance of marine electrical and electronic systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alternating current (AC)/DC voltage
- batteries
- circuit breakers and interlocks fitted to circuit breakers
- circuits
- current protection relays:
  - operate on fault and request

- operate on fault and request and demand
- operate on fault and request and under voltage
- earthing
- electrical measuring and testing instruments
- electrical symbols, basic electrical and electronic diagrams and circuits
- fault protection equipment:
  - differential protection device
  - fuses
  - over voltage devices
  - over current devices
  - reverse power devices
  - thermal overload devices
  - thermistor protection devices
  - under voltage devices
- function and performance testing of system monitoring devices including:
  - alarm printer
  - data logger
- nature and causes of typical start up and shut down malfunctions of main and auxiliary electrical and associated systems and available methods for their detection and rectification
- operation of:
  - boiler, purifier and generator shut down systems
  - main engine shut down protective devices
  - protective devices found on board vessels
- operational characteristics and performance specifications for different types of electrical and electronic systems found on vessels
- principles and procedures of electrical maintenance
- purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- relevant procedures such as those relating to:
  - adjusting, testing and maintaining fault protection devices on switchboards
  - carrying out start up and shut down of electrical machinery and associated systems to ensure compliance with company and survey requirements and regulations
  - changing alarm-setting values in monitoring systems
  - confirming the accuracy of measuring monitoring
  - detecting electrical malfunctions and preventing damage
  - electrical safety and isolation
  - fault finding
  - marine maintenance, including difference between breakdown repair, planned maintenance and condition monitoring; purpose of maintenance recording and reporting procedures

- routine maintenance on marine electrical motors (cleaning inspection, deterioration of insulation, removal of dust and oil, renew of bearings)
- safety and emergency
- testing function and performance of protection devices as part of vessel statutory survey
- risks and safety procedures associated with working in high voltage environments
- safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine electrical machinery and associated systems
- safety requirements associated with working on marine electrical systems, including:
  - dangers associated with the spaces in the vicinity of busbars
  - potential dangers associated with instrument voltage/current transformer circuits
  - protection normally provided on doors of switchboard cubicles
- types of electrical and electronic equipment and components
- vessel safety management systems
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- working safely with electricity:
  - appropriate method of removing an electric shock victim from a live electrical situation
  - common causes of electrical accidents
  - effects of electric shock on the human body
  - electrical safe working practices
  - need for ensuring safe isolation of an electrical supply
  - precautions that can minimise chance of electric shock.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB014 Maintain and repair shipboard machinery and equipment

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain and repair shipboard machinery and equipment on a vessel. This includes maintaining marine pumps, valves, air compressors, heat exchangers, diesel engines, turbochargers, marine lubricating systems and deck machinery as well as conducting inspections of marine boilers and marine refrigeration units.

This unit applies to the work of a Marine Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Follow safe work practices**

- 1.1 Work health and safety (WHS)/occupational health and safety (OHS) procedures relevant to maintaining shipboard machinery and equipment are complied with
- 1.2 Safety hazards are identified and reported according to safety

and vessel procedures

1.3 Prior to use, tools, equipment and testing devices needed to carry out maintenance activities for correct operation and safety are checked according to safety and vessel procedures

1.4 Before commencing maintenance activities, isolation precautions are implemented according to safety and vessel procedures

## **2 Maintain marine pumps**

2.1 Maintenance requirements for pump are determined according to safety, manufacturer and vessel procedures and documentation

2.2 Appropriate procedures, materials, tools and equipment for maintaining pump are selected according to safety, manufacturer and vessel procedures

2.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities

2.4 Pump is disassembled, inspected and serviced according to safety, manufacturer and vessel procedures

2.5 Pump is reassembled and tested according to safety, manufacturer and vessel procedures

2.6 Performance of pump is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

## **3 Maintain valves**

3.1 Maintenance requirements for valve are determined according to safety, manufacturer and vessel procedures and documentation

3.2 Appropriate procedures, materials, tools and equipment for maintaining valve are selected according to safety, manufacturer and vessel procedures

3.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities

3.4 Valves are removed for maintenance according to safety, manufacturer and vessel procedures and documentation

3.5 Valve is disassembled and valve maintenance is performed according to safety, manufacturer and vessel procedures and



- documentation
- 3.6 Valves are reassembled and tested according to safety, manufacturer and vessel procedures and documentation
- 4 Maintain air compressors**
- 4.1 Maintenance requirements for air compressor are determined according to safety, manufacturer and vessel procedures and documentation
- 4.2 Appropriate procedures, materials, tools and equipment for maintaining air compressor are selected according to safety, manufacturer and vessel procedures
- 4.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 4.4 Air compressor is disassembled and inspected according to safety, manufacturer and vessel procedures
- 4.5 Air compressor is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 4.6 Performance of air compressor is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 5 Maintain heat exchangers**
- 5.1 Maintenance requirements for heat exchanger are determined according to safety, manufacturer and vessel procedures and documentation
- 5.2 Appropriate procedures, materials, tools and equipment for maintaining heat exchanger are selected according to safety, manufacturer and vessel procedures
- 5.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 5.4 Heat exchanger is disassembled and inspected according to safety, manufacturer and vessel procedures
- 5.5 Heat exchanger is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 5.6 Performance of heat exchanger is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 6 Maintain diesel**
- 6.1 Maintenance requirements for diesel engine are determined

- engines**
- according to safety, manufacturer and vessel procedures and documentation
- 6.2 Appropriate procedures, materials, tools, measuring instruments and equipment for maintaining diesel engine are selected according to safety, manufacturer and vessel procedures
- 6.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 6.4 Diesel engine components are disassembled and inspected for wear and deterioration according to safety, manufacturer and vessel procedures
- 6.5 Routine maintenance on diesel engines is performed according to manufacturer and vessel procedures
- 6.6 Diesel engine components are refurbished, as required, according to manufacturer and vessel procedures
- 6.7 Specialised tools and measuring instruments are used to maintain and refurbish diesel engines/components according to safety, manufacturer and vessel procedures
- 6.8 Diesel engine is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 6.9 Performance of diesel engine is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures
- 7 Maintain turbochargers**
- 7.1 Maintenance requirements for turbocharger are determined according to safety, manufacturer and vessel procedures and documentation
- 7.2 Appropriate procedures, materials, tools and equipment for maintaining turbocharger are selected according to safety, manufacturer and vessel procedures
- 7.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 7.4 All components of turbocharger are disassembled and inspected for wear and deterioration according to safety, manufacturer and vessel procedures

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|---|------|--|
|   | 7.5  | Turbocharger is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures   |
|   | 7.6  | Performance of turbocharger is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures              |
| <b>8 Inspect marine boilers</b>               | 8.1  | Inspection requirements for marine boiler are determined according to safety, manufacturer and vessel procedures and documentation                           |
|   | 8.2  | Appropriate procedures for inspecting marine boiler are selected according to safety, manufacturer and vessel procedures                                     |
|   | 8.3  | Relevant information is extracted from drawings and technical specifications required to perform inspection activities                                       |
|   | 8.4  | Marine boiler is inspected for repair or general maintenance according to safety, manufacturer and vessel procedures   |
|   | 8.5  | Performance of marine boiler is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures             |
| <b>9 Inspect marine refrigeration units</b>   | 9.1  | Inspection requirements for marine refrigeration unit are determined according to safety, manufacturer and vessel procedures and documentation               |
|   | 9.2  | Appropriate procedures for inspecting marine refrigeration unit are selected according to safety, manufacturer and vessel procedures                         |
|   | 9.3  | Relevant information is extracted from drawings and technical specifications required to perform inspection activities                                       |
|   | 9.4  | Marine refrigeration unit is inspected for repair or general maintenance according to safety, manufacturer and vessel procedures                             |
|   | 9.5  | Performance of marine refrigeration unit is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures |
| <b>10 Maintain marine lubricating systems</b> | 10.1 | Inspection and maintenance requirements for lubricating systems are determined according to safety, manufacturer and vessel procedures and documentation     |

- 10.2 Relevant information is extracted from drawings and technical specifications required to perform inspection and maintenance activities
  - 10.3 Purifier maintenance procedures are applied according to safety, manufacturer and vessel procedures
  - 10.4 Components of lubricating system are inspected according to safety, manufacturer and vessel procedures
- 11 Maintain and repair deck machinery**
- 11.1 Maintenance and/or repair requirements for deck machinery are determined according to safety, manufacturer and vessel procedures and documentation
  - 11.2 Appropriate procedures, materials, tools and equipment for maintaining and/or repairing deck machinery are selected according to safety, manufacturer and vessel procedures
  - 11.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
  - 11.4 Deck machinery maintenance and/or repair procedures are implemented according to safety, manufacturer and vessel procedures
  - 11.5 Deck machinery is tested and adjusted according to safety, manufacturer and vessel procedures
  - 11.6 Performance of deck machinery is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential

operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| Pumps include one or more of the following:              | <ul style="list-style-type: none"><li>• axial</li><li>• centrifugal</li><li>• gear</li><li>• reciprocating</li><li>• screw</li></ul>  |
| Serviced includes one or more of the following:          | <ul style="list-style-type: none"><li>• dismantling rod and gears, seals, bearings and relief valve</li><li>• identifying wear and deterioration</li><li>• measuring wear in cylinders, neck rings and rods</li><li>• protecting finished surfaces</li><li>• removing:</li><li>• gland packing</li><li>• studs, intact and broken</li><li>• replacing and adjusting seals</li></ul> |
| Valves include one or more of the following:             | <ul style="list-style-type: none"><li>• ball</li><li>• butterfly</li><li>• check</li><li>• diaphragm</li><li>• gate</li><li>• globe:</li><li>• screw down non return</li><li>• screw lift</li></ul>   |
| Valve maintenance include one or more of the following : | <ul style="list-style-type: none"><li>• examining seats, valves, spindles and glands</li><li>• gland packing:</li><li>• selection</li><li>• removal</li><li>• repacking</li><li>• lapping valves and seats</li><li>• machining valves and seats</li></ul>   |
| Air compressor is  | <ul style="list-style-type: none"><li>• coolers and cooling passages</li></ul>  |

disassembled and inspected include one or more of the following:

- lubricating systems
- piston and rings
- suction and delivery valves and seats

Heat exchanger is disassembled and inspected include one or more of the following:

- corrosion
- erosion
- fouling
- leakage
- provision for tube expansion

Diesel engine components are disassembled and inspected include one or more of the following:

- bearings
- cooling system
- crankshaft alignment
- liners
- lubrication system
- pistons
- rings
- valves

Routine maintenance on diesel engines include one or more of the following:

- air intake system:
  - inspecting and changing air filters
  - inspecting turbocharger to make sure there is no fouling of compressor blades from crankcase gases
- cooling system
  - fluid level checks
  - coolant sampling for trending analysis
  - draining, flushing and refilling system when required
- emissions systems:
  - inspecting crankcase ventilation systems, selective catalytic reduction (SCR) systems and diesel particulate filters (if so equipped)
- exhaust system:
  - inspecting for leaks, corrosion, wet stacking
- fuel system:
  - changing fuel filters, fuel injectors
  - checking water separators
- lubrication:
  - checking levels
  - changing oil, oil filters

- taking oil samples for trending analysis to optimise oil change intervals and to detect engine wear
- mechanical systems:
  - inspecting resilient engine mounts and torsional couplings
  - generally inspecting for leaks, wear or deterioration
- operating systems:
  - downloading data from digital engine management system to note and review alarm conditions
- valves and heads:
  - inspecting, adjusting and recording valve train wear for trending analysis
  - inspecting and recording cylinder head wear for trending analysis

Diesel engine components are refurbished include one or more of the following:

- air start valves
- cylinder heads
- exhaust valves
- fuel injectors
- relief valves

Components of turbocharger include one or more of the following:

- air casing
- air filters
- bearings
- diffuser
- gas inlet grid
- impeller
- inducer
- nozzle ring
- rotor
- volute

Inspection requirements for marine boiler include one or more of the following:

- fire side
- water side

Inspection requirements for marine refrigeration unit include one or more

- compressors
- condensers
- evaporators

of the following:

- expansion valves
- oil separators

Components of lubricating system include one or more of the following:

- settling tank
- system bearings
- system filters

Deck machinery includes one or more of the following:

- cranes
- lifeboat davits and gear
- mooring winch
- winch
- windlass

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARB5002A Maintain and repair shipboard machinery and equipment.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB014 Maintain and repair shipboard machinery and equipment**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining principles of shipboard machinery and equipment and imparting knowledge and ideas verbally and in writing
- initiating timely action in response to defects or damage
- performing calculations and interpreting graphical information used in maintaining shipboard machinery and equipment
- reading and interpreting written information related to the operation, performance and maintenance of shipboard machinery and equipment, including machinery specifications and operational manuals
- scheduling maintenance of shipboard machinery and equipment
- using testing equipment and explaining test and performance results relevant to shipboard machinery and equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of diesel engine operation including:
  - typical starting air and manoeuvring systems of diesel engines, including all components normally found therein
  - typical diesel engine lubrication systems, including:
  - operating principles and adjustments of diesel engine fuel injection equipment, including common service faults, symptoms and causes of diesel fuel injection problems, explaining appropriate actions to be taken
  - means of pressure charging diesel engines, including common service faults, appropriate actions to rectify these faults, and emergency operation and isolation procedures
  - different methods of cooling marine diesel engines, including common requirements of cooling
  - common faults and appropriate action to be taken with cooling of diesel engines

- causes of crankcase and air-line explosions, and scavenge and uptake fires
- materials used to construct following diesel engine major parts:
  - crank shafts
  - cylinder liners and heads
  - exhaust valves
- basic principles of electrotechnology, marine electrical practice and marine automation and control relevant to detection, fault finding and repair of faults in electrical and electronic equipment, including:
  - basic electrical circuit theory
  - basic theory of electromagnetism and electrostatics
  - electrolytic action and cells
  - AC and DC theory and plant and equipment
  - basic cabling, distribution and lighting systems
  - basic control and switch gear
  - instruments, calibration and testing
- basic principles of mechanics as they relate to forces, pressures, stress and strains in shipboard dynamic machinery
- basic principles of operating and maintaining:
  - fluid power control systems
  - refrigeration systems
  - machinery lubrication systems
  - marine boilers and materials used to construct following boiler major parts:
    - water tubes
    - furnace
    - steam and water drum
    - superheaters
- basic thermodynamics, including:
  - basic thermodynamic properties of common working fluids
  - methods of heat transfer and related problems
  - principles of heat transfer by conduction, convection and radiation and their application to marine systems
  - elementary principles of steam plants
  - basic steam plant cycles and function of each component
  - combustion process and calorific value of fuels
  - air/fuel ratio and significance of excess air on combustion
  - operating cycle of single stage reciprocating air-conditioners, including methods for the mass of air delivered
  - clearance volume, its effect on volumetric efficiency and methods of calculating volumetric efficiency
  - advantages of multi-staging and inter-cooling
  - meaning of gauge and absolute pressure

- temperature and temperature scales
- system international (SI) units and common thermodynamic terms and principles
- maintenance and repair hazards and problems, and appropriate preventative and remedial action and solutions during maintaining and repairing shipboard plant and equipment
- maritime communication techniques needed during maintenance and repair operations
- materials used to construct the following gas turbine major parts:
  - turbine casing
  - rotors
  - compressors
  - gas generators
- materials used to construct the following steam turbine major parts:
  - turbine casings
  - rotors
  - blades
  - nozzles
  - reduction gears
- national and international regulations, International Maritime Organization (IMO) Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders applicable to managing shipboard plant and equipment maintenance and repair operations
- nature and causes of typical shipboard plant and equipment malfunctions and available methods for their detection and repair, including established fault finding techniques
- operating principles and performance specifications for different types of shipboard plant and equipment usually found on a vessel of unlimited propulsion power
- operating principles of unmanned machinery spaces (UMS) and automated monitoring and control of machinery
- planned maintenance systems and procedures for condition monitoring of plant and equipment, including responsibilities and requirements covered by various forms of vessel survey
- plant and equipment typically found on board a vessel of unlimited propulsion power
- procedures for:
  - carrying out shipboard plant and equipment fault finding and repair as part of routine maintenance procedures to ensure compliance with company and survey requirements, and established safety rules and regulations
  - completing temporary and permanent repair and/or replacement procedures for plant and equipment on board vessels at sea, alongside and in dry dock
  - reading and interpreting plant and equipment performance readings and instrumentation
- purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- safe procedures for:
  - handling heavy plant, equipment and component parts during maintenance and repair of shipboard plant and equipment
  - using hand and power tools and maintenance equipment

- safety, environmental and hazard control precautions and procedures relevant to shipboard plant and equipment inspection and maintenance operations
- types of vessel maintenance and repair records to be maintained to meet requirements of company, survey and regulatory authorities
- typical vessel and plant and equipment specifications, equipment drawings, operational manuals, and electrical and control circuit diagrams
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB015 Maintain firefighting appliances

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain firefighting equipment. It includes following a maintenance program, working safely, carrying out maintenance and completing necessary maintenance documentation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

- |   |     |   |
|---|-----|---|
| <b>1 Prepare to carry out maintenance</b> | 1.1 | Details of firefighting equipment and systems are ascertained from manufacturer documentation and equipment certification documentation |
|   | 1.2 | Extent of maintenance to be conducted is established from maintenance schedule  |
|   | 1.3 | Tools, equipment and testing devices needed to carry out maintenance work are obtained and checked for correct operation and safety     |
| <b>2 Carry out maintenance</b>            | 2.1 | Work is carried out according to maintenance schedule to ensure all items are correctly maintained                                      |

- |  |   |
|--|---|
| <b>3 Complete maintenance work inspections and documentation</b> | <ul style="list-style-type: none"><li>2.2 Equipment and systems are checked and tested according to established procedures to determine whether it functions correctly, complies with approval documentation and is not subject to deterioration or damage</li><li>2.3 Equipment and systems are adjusted or repaired within limits permitted by equipment certification and according to manufacturer instructions</li><li>2.4 Certification documentation for replacement equipment and systems is sighted to ensure it is identical to equipment it replaces, according to regulatory requirements</li><li>2.5 Equipment being withdrawn from service is isolated safely according to regulatory requirements</li><li>2.6 Spare equipment is maintained and suitably stored where it is not likely to suffer deterioration or damage</li><li>3.1 Detailed inspection of equipment and systems subject to maintenance work is arranged according to regulatory requirements</li><li>3.2 Results of inspections and maintenance activities are recorded according to regulatory and organisational requirements</li><li>3.3 Appropriate personnel are notified of completion of maintenance and details are documented according to regulatory and organisational requirements</li></ul> |
|--|---|

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Firefighting equipment and systems must include:

- closing appliances
- fire pumps and fire main systems

- fixed fitted detection and suppression systems
  - fixed installations
  - foam applicators
  - hoses
  - international ship-to-shore connection
  - nozzles
  - portable and semi-portable extinguishers
  - remote shut-offs
  - stretchers/ropes and lines
  - incorrect stowage of equipment
  - lack of required maintenance
- Deterioration or damage must include:

## Unit Mapping Information

This unit replaces and is equivalent to MARB3001A Maintain firefighting appliances.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB015 Maintain firefighting appliances

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- adapting to variations in firefighting equipment and systems on different vessels
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- following procedures to maintain firefighting equipment and systems
- interpreting technical specifications related to maintaining firefighting equipment and systems
- identifying faults and problems related to maintaining firefighting equipment and systems
- taking appropriate action to prevent pollution of marine environment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- faults that can occur with firefighting equipment and systems
- fire pumps and fire main systems
- fixed installations, closing appliances and remote shut-offs
- ISM Code safety management system
- organisational policies and procedures related to maintaining firefighting equipment and systems
- recommended maker instructions for repair equipment
- relevant regulations and codes of practice related to maintaining firefighting equipment and systems
- statutory and organisational requirements for documentation related to maintaining firefighting equipment and systems
- uses of hoses and nozzles
- valid survey certificates
- WHS/OHS requirements and work practices



## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where maintaining firefighting appliances can be applied.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry to maintain firefighting equipment.
- Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB016 Contribute to routine engine maintenance on a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to contribute to servicing engines and engine components on a vessel.

This unit applies to an Integrated Rating or Able Seafarer-Engine, who assists under the direction of the officer in charge of the engineering watch, in performing a range of engine maintenance activities on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan engine maintenance tasks**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Planned maintenance system is accessed to establish engine maintenance requirements for vessel

- 1.2 Maintenance tasks are proposed and prioritised in conjunction with others involved in or affected by the maintenance work
- 1.3 Resource requirements are identified and accessed to ensure efficient completion of tasks
- 1.4 Maintenance tasks are recorded in the maintenance schedule according to organisational procedures
- 2 Prepare for engine service**
  - 2.1 Nature and scope of work requirements are confirmed according to organisational procedures
  - 2.2 Service procedures, workshop manuals and manufacturer specifications are accessed and interpreted
  - 2.3 Tools, equipment and materials required for servicing are identified and prepared
  - 2.4 Engine and components are visually inspected for external signs of defects according to maintenance documentation
  - 2.5 Electrical components are identified and electrical equipment is used safely
  - 2.6 Engine is started, ran up to operating temperature and checked for leaks, abnormal noises and pressures
  - 2.7 Test results are compared with manufacturer/component supplier specifications to determine compliance or non-compliance
  - 2.8 Results are documented with supporting information and recommendations are made about serviceability and repair
- 3 Service engines and engine components**
  - 3.1 Work health and safety (WHS)/occupational health and safety (OHS) requirements are identified and observed
  - 3.2 Service operations are performed according to organisational procedures manufacturer/component supplier specifications
  - 3.3 Fluid level checks and replenishments are carried out according to manufacturer/component supplier specifications
  - 3.4 Appropriate lubricants are applied to engine
  - 3.5 Equipment/components requiring replacement are changed according to manufacturer/component supplier specifications

- 3.6 Adjustments are made according to manufacturer/component supplier specifications
- 4 Complete work**
- 4.1 Engine is inspected to ensure protective guards, cowlings and safety features are in place
- 4.2 Engine is cleaned according to organisational procedures
- 4.3 Materials to be reused are collected and stored according to manufacturer specifications and organisational procedures
- 4.4 Tools and equipment are cleaned, maintained and stored according to manufacturer specifications and organisational procedures
- 4.5 Waste and scrap are removed according to legislative requirements and organisational procedures
- 4.6 Unserviceable equipment is tagged and faults are identified and reported according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- Maintenance tasks include one or more of the following:
- economiser cleaning
  - engine room rounds (daily/weekly/monthly maintenance checks)
  - greasing and oiling of machinery
  - inspection and maintenance of:
    - hatches, watertight doors ports and deadlights
    - hoists and lifting equipment
  - routine inspection of hand and power tools, measuring instruments and machinery tools
  - safe disposal of waste materials
  - scavenge space cleaning

- soot blowing
- surface preparation and painting

## Unit Mapping Information

This unit replaces and is equivalent to MARB3002A Perform routine engine maintenance on a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB016 Contribute to routine engine maintenance on a vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assisting in maintaining and servicing marine:
  - cooling systems/components
  - batteries
  - engine mounting systems/components
  - exhaust systems/components
  - fuel systems/components
  - intake systems/components
  - lubrication systems/components
- communicating with other personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- confirming maintenance to be undertaken and identifying resource requirements with the officer in charge of the engineering watch
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant WHS/OHS skills and knowledge
- identifying hazards and safety issues and reporting these to the engineering officer of the watch
- identifying tools, equipment and materials required to undertake maintenance tasks
- using electrical equipment safely and applying:
  - correct emergency procedures
  - different voltages in use on board
  - isolation procedures
  - precautions to prevent electric shock
  - safety precautions before commencing work

- using painting, lubrication and cleaning materials, and equipment safely.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic electrical principles covering voltage, current, resistance, power, magnetic and inductance
- basic mechanical principles covering the concepts of mechanical, hydraulic and pneumatic systems
- causes of electric shock and precautions to be observed to prevent shock
- engine room cleaning procedure and relevant cleaning agents
- engine room hazards and safety including:
  - electrical safety
  - gas testing
  - head of water/fluid
  - heat stress
  - high pressures
  - hot fluids
  - mechanical safety
  - noise
  - pollution
  - steam
  - toxic gases
  - ventilation
  - vibration
- engine room machinery and equipment including:
  - air compressors
  - air start systems
  - bilge system, bilge pumps, bilge pick ups, bilge valves, bilge piping
  - engine protection devices (crankcase mist detectors)
  - hydraulic systems, power packs, rams and motors, directional control valves (DCVs)
  - oily water separators
  - pumps – positive displacement, centrifugal, axial flow
  - purifiers and clarifiers

- refrigeration and air-conditioning plant
- sewage treatment plant
- slow speed, medium speed and high speed diesels
- steering systems
- osmosis plant
- valves – globe and full flow, screw down non return, screw lift, butterfly, ball, relief, non-return, gate
- water making (both fresh water generators and reverse)
- manufacturer safety guidelines and shipboard instructions
- purpose of isolation procedures and application of lock out tags
- rights and responsibilities of individuals about lock out and tagging of plant and equipment
- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- routine maintenance and repair procedures
- safe disposal of waste materials
- surface preparation techniques, including:
  - abrasive blast cleaning
  - flame cleaning
  - hand and power tool cleaning
- types, functions and limitations of marine:
  - cooling systems/components
  - engines
  - engine mounting systems/components
  - exhaust systems/components
  - fuel systems/components
  - intake systems/components
  - lubrication systems/components.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace operational situation where routine maintenance



can be undertaken on a range of marine engines. Where this is not available, in a simulated workplace operational situation that replicates workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials that replicate and are currently used in industry, including:
  - cleaning agents and equipment
  - hand tools
  - machine tools
  - measuring instruments
  - power tools
  - suitable marine engine and relevant components
  - relevant engine room machinery and equipment
  - relevant diagnostic equipment
- personal protective equipment currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB017 Perform routine maintenance and repairs on a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to perform routine remedial, preventative and survey deck maintenance and repairs. It includes basic deck maintenance, cleaning tasks, marine painting, and servicing deck machinery and systems on a vessel.

This unit applies to an Integrated Rating or Able Seafarer-Deck/Engine engaged in a range of maintenance activities required on a range of vessels, under the direction of the officer in charge of the deck watch.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                               |            |  |
|-------------------------------|------------|--|
| <b>1 Plan and prepare for</b> | <b>1.1</b> | Maintenance and repair activities are identified from work |
|-------------------------------|------------|--|

<b>work</b>		orders and are clarified with the officer in charge of the deck watch
	1.2	Relevant plans, drawings and texts are interpreted to determine job specifications
	1.3	Resources required to complete tasks are identified, obtained and inspected for compliance with job specifications
	1.4	Appropriate fall arrest and restraint devices are selected and used according to work health and safety (WHS)/ occupational health and safety (OHS) requirements when working at heights or overside
	1.5	Tasks are sequenced and prioritised
	1.6	Coordination requirements are resolved with the officer in charge of the deck watch and others involved or affected by the work
	1.7	Potential hazards are identified and prevention and/or control measures are selected according to work plan and organisational procedures
<b>2 Perform basic deck maintenance</b>	2.1	Suitable personal protective clothing is selected and used according to WHS/OHS requirements
	2.2	Deck surfaces are checked according to planned maintenance system
	2.3	Deterioration or corrosion of deck surfaces is identified and appropriate maintenance action is carried out according to manufacturer instructions and organisational procedures
	2.4	Minor faults and imperfections in paint surfaces are repaired according to manufacturer instructions and organisational procedures
	2.5	Weathered surfaces are restored using cleaners and liquid abrasives according to manufacturer instructions and organisational procedures
	2.6	Tools and equipment are used correctly and safely
	2.7	Maintenance materials are obtained, prepared and applied according to manufacturer instructions and organisational procedures
<b>3 Carry out cleaning tasks</b>	3.1	Suitable personal protective clothing is selected and used according to WHS/OHS requirements

- 3.2 Area to be cleaned is prepared and hazards are identified
- 3.3 Work area is barricaded or warning signs are provided as required to reduce risk to other crew members
- 3.4 Correct chemicals and cleaning agents are selected and applied according to manufacturer instructions and WHS/OHS requirements
- 3.5 Equipment is used correctly and safely
- 3.6 Cleaning tasks are completed according to manufacturer instructions and organisational procedures
- 4 Prepare and paint surfaces**
  - 4.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements
  - 4.2 Surfaces are prepared using correct equipment
  - 4.3 Rust remover, rust converter and undercoats are applied according to manufacturer instructions
  - 4.4 Paints are mixed in correct proportions according to manufacturer instructions
  - 4.5 Paint is applied using appropriate application equipment
- 5 Carry out routine maintenance of deck fittings, equipment and systems**
  - 5.1 Fittings and equipment are inspected and inspection results are compared with manufacturer specifications
  - 5.2 Maintenance tasks are carried out to specification
  - 5.3 Mechanical equipment and system components are checked with appropriate instruments
  - 5.4 Faulty items or components are identified and appropriate maintenance procedure is selected
  - 5.5 Unserviceable equipment is tagged according to organisational procedures
- 6 Repair/replace faulty fittings and equipment**
  - 6.1 Fittings and equipment are safely isolated according to regulations and WHS/OHS requirements
  - 6.2 Faulty fittings or equipment are removed using appropriate tools, equipment and procedures
  - 6.3 Replaceable items are selected or serviceable items are repaired according to manufacturer specifications

- 6.4 Adjustments are made to fittings or equipment to comply with specifications
- 6.5 Operational check is carried out to ensure compliance with manufacturer specifications
- 6.6 Maintenance report is completed according to organisational procedures

## **7 Clean up**

- 7.1 Work area is cleared and cleaned
- 7.2 Materials are disposed of or recycled according to legislative and organisational requirements
- 7.3 Tools and equipment are checked, maintained and stored according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

Maintenance and repair activities include the following:

- fire and bilge pumps greasing and oiling
- lifebuoys and lifejackets – subject to regular inspection
- lifesaving appliances – regular inspection and maintenance of lifeboats and equipment, which may include replacing lashings, wires, expired food, and general cleaning and painting
- ropes and wires – inspecting for damage, repairing damaged areas (splicing), replacing, where necessary, such items as mooring lines, cargo wires, lashings, lifeboat falls
- rust prevention

## Unit Mapping Information

This unit replaces and is equivalent to MARB3003A Perform routine maintenance and repairs on a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB017 Perform routine maintenance and repairs on a vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying corrosion control and preventive measures/maintenance
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying safe and environmentally responsible work practices when performing routine remedial, preventative and survey deck maintenance on a vessel
- applying surface preparation techniques
- communicating with other personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- completing any required records when performing routine remedial, preventative and survey deck maintenance on a vessel
- correctly using paint, lubrication and cleaning materials and equipment
- following required work schedule according to organisational requirements
- reading and interpreting instructions for performing routine remedial, preventative and survey deck maintenance on a vessel
- reading and interpreting manufacturer specifications and safety data sheets (SDSs)/material safety data sheets (MSDSs)
- recognising routine problems when performing routine remedial, preventative and survey deck maintenance on a vessel
- selecting, using and maintaining suitable lifting gear
- selecting and using relevant tools, equipment and materials
- undertaking regular testing with repairs, as required
- using fall arrest and restraint devices, as required.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- application, use, type and maintenance of lifting gear used on a vessel
- component parts, operation and routine maintenance requirements of vessel machinery
- corrosion control and preventive measures/maintenance, paint systems and surface preparation techniques
- job safety analyses (JSAs)/safe work method statements (SWMSs)
- maintenance records for a vessel
- manufacturer safety guidelines and shipboard instruction
- nature and causes of corrosion of marine surfaces and structures, and available methods of control
- organisational procedures for cleaning and maintenance
- paint types suitable for interior and exterior application on a vessel
- planned maintenance systems
- principal parts of a vessel and basic design methods
- principles and procedures of machinery lubrication as they relate to vessel machinery
- procedures for:
  - checking deck areas, machinery and fittings of a vessel as part of the planned routine maintenance on a vessel
  - using hand tools for routine maintenance operations
- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- safe disposal of waste materials according to with the International Convention for the Prevention of Pollution from Ships (MARPOL Convention)
- safety management system as it relates to planned vessel maintenance systems
- storage requirements for paints, chemicals and cleaning agents used in planned maintenance operations
- suitable equipment cleaning and preservation techniques used on board a vessel
- surface preparation techniques, including:
  - abrasive blast cleaning
  - flame cleaning
  - hand and power tool cleaning
- type, characteristics and functions of:
  - equipment/tools used in cleaning and maintenance
  - vessel machinery and equipment
- use of various vessel construction material and regulations governing structure.



## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations in a range of locations including:

- battery room
- exposed deck area
- firefighting equipment spaces
- store room
- wheelhouse and accommodation area.

Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and fittings that replicate and are currently used in industry including:
  - cleaning chemicals, agents and equipment
  - fall arrest and restraint devices
  - fuel, fresh and ballast water, bilge and firefighting pumps
  - hand tools
  - lifting equipment
  - navigation lights and shapes
  - paint residues
  - power tools
  - rags
  - spent oil
  - steering gear
  - windlass and capstan
- personal protective equipment currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB018 Implement vessel planned maintenance system

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to establish, organise and implement preventative and reactive maintenance programs to optimise vessel operational performance.

This unit applies to individuals working as a Chief Integrated Rating on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Develop maintenance plan**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Vessel and equipment specifications, service requirements and organisational procedures are checked for recommended maintenance intervals and processes according to the safety management system

- 1.2 Special requirements for maintenance are separated from routine maintenance tasks
  - 1.3 Maintenance plan and a related work schedule are developed
  - 1.4 Procedures for safety checks of equipment are developed and documented according to organisational procedures
  - 1.5 Recordkeeping system is developed for maintenance work completed and equipment replaced according to organisational procedures
- 2 Establish maintenance systems**
  - 2.1 Resource requirements are identified and supplied
  - 2.2 Roles and responsibilities of crew are clarified and built into position descriptions and work instructions
  - 2.3 Mentoring and training is provided to support the maintenance strategy
  - 2.4 Maintenance procedures and schedules are prepared to minimise negative impacts on vessel operations, costs, waste and the environment
  - 2.5 Potential risks are analysed and management strategies are recommended
  - 2.6 Contingency plans are prepared
  - 2.7 Maintenance schedules and procedures are effectively communicated to crew
- 3 Implement maintenance plan**
  - 3.1 Consumables and equipment are coordinated to meet maintenance work schedule
  - 3.2 Maintenance work schedule is completed according to maintenance plan
  - 3.3 Technical assistance is provided to crew in completing maintenance activities as required
  - 3.4 Appropriate readings, measurements and recordings are made and compared to equipment and other relevant specifications
  - 3.5 Areas of vessel and equipment requiring further testing are identified and appropriate procedures for testing are implemented

- |   |     |  |
|---|-----|--|
|   | 3.6 | Appropriate adjustments are made to maintenance plan based on experience and required documentation is completed                             |
|   | 3.7 | Maintenance records are completed and forwarded to appropriate personnel   |
|   | 3.8 | Areas where changes to equipment operation or routine maintenance are required to maintain optimum work output and equipment life, are noted |
| <b>4 Monitor and review maintenance management system</b> | 4.1 | Continuous improvement strategies are developed  |
|   | 4.2 | Performance criteria for maintenance goals are determined and data collection strategies are established                                     |
|   | 4.3 | Performance information and outcomes are analysed and implications are reported to appropriate personnel                                     |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |  |  |
|--|--|
| Special requirements for maintenance include one or more of the following: | <ul style="list-style-type: none"> <li>• damage repair</li> <li>• hatch cover watertight arrangements</li> <li>• main engine or auxiliary machinery breakdowns</li> <li>• replacing defective cargo-lifting equipment</li> </ul>   |
| Routine maintenance tasks include one or more of the following:            | <ul style="list-style-type: none"> <li>• back-ups</li> <li>• changing user codes</li> <li>• checks of cooling system, fuel, grease and oil, battery levels</li> <li>• confirmation of operational effectiveness</li> <li>• dismantling and assembling</li> <li>• identification and replacement of worn parts</li> <li>• inspections of fan belts, leads, lines, connections, air filters, hydraulics, lighting</li> </ul> |

- Maintenance strategy includes one or more of the following:
- minor adjustments
  - testing
  - cleaning
  - electrical
  - emergency lighting
  - evacuation
  - housekeeping
  - painting
  - pests
  - plumbing
  - security
- Potential risks include one or more of the following:
- dealing with hazardous material
  - hot work
  - working at heights
  - working in confined spaces
  - working overside
- Maintenance goals include one or more of the following:
- changes in attitudes
  - costs
  - frequency of breakdowns
  - length of time out of action
  - time of repairs

## Unit Mapping Information

This unit replaces and is equivalent to MARB4002A Implement vessel planned maintenance system.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB018 Implement vessel planned maintenance system**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- determining and recommending the need for capital expenditure to replace plant and equipment
- developing effective planning documents
- developing maintenance strategies including establishing criteria for determining maintenance priorities, and planning and scheduling routine equipment and overhead maintenance to meet quality system requirements
- developing recordkeeping procedures to document maintenance costs, problems, priorities, solutions, schedules and completions
- ensuring currency of relevant legislative and regulatory knowledge
- establishing and monitoring performance targets for maintenance teams within performance planning and appraisal processes
- evaluating and recommending alternative maintenance policies and strategies including changes in work roles and responsive/preventative models for maintenance
- identifying and applying relevant WHS/OHS, regulatory and organisational requirements
- managing maintenance costs
- monitoring system performance
- using appropriate information technology and software when preparing reports and plans.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- cleaning materials, and methods of storage and handling of such materials
- computer applications and software suitable for developing a range of reports, plans and schedules
- cost elements in maintenance system costing and budgeting
- costs resulting from poor maintenance and the benefits of a preventative maintenance system
- health hazards associated with maintenance procedures
- impacts of poor maintenance on vessel, and on occupational and environmental safety
- maintenance issues related to vessel
- plant and equipment falling under scope of maintenance program
- relevant legislation and regulations, and industrial agreements
- types of lubrication, and lubricant storage and handling
- use and care of personal safety equipment.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Establishing and implementing a planned maintenance system on a vessel must be assessed in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, personnel and personal protective equipment that replicate and are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARB019 Manage stores for planned maintenance system

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to plan and control inventory levels of materials required for vessel maintenance.

This unit applies to individuals working as a Chief Integrated Rating on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Identify materials requirements**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Drawings and specifications for vessel and equipment are read and interpreted to determine materials requirements
- 1.2 Sources of product supply are identified and recorded

- 1.3 Normal quantity supply and matching storage facilities and equipment are identified
- 1.4 Safety data sheets (SDSs)/material safety data sheets (MSDSs) or other supplier information are read, relevant engineering controls or personal protection equipment are identified, and additional resources required for handling and storing materials are documented
- 1.5 Procedures to deal with fire or explosion risk, spills or injury are identified and recorded
- 2 Plan inventory levels**
  - 2.1 Estimates are calculated according to specification requirements and organisational procedures
  - 2.2 Cost reports are prepared
  - 2.3 Estimates that meet initial requirements are documented
  - 2.4 Estimates are authorised for implementation by appropriate personnel
- 3 Monitor receipt and dispatch of goods**
  - 3.1 Organisational procedures are implemented in the receipt, dispatch and secure storage of materials
  - 3.2 Materials are inspected for quality and quantity on receipt
  - 3.3 Variation to quantity and quality of delivered materials is acted on according to organisational procedures
  - 3.4 Safe handling and storage of materials is supervised according to organisational procedures
  - 3.5 Information is formatted and entered into inventory system according to organisational procedures and system requirements
- 4 Manage stock control**
  - 4.1 Organisational procedures are implemented for stock control and inventories
  - 4.2 Procedures are established and implemented to monitor and control stock levels
  - 4.3 Stock levels are monitored and maintained at required levels
  - 4.4 Stock reorder cycles are maintained and adjusted as required
  - 4.5 Stocktaking procedures are established and implemented
  - 4.6 Contingency plans for stock delivery times are established

and implemented

4.7 Accurate reports on stock inventories are prepared

4.8 Stock discrepancies are identified and recorded

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |  |  |
|--|--|
| Materials requirements include one or more of the following: | <ul style="list-style-type: none"><li>• appropriate oils and grease</li><li>• cleaning material</li><li>• machinery spare parts</li><li>• mooring ropes and wires</li><li>• paint</li><li>• shackles and other lifting equipment</li><li>• tools, hand and power</li></ul> |
| Stock control includes one or more of the following:         | <ul style="list-style-type: none"><li>• cyclical counts</li><li>• minimisation of out-of-date stock</li><li>• monitoring stock levels</li><li>• quality control</li><li>• stocktaking</li></ul>  |

## Unit Mapping Information

This unit replaces and is equivalent to MARB4004A Manage stores for planned maintenance system.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB019 Manage stores for planned maintenance system

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- anticipating interruptions to supply
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- avoiding surplus holdings and wastage
- calculating correct inventory requirements taking into account lead times, re-order triggers, impacts of turnover and supply margins
- calculating materials and other resource requirements and costs
- costing and documenting requirements
- forecasting accurate inventory demand
- identifying appropriate materials and consumables to match maintenance standards
- identifying commercially viable sources of consumables and materials
- identifying the impact of decisions in terms of commercial, environmental and safety risks
- planning and organising activities to avoid any back tracking, workflow interruptions or wastage
- planning for inventory required to meet special events or contingencies
- researching information related to inventory including relevant technical, regulatory, environmental and safety requirements
- using appropriate information technology and software when preparing inventory.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- authorised maintenance processes and plans, and related materials and consumables
- commercial supply systems including standard documentation support processes

- computer applications and software suitable for managing an inventory
- cost-benefit analysis or equivalent techniques
- inventory and operations management approaches
- inventory control systems used on a vessel
- materials, process characteristics and special requirements
- systems and equipment for inventory recording and control
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Planning and controlling inventory levels must occur in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment that replicate and are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB020 Manage repairs and maintenance of a vessel 500 gross tonnage or more

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to implement a vessel planned maintenance system to ensure effective maintenance of a vessel 500 gross tonnage or more to ensure its seaworthiness.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Define maintenance targets

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Compliance documentation relevant to maintaining the vessel is interpreted

1.2 Vessel planned maintenance system is interpreted to

establish maintenance activities and priorities, according to regulatory and organisational requirements

1.3 Current maintenance practices are reviewed to evaluate efficiency, reliability and comparative cost effectiveness

1.4 Maintenance targets are set to ensure compliance and cost effectiveness

## **2 Optimise maintenance management**

2.1 Objectives of maintenance are clearly defined and appropriate maintenance mechanisms are determined

2.2 Preventative maintenance activities are forecast, scheduled and matched to resources to ensure work is done on time and within cost

2.3 Optimal cost balance between preventative and corrective maintenance activities is determined

2.4 Priority system for preventative and corrective maintenance is developed based on critical analysis to maximise quality outcomes

2.5 Maintenance plan is negotiated and agreed in consultation with relevant stakeholders

2.6 Monitoring and reporting arrangements for maintenance activities are established and documented according to organisational procedures

2.7 Risk management plan to identify, assess and control risks is incorporated into maintenance plan according to regulatory and organisational requirements

## **3 Organise support processes**

3.1 Resource requirements are determined and organised according to the maintenance plan

3.2 Targets and milestones are identified and linked to the achievement of outcomes according to the maintenance plan

3.3 Documentation and checklists associated with the implementation of the maintenance plan are prepared in established formats and distributed to relevant people

3.4 Information related to the implementation of the maintenance plan is distributed according to organisational procedures

3.5 Contingency arrangements for the implementation of the



maintenance plan are identified

#### **4 Monitor implementation of maintenance plan**

- 4.1 Progress is systematically monitored and variations to implementation of the maintenance plan are verified as required with relevant people
- 4.2 Expenditure and resource usage are monitored and controlled to ensure objectives are achieved within specified parameters
- 4.3 Coaching and mentoring assistance is provided to crew members as required to overcome difficulties in implementing the plan
- 4.4 Systems, records and reporting procedures are maintained according to regulatory and organisational requirements

#### **5 Evaluate implementation of maintenance plan**

- 5.1 Regular reports on progress and outcomes are provided orally or in writing to relevant stakeholders to ensure completion of activities is in line with maintenance plan
- 5.2 Systematic review processes and established evaluation methods are used to evaluate implementation processes and outcomes
- 5.3 Evaluation results are prepared in required format and presented to relevant people within agreed timeframes
- 5.4 Recommendations for improving implementation processes are presented to relevant people according to organisational procedures
- 5.5 Relevant documentation is completed and processed according to regulatory and organisational requirements

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Compliance documentation includes one or more of the following:

- cargo gear and equipment register
- maintenance schedules and records according to the planned maintenance system
- port state control inspection records
- statutory survey certificates
- statutory survey periodic inspection records
- vessel general arrangement plans, docking plan and manuals relevant to maintenance requirements

Vessel planned maintenance system includes one or more of the following:

- adequate back up, either back-up copy on board or a regular exchange of data between ship and office for computerised systems
- documents specifying maintenance jobs carried out and their results
- equipment manufacturer requirements as part of planned maintenance program
- following maintenance procedures
- performance results and measurements taken at certain intervals for trend investigations from delivery stage
- procedures required for docking preparation, including repair lists and survey requirements
- signing instructions to indicate who is responsible for verification of maintenance work carried out
- time intervals at which the maintenance jobs are to take place
- writing description and documentation of planned maintenance system in English

Preventative maintenance activities include one or more of the following

- applying lubricants to moving parts
- hull cleaning and painting
- identifying deterioration of vessel structure and fittings, including cargo spaces, fresh water and ballast tanks
- inspecting and repairing or replacing cargo handling equipment including wires, blocks, shackles, chains and hooks
- prescribed tank inspections
- restoring weathered and rusted surfaces
- routine maintenance inspections

Corrective maintenance activities include one of the following:

- damage repairs and control measures
- replacing defective parts

- Maintenance plan includes one or more of the following:
- budgets and timetables that enable the commitment of resources at appropriate points
  - consultative processes to involve stakeholders
  - contingency plans to cater for changes or significant difficulties
  - damage control plans
  - environment plans
  - life cycle management plans
  - long-term capital and maintenance financial forecast
  - maintenance standards
  - objectives, scope and expected benefits of plan
  - quality assurance procedures
  - risk management processes
  - specifications
  - vessel and machinery and equipment maintenance, cleaning and lifesaving appliances maintenance
- Targets and milestones include one or more of the following:
- agreed reporting requirements
  - completing key tasks and maintenance phases
  - measurement and achievement of set outcomes
  - progress reports
- Contingency arrangements include one or more of the following:
- budgetary constraints
  - competing work demands of contractors
  - environmental factors, such as time and weather
  - equipment and technology breakdown
  - industrial disputes
  - non-availability of resources and materials
  - unforeseen incidents
  - workplace hazards, risks and controls
- Evaluation methods include one or more of the following:
- checklists
  - cost data analysis
  - interviews
  - observation
  - review of quality assurance data
  - review of safety and planned maintenance systems

## Unit Mapping Information

This unit replaces and is equivalent to MARB6001A Manage repairs and maintenance of a vessel 500 gross tonnage or more.

MARB6001A replaces and is equivalent to TDMMB4307A Monitor and manage the seaworthiness of the vessel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB020 Manage repairs and maintenance of a vessel 500 gross tonnage or more**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- analysing current practice
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to detail when completing documentation
- documenting information
- ensuring currency of relevant legislative and regulatory knowledge
- estimating resource and time requirements
- identifying potential barriers to implementing maintenance plan, analysing risks and establishing contingencies
- making decisions
- preparing appropriate reports on the outcomes of inspection and maintenance activities to ensure the seaworthiness of a vessel
- preparing docking requirements including repair lists and survey requirements
- preparing a detailed vessel maintenance plan that incorporates strategies addressing risk management, resource needs, monitoring and reporting arrangements, and quality assurance controls
- providing high quality reports
- sequencing maintenance activities logically, planning and documenting strategies to implement maintenance plans, setting goals and meeting time constraints
- undertaking forecasting and scheduling.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- beam theory and stress calculations
- construction of double bottoms, ship's hull, bulkheads, fore and aft ends, construction of tankers, bulk carriers and container vessels
- construction, materials, layout and subdivision requirements of a typical vessel, including the freeboard and bulkhead deck, watertight compartments, weather tight compartments, the bulkhead of the vessel and the collision bulkhead
- corrosion control measures including surface preparation, painting and antifouling
- fire protection on ships
- nature and causes of corrosion of marine surfaces and structures, and the available methods for its control
- preservatives and finishes used in marine maintenance, and the related procedures and precautions to be taken for preparation, application and storage
- principal features of the structure of a vessel
- properties and application of materials used in vessel construction
- relevant national and international legislation related to maintaining vessels
- stresses imposed on vessels at sea
- typical problems related to slipping, docking and maintaining vessels with appropriate action and solutions
- vessel and machinery specifications, vessel design machinery design drawings, operational manuals, specifications, and electrical and control circuit diagrams
- vessel planned maintenance system.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions where the management of vessel maintenance and repairs can be demonstrated.

Resources for assessment include access to:

- relevant documentation including budgets and operating costs, service and maintenance records, workplace procedures, regulations and legal documentation and operation manuals.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARB021 Perform routine tasks in a marina

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to apply safe work practices according to the organisation's work health and safety (WHS)/occupational health and safety (OHS) policies and procedures when planning and undertaking a routine task on a marina.

This unit applies to individuals who undertake routine tasks on a regular basis.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

B – Equipment Checking and Maintenance

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Establish task requirements

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Procedures are obtained, interpreted and clarified with relevant personnel as necessary

1.2 Specifications for task outcomes are obtained and clarified by relevant personnel



- |   |  |
|---|--|
|   | 1.3 Milestones, timelines and quality measures are established and documented  |
| <b>2 Plan steps required to complete the task</b> | 2.1 Individual steps and activities required to undertake the task are established and documented                      |
|   | 2.2 Sequence of steps and activities is determined   |
|   | 2.3 Resources, tools and equipment required to complete the task are identified, documented and obtained               |
|   | 2.4 Plan is checked to ensure it complies with specifications and task requirements                                    |
| <b>3 Undertake the task</b>                       | 3.1 Personal protective clothing and/or equipment is identified, used and maintained according to workplace procedures |
|   | 3.2 Safe work practices and environmental requirements are established and followed                                    |
|   | 3.3 Task is completed according to plan requirements   |
|   | 3.4 Work area is cleaned and tools and equipment are stored according to workplace procedures                          |
| <b>4 Review plan</b>                              | 4.1 Plan is reviewed against specifications and task requirements  |
|   | 4.2 Outcomes are compared with milestones, timelines, quality measures and task requirements                           |
|   | 4.3 Plan is revised to better meet specifications and task requirements as required                                    |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Marinas

- buildings, wharves, slipways and surroundings where vessels are built,

include:                    stored and maintained

Tasks include:

- answering telephone inquiries
- communicating with customers through email
- dock walks and inspection of public areas on a marina
- rope work, knot tying and splicing
- tying up and letting go of boats

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB021 Perform routine tasks in a marina

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety(WHS)/occupational health and safety (OHS) requirements and work practices
- communicating and interpreting information
- comparing planned steps against specifications and task requirements
- identifying relevant specifications from documentation, job cards or other information
- obtaining instructions for tasks from correct source
- preparing plans for tasks from information provided
- reading, interpreting and clarifying tasks and required outcomes with appropriate personnel.
- 

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic problem solving
- berth occupancy and berthing report and their importance in operating a marina
- correct sources of information for a particular task
- hazards and established control measures associated with the routine task, including housekeeping
- procedures for obtaining instructions and clarification
- relevant forms of communication
- security measures on a marina and associated daily checks
- site layout and obstacles of an operational marina
- WHS)/(OHS) practices and procedures.
-

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, and operation manuals
- dedicated tools and equipment, materials and parts currently used in industry.
- 

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB022 Refuel a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to apply safe work practices when refuelling vessels in a marina, including conducting pre-operational checks and completing post-refuelling operations and refuelling documentation.

This unit applies to marina operators who refuel vessels in a marina and on water.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan vessel refuelling

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Dangers of volatile fuel liquids and vapours are established and recorded
- 1.2 Precautions for minimising risks associated with volatile liquids are identified and recorded

- 1.3 Safety and environmental requirements for refuelling vessel are identified and recorded
- 1.4 Fuel is selected based on vessel use and manufacturer requirements
- 1.5 Procedures for refuelling are identified and followed established according to workplace procedures and relevant regulations and standards
- 2 Prepare for refuelling**
  - 2.1 Personal protection is identified, accessed and used
  - 2.2 Firefighting and spill response equipment is located and checked, faulty equipment is replaced and faults are reported
  - 2.3 Refuelling equipment is checked and secured according to workplace procedures
  - 2.4 Vessel is positioned and secured for refuelling
  - 2.5 Tank valves are opened as necessary
- 3 Refuel vessel**
  - 3.1 Safety and environmental requirements for refuelling vessel are applied
  - 3.2 Vessel is refuelled according to workplace procedures, and relevant regulations and standards
  - 3.3 Workplace procedures are followed to contain spill and minimise environment or safety dangers
  - 3.4 Fuel levels are checked and if acceptable, refuelling is completed
- 4 Complete refuelling**
  - 4.1 Refuelling equipment is cleaned and stowed according to workplace procedures
  - 4.2 Spillage is cleaned up according to workplace procedures
  - 4.3 Required documentation is completed according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Spill containment includes:

- absorbing materials
- containment booms and portable bunding

Fuels include one or more of the following:

- diesel (distillate)
- kerosene
- liquefied petroleum gas (LPG)
- methylated spirits
- petrol (gasoline) including premixed two stroke fuel

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB022 Refuel a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices
- checking for and activating ventilation devices
- checking fuel levels
- completing documentation for refuelling activities
- completing vessel refuelling in a consistent and timely way
- complying with environmental procedures and response plans
- identifying and checking firefighting equipment
- identifying correct fuel for the application
- implementing the requirements, procedures and techniques for the safe, effective and efficient refuelling of vessels
- interpreting HAZCHEM (or similar) requirements
- locating, reading and applying relevant documentation, policies and procedures
- refilling fuel containers and tanks
- selecting and fitting appropriate personal protective equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- correct handling of gas cylinders
- different fuels and their applications
- emergency procedures
- emergency situations and environmental issues
- hazards associated with refuelling a vessel
- HAZCHEM symbols and implications for safe work
- location and use of safety alarms, emergency shut-off systems, emergency communications systems
- location and selection of firefighting equipment/appliances and emergency escape routes
- processes and procedures for dealing with spills
- personal and environmental dangers associated with fuels and refuelling/filling
- personal protective equipment associated with fuels
- risks associated with refuelling vessels and related precautions to control the risk
- recording and reporting procedures in regard to unsafe situations, fire hazards, broken or damaged equipment or fittings, sickness and accidents or incidents
- techniques for handling hazardous materials and substances
- techniques used for reducing vapours
- WHS/ OHS requirements and safe work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions where refuelling vessels can be applied.

Resources for assessment include:

- dedicated tools and equipment, materials and parts currently used in industry including:
  - masks or respirators
  - goggles/face shields
  - gloves and appropriate clothing
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.
-

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARB023 Maintain marina infrastructure

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to develop and implement an infrastructure maintenance plan, which includes site, plant and equipment.

This unit applies to individuals working in a marina and undertaking routine maintenance in a marina.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

B – Equipment Checking and Maintenance

### Unit Sector

Not applicable.

### Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
<b>1 Prepare for maintenance</b>	<p>1.1 Marina infrastructure that requires regular maintenance is recognised and confirmed with relevant personnel, if required</p> <p>1.2 Potential risks, hazards and environmental issues are identified and control measures are established</p>

1.3 Appropriate tools and equipment required to undertake maintenance activities are identified and assembled

1.4 In preparation for fire/accident/emergency, relevant emergency procedures are obtained and interpreted

1.5 Skills and experience of marina personnel required to carry out maintenance are established and duties are allocated

1.6 Maintenance schedule is obtained and interpreted

## **2 Undertake maintenance**

2.1 Personal protective clothing and/or equipment is identified, used and maintained according to workplace procedures

2.2 Firefighting equipment is located, selected and made ready according to workplace procedures

2.3 Work area is prepared according to workplace policies and procedures

2.4 Relevant plant, tools and equipment are prepared and made ready for use

2.5 Maintenance is carried out safely according to workplace policies and procedures

2.6 Safe work practices and environmental requirements are followed

2.7 Work is checked against job requirements and presented to relevant personnel for verification

## **3 Complete maintenance and clean-up work area**

3.1 Work area is cleaned and tools and equipment are stored according to workplace procedures

3.2 Defective or malfunctioning plant, tools, equipment and systems are reported according to workplace procedures

3.3 Maintenance schedule is reviewed and revised if necessary

3.4 All required documentation is completed according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Infrastructure requiring regular maintenance includes:

- equipment including:
  - marina trolley
  - straddle carrier
- fendering (fender strip)
- gangways and ramps
- pontoons
- piles
- rollers and rubbing blocks on pile guides
- service pedestals, power/water

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB023 Maintain marina infrastructure

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- identifying hazards and assessing risks appropriate to own work area and job role
- implementing standard operating procedures (SOPs)
- interacting effectively with other personnel on a one-to-one basis and in groups
- planning and organising own work activities
- preparing draft maintenance schedule
- reading and interpreting written information needed to perform basic calculations and establish job requirements.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- common damage that occurs in a marina
- boat types and construction
- efficient and productive use of materials with minimum wastage
- hazards and established control measures associated with the routine task, including housekeeping
- preventive maintenance, benefits and its importance in a marina
- purpose and benefits of regular maintenance in a marina
- roles, responsibility and duties undertaken by marina staff
- site layout
- types of marinas, use, characteristics and features
- types of vessel, size and construction
- use and purpose of SOPs
- workplace policies and procedures
- WHS/OHS practices and procedures.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions where marina maintenance can be applied.

Resources for assessment include:

- dedicated tools and equipment, materials and parts currently used in industry
- protective clothing and equipment including:
  - head protection/helmet
  - hand protection/gloves
  - radiant heat protection/coat
  - foot protection/boots
- relevant information and documentation including:
  - organisational policies and procedures, relevant Acts, regulations, codes of practice, licensing requirements and standards.
-

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARB024 Undertake basic boatyard operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to safely perform basic boatyard operations on a variety of vessels including servicing, repairs, upgrades, maintenance, refits and/or installation.

This unit applies to individuals working in a marina who apply safe work practices when undertaking a range of basic boatyard operations.

No licencing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan and prepare boatyard operations**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Job requirements are identified and interpreted and clarified with relevant personnel as necessary

1.2 Relevant plant, tools and equipment required to undertake work

activity are identified and assembled

- 1.3 Actual and potential hazards are identified and protective clothing and equipment are selected to minimise risks

## **2 Conduct boatyard operations**

- 2.1 Relevant regulatory and work health and safety (WHS)/occupational health and safety (OHS) procedures are followed and personal protective clothing and equipment are used according to workplace policies and procedures
- 2.2 Procedures to prevent pollution including sound environmental protection are identified, observed and implemented at all times
- 2.3 Work area is prepared, signage is placed appropriately and yard space is utilised efficiently according to workplace policies and procedures
- 2.4 Relevant plant, tools and equipment are checked, prepared and made ready for use
- 2.5 Work activity is carried out according to workplace policies and procedures
- 2.6 Work is checked against job requirements and verified by relevant personnel

## **3 Complete boatyard operations and clean-up work area**

- 3.1 Waste and scraps are removed and material that can be reused is collected and stored
- 3.2 Plant, tools and equipment and work area are cleaned and inspected according to workplace procedures
- 3.3 Defective or malfunctioning plant, tools, equipment and systems are reported according to workplace procedures
- 3.4 Tools and equipment are stored according to workplace procedures
- 3.5 Required documentation is completed according to workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Boatyard operations include one or more of the following:

- hauling and blocking vessels
- maintaining and repairing vessels
- maintaining equipment and facilities
- pressure washing and antifouling vessels
- refit or installation

Hazards include:

- chemicals and cleaning agents
- forklift accidents
- moving to and from the wash down bay
- moving vessels on and off the hardstand
- noise, dust, working outdoors
- slipping vessels
- tripping
- vessels entering and exiting the straddle carrier (lifting and relaunching)

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARB024 Undertake basic boatyard operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Version 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant regulations, work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- identifying hazards and assessing risks appropriate to own work area and job role
- interacting effectively with other personnel on a one-to-one basis and in groups
- planning and organising own work activities
- reading and interpreting written information needed to perform basic calculations and establish job requirements.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic problem solving
- boat carriage
  - crane/gantry
  - forklift
  - rail slipway
  - straddle carrier/boat hoist
  - transporter
  - trailer
- boat types and construction
- correct use of safety signage
- different types of boat carriage and their use
- efficient and productive use of materials with minimum wastage

- hazards and established control measures associated with routine tasks, including housekeeping
- site layout
- WHS/OHS practices and procedures
- workplace policies and procedures.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions where basic boatyard operations can be applied.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, and operation manuals
- dedicated tools and equipment, materials and parts currently used in industry.
- 

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB025 Maintain mooring equipment

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain mooring equipment. It includes identifying faulty equipment, working safely, carrying out maintenance and completing necessary documentation.

This unit applies to individuals working in the maritime industry who have responsibility for the operational maintenance of mooring equipment.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Prepare to carry out maintenance**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Inspections are conducted to determine extent of maintenance required according to organisational procedures

- |          |                              |  |
|----------|------------------------------|--|
|          | 1.2                          | Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work and task prioritisation is determined |
|          | 1.3                          | Relevant tools and equipment required to undertake maintenance are identified and assembled  |
|          | 1.4                          | Actual and potential hazards are identified and personal protective equipment (PPE) is selected and assembled to minimise risks              |
| <b>2</b> | <b>Carry out maintenance</b> |  |
|          | 2.1                          | Maintenance is carried out according to manufacturer procedures and specifications, and organisational procedures                            |
|          | 2.2                          | Equipment that is unable to be repaired or requires specialised maintenance is reported to relevant personnel                                |
|          | 2.3                          | Equipment is checked and tested according to organisational procedures to determine whether it functions correctly                           |
| <b>3</b> | <b>Complete maintenance</b>  |  |
|          | 3.1                          | Equipment is suitably stored where it is not likely to suffer deterioration or damage  |
|          | 3.2                          | Required documentation is completed and processed according to organisational procedures   |
|          | 3.3                          | Appropriate personnel are notified of completion of maintenance and details are documented according to organisational procedures            |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Mooring equipment includes:

- anchors
- bilges
- buoys
- chains

	<ul style="list-style-type: none"><li>• hooks</li><li>• marine fenders</li><li>• mooring cock</li><li>• mooring rollers</li><li>• quick release systems</li><li>• radios</li><li>• ropes and lines</li><li>• shackles</li><li>• sheaves</li><li>• stoppers</li><li>• towing hook</li><li>• wires</li></ul>
Personal protective equipment includes:	<ul style="list-style-type: none"><li>• eye protection/glasses or protective shield</li><li>• helmet</li><li>• personal life vest</li><li>• radiant heat protection/coat</li><li>• reflective clothing</li><li>• safety footwear</li><li>• suitable gloves</li><li>• vest</li></ul>

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARB025 Maintain mooring equipment

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying decision-making techniques in determining extent of damage and selecting the type of maintenance required
- communicating effectively with others and working as part of a team
- completing documentation related to maintenance of mooring equipment
- following procedures to maintain equipment
- identifying faults and problems related to mooring equipment
- initiating timely action in response to defects or damage
- reading and interpreting instructions, procedures and information relevant to mooring equipment maintenance
- selecting and using required personal protective equipment (PPE) that conforms to industry and WHS/OHS standards.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- decision-making techniques
- organisational policies and procedures related to maintaining mooring equipment
- PPE required when maintaining mooring equipment
- recommended manufacturer instructions for equipment repair
- relevant regulations and codes of practice related to maintaining equipment
- requirements for completing relevant documentation
- typical faults that can occur with mooring equipment and related action that should be taken to repair, isolate, replace, report and record faulty equipment
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations sites that replicate workplace conditions.

Resources for assessment include access to:

- a range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- relevant documentation including workplace procedures, regulations, codes of practice, operation manuals, and manufacturer instructions and procedures
- tools, equipment, materials and PPE specified in the range of conditions and currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB026 Apply knowledge of marine terminology and port procedures

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to develop, apply and maintain a knowledge of the maritime industry and port and terminal procedures.

This unit applies to people working in the maritime industry as a Linesperson.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Undertake research

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Sources that provide accurate and current information about the maritime industry are identified and accessed

- 1.2 Relevant information about characteristics and structure of the maritime industry is collected and documented
  - 1.3 Roles of relevant professional associations, industry bodies, unions and regulators are identified and recorded
  - 1.4 Information is organised and stored in an easily accessible format and is applied in day to day work
- 2 Identify relevant marine terminology**
  - 2.1 Marine terms and terminology are obtained and recorded
  - 2.2 Typical terminology used by an organisation is identified and the meaning of each is explained
  - 2.3 Terminology relevant to the organisation is discussed with team members and supervisor
  - 2.4 Terminology is reviewed, documented and applied in day to day work
- 3 Provide an overview of port and terminal procedures**
  - 3.1 Port and terminal procedures are obtained, interpreted and clarified as required with relevant personnel
  - 3.2 Similarities and differences between various ports and terminal procedures are outlined, and advantages and disadvantages of each are explained and documented
  - 3.3 Duties of port and terminal personnel are identified
- 4 Maintain industry knowledge**
  - 4.1 Relevant information, terminology and procedures are reviewed regularly and any changes are identified and applied in day to day work
  - 4.2 Arrangements for keeping up with changes and maintaining up to date knowledge are established and applied
  - 4.3 Emerging accepted trends are applied and changes affecting the organisation are reviewed and incorporated into day to day work activities

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |   |  |
|---|--|
| Relevant information includes one or more of the following: | <ul style="list-style-type: none"><li>• maritime authority instructions</li><li>• mooring and unmooring plans, procedures, checklists and instructions</li><li>• reports and records of mooring and unmooring operations or safety incidents</li><li>• rope and equipment manufacturer instructions and procedures</li><li>• safety instructions and procedures</li><li>• port procedure manuals</li></ul> |
| Personnel include one or more of the following:             | <ul style="list-style-type: none"><li>• launch crew</li><li>• mooring supervisor</li><li>• wharf mooring personnel (bow) forward</li><li>• wharf mooring personnel (stern) aft</li><li>• pilot</li><li>• port and terminal personnel</li><li>• tug crew/s</li><li>• vessel crew</li></ul>  |

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB026 Apply knowledge of marine terminology and port procedures**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- communicating effectively with team members and other personnel
- locating, reading, interpreting and applying relevant documentation and procedures
- maintaining communications with team members and other personnel
- planning and organising own work activities
- working collaboratively with others.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic research methodology
- marine terms and terminology relevant to ports/wharfs/terminals and mooring and unmooring activities
- mooring and unmooring equipment
- nature, role and functions of relevant professional associations, unions, industry bodies and regulators
- port emergency and evacuation procedures
- port/wharf/terminal site layout
- relevant legislation related to port procedures
- relevant maritime websites to locate current and relevant information
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation, codes of practice, policies and procedures
- roles, responsibility and duties undertaken by staff
- types and characteristics of mooring lines
- types of port/wharf/terminal, characteristics and features

- typical superstructure configurations and general deck layouts
- vessel types, classification, construction, size and capacity
- workplace processes, policies and procedures.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- a range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB027 Perform basic servicing and maintenance of main propulsion unit and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to perform basic maintenance and servicing of main propulsion units and auxiliary systems.

This unit applies to people working in the maritime industry in the capacity of:

- coxswain on vessels <12 m in length with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine operating in inshore or designated waters or
- coxswain on tenders or auxiliary vessels <12 m in length operating within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 1 NC, as defined in the National Standard for Commercial Vessels (NSCV) Part D.

The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification.

The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under the *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable



## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare for work

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Manufacturer equipment specifications are obtained

**1.2** Safety requirements associated with maintaining equipment and workplace environment are implemented

**1.3** Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work

**1.4** Tools and equipment are selected and checked for serviceability

**1.5** Work area is prepared

#### 2 Carry out routine service

**2.1** Equipment is inspected and inspection results are compared with manufacturer specifications

**2.2** Servicing tasks are carried out to specifications

**2.3** Mechanical equipment and system components are checked with appropriate instruments

**2.4** Faulty items or components are identified and serviceability or unserviceability is determined

**2.5** Unserviceable equipment is tagged according to workplace procedures

#### 3 Repair or replace faulty components

**3.1** Equipment is safely isolated according to regulations and/or work health and safety (WHS)/occupational health and safety (OHS) requirements

**3.2** Faulty items or components are removed using appropriate tools and equipment according to workplace

procedures

- 3.3 Replaceable items are selected or serviceable items are fitted according to manufacturer specifications
- 3.4 Adjustments are made to equipment or components to comply with specifications
- 3.5 Operational checks are carried out on system to ensure its compliance with manufacturer specification
- 3.6 Maintenance report and logbooks are completed according to workplace procedures

#### **4 Clean up**

- 4.1 Work area is cleared and cleaned
- 4.2 Materials are disposed of or recycled according to legislative and workplace requirements
- 4.3 Tools and equipment are cleaned, checked and stored according to workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARB002 Perform basic servicing and maintenance of main propulsion unit and auxiliary systems.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARB027 Perform basic servicing and maintenance of main propulsion unit and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying state or territory work health and safety (WHS)/occupational health and safety (OHS) requirements (specifically relating to personal protective equipment (PPE), use of tools and equipment, workplace environment and safety, handling of materials, hazard control and hazardous materials and substances) as per legislative requirements and vessel operating procedures
- completing all work required to service, replace and repair faulty equipment to specification/s
- completing relevant logbooks and service reports
- implementing safe operating procedures, including recognising and preventing hazards: associated with:
  - worksite visitors and the public
- performing emergency shutdown and stopping of equipment
- undertaking basic servicing tasks
- reading and interpreting:
  - gauges
  - safety data sheets (SDS)/material safety data sheets (MSDS)
- selecting and using appropriate processes, tools and equipment
- servicing and maintaining propulsion machinery and auxiliary equipment to manufacturer specifications.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bleeding fuel systems
- basic servicing tasks, including:
  - battery maintenance
  - checking shaft glands, strainers, cooling system, fuel levels and fuel systems
  - greasing

- visually checking for oil leaks
- visually checking, identifying and reporting obvious equipment faults
- care of extra low voltage electrical systems on a vessel, including precautions necessary when charging batteries
- emergency procedures, including emergency shutdown and stopping of equipment
- environmental impacts and minimisation measures associated with servicing and maintaining propulsion machinery and auxiliary equipment
- identifying faulty items or components and appropriate actions required to rectify faults
- job safety analyses (JSAs) and safe work method statements
- manufacturer specifications for servicing and maintaining propulsion machinery and auxiliary equipment
- operating principles and operating methods for propulsion machinery and auxiliary equipment
- potential risks and hazards associated with servicing and maintaining propulsion machinery and auxiliary equipment
- processes of maintaining propulsion machinery and auxiliary equipment
- relevant WHS/OHS and PPE requirements
- routine checks required when servicing and maintaining propelling machinery, auxiliary equipment and other mechanical equipment.
- safe and environmentally responsible work practices in servicing and maintenance activities
- process for servicing and maintaining propulsion machinery and auxiliary equipment to manufacturer specifications, including:
  - ancillary deck equipment
  - bilge systems
  - cooling and lubricating systems
  - fuel systems
  - diesel engines
  - drive train assembly
  - low voltage electrical systems
  - monitoring machinery
  - outboard engines
  - shore power leads and connections
  - steering gear.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy

requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel  $\geq 5.0$  m with propulsion power of  $\geq 75$  kW, or appropriate engine ashore
- applicable documentation, such as legislation, regulations, codes of practice, safety management system, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB028 Service marine internal combustion engines and propulsion and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to perform basic servicing of marine internal combustion engines, and propulsion and auxiliary systems.

This unit of competency applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <750 kW, within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power, within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room of vessels <80 m long with propulsion power <3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare for work

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Planned maintenance program is accessed to determine servicing requirements
- 1.2 Inspections are conducted and additional non-routine servicing requirements are determined
- 1.3 Manufacturer specifications for equipment are obtained
- 1.4 Tasks are planned and sequenced in conjunction with others involved in or affected by servicing work
- 1.5 Equipment is safely isolated according to regulations and work health and safety (WHS)/occupational health and safety (OHS) requirements
- 1.6 Tools and equipment are selected and checked for serviceability
- 1.7 Work area is prepared

#### 2 Carry out routine service

- 2.1 Equipment is inspected throughout servicing and inspection results are compared with manufacturer specifications
- 2.2 Servicing tasks are carried out to specifications
- 2.3 Mechanical equipment and system components are checked with appropriate instruments
- 2.4 Unserviceable equipment is tagged according to workplace procedures and appropriate personnel are notified

- |   |            |  |
|---|------------|--|
| <b>3 Repair and replace faulty components</b> | <b>3.1</b> | Faulty items or components are removed using appropriate tools and equipment according to workplace procedures |
|   | <b>3.2</b> | Replaceable items are selected or serviceable items are fitted according to manufacturer specifications        |
|   | <b>3.3</b> | Adjustments are made to equipment or components to ensure compliance with specifications                       |
|   | <b>3.4</b> | Operational check is carried out on system to ensure compliance with manufacturer specifications               |
| <b>4 Clean up and complete documentation</b>  | <b>4.1</b> | Work area is cleared and cleaned   |
|   | <b>4.2</b> | Materials are disposed of or recycled according to legislative and workplace requirements                      |
|   | <b>4.3</b> | Tools and equipment are cleaned, checked and stored according to workplace procedures                          |
|   | <b>4.4</b> | Maintenance report is completed according to workplace procedures  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB003 Service marine internal combustion engines, and propulsion and auxiliary systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB028 Service marine internal combustion engines and propulsion and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- carrying out servicing tasks, including:
  - checking propeller for damage
  - checking shaft alignment
  - cleaning strainers
  - lubricating
  - replacing:
    - anodes
    - drive belt
    - filters
    - gland packing
    - pumps
  - topping up oils
- implementing safe and environmentally responsible work practices
- implementing workplace environmental and waste management procedures correctly.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- air intake system and system maintenance
- basic combustion process
- basic electronic control unit and governor maintenance
- basic reverse or reduction gearbox maintenance
- basic timing diagrams
- circulating pumps and maintenance

- cleaning heat exchangers
- controllable pitch propellers maintenance
- cooling systems and cooling system maintenance
- couplings types, fittings, keys and keyways, securing nuts and locking
- disposal and recycling of refrigerant gases
- environmental responsibilities, regulations and legislative requirements
- fuel systems and fuel system maintenance
- instrumentation maintenance
- lube oil contamination
- lubricating systems and systems maintenance
- principles of lubrication
- process for cleaning on completion of work, including:
  - cleaning and stowing tools and equipment
  - clearing and cleaning work area
  - disposing of or recycling materials
- propeller and intermediate shaft alignment
- routine and remedial maintenance of:
  - drive systems, belts, clutches and motors
  - hydraulic systems
  - pumping systems
  - refrigeration systems
  - seawater piping, including corrosion control
  - shaft seals and rudder stock, glands and packings
  - steering systems
- routine servicing of:
  - firefighting equipment in engine space
  - valves used in fire and bilge pumping systems
- shaft bearing maintenance
- stern drive and water jet drive unit maintenance
- techniques for reading and interpreting:
  - manufacturer specifications
  - safety data sheets (SDS)/material safety data sheets (MSDS)
- types, characteristics and functions of equipment or tools used in maintenance
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of

assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel with inboard diesel propulsion power of  $\geq 75$  kW or appropriate engine ashore
- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB029 Perform routine maintenance on a vessel up to 24 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to perform routine remedial, preventative and survey deck maintenance. It includes basic deck maintenance, cleaning tasks, marine painting, and servicing deck machinery and systems on commercial vessels up to 24 m.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <24 m in length within the exclusive economic zone (EEZ) or
- chief mate or deck watchkeeper on vessels <35 m in length within the EEZ or
- chief mate or deck watchkeeper on vessels <80 m in length in inshore waters; and
- master on commercial vessels <24 m in length in inland waters.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters) and Master <24 m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## Competency Field

B - Equipment Checking and Maintenance

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Plan maintenance tasks

- 1.1 Planned maintenance system is accessed to establish maintenance requirements for vessel
- 1.2 Maintenance tasks are proposed and prioritised in conjunction with others involved in or affected by the maintenance work
- 1.3 Resource requirements are identified and allocated to ensure efficient completion of tasks
- 1.4 Maintenance tasks to be performed are recorded in a maintenance schedule according to organisational procedures

#### 2 Perform basic deck maintenance

- 2.1 Deck surfaces are checked according to planned maintenance system
- 2.2 Deterioration or corrosion of vessel deck surfaces is identified and appropriate maintenance action is carried out according to planned maintenance system
- 2.3 Minor faults and imperfections in paint surfaces are repaired according to organisational procedures
- 2.4 Weathered surfaces are restored using cleaners and liquid abrasives according to manufacturer instructions and organisational procedures
- 2.5 Tools and equipment are used correctly and safely
- 2.6 Maintenance materials are obtained, prepared and applied according to organisational procedures and

- manufacturer instructions
- 3 Carry out cleaning activities**
- 3.1** Area to be cleaned is prepared and hazards are identified
- 3.2** Work area is barricaded or warning signs provided, as appropriate, to reduce risk to other crew members
- 3.3** Correct chemicals and cleaning agents are selected and applied according to manufacturer instructions and work health and safety (WHS)/occupational health and safety (OHS) requirements
- 3.4** Equipment is used correctly and safely
- 3.5** Cleaning tasks are completed according to organisational procedures and manufacturer instructions
- 4 Prepare and paint surfaces**
- 4.1** Suitable personal protective clothing is selected and used according to WHS/OHS requirements
- 4.2** Surfaces are prepared using correct equipment
- 4.3** Rust remover, rust converter and undercoats are applied according to manufacturer specifications
- 4.4** Paints are mixed in correct proportions according to manufacturer specifications
- 4.5** Paint is applied using appropriate application equipment
- 5 Carry out routine maintenance of deck fittings, equipment and systems**
- 5.1** Fittings and equipment are inspected and inspection results are compared with manufacturer specifications
- 5.2** Maintenance tasks are carried out to specifications
- 5.3** Mechanical equipment and system components are checked with appropriate instruments
- 5.4** Faulty items or components are identified and maintenance procedures selected
- 5.5** Unserviceable equipment is tagged and faults are identified according to organisational procedures
- 6 Repair or replace faulty fittings and equipment**
- 6.1** Fittings and equipment are safely isolated according to regulations and WHS/OHS requirements

- 6.2 Faulty fittings or equipment are removed using appropriate tools, equipment and procedures
  - 6.3 Replaceable items are selected or serviceable items are fitted according to manufacturer specifications
  - 6.4 Adjustments are made to fittings or equipment to comply with specifications
  - 6.5 Operational check is carried out to ensure compliance with manufacturer specifications
  - 6.6 Maintenance report is completed according to organisational procedures
- 7 Supervise crew in completing maintenance tasks**
  - 7.1 Workload is organised in order of priority according to planned maintenance system
  - 7.2 Maintenance tasks are allocated to appropriate crew members with consideration of individual experience and qualifications
  - 7.3 Crew members are clearly briefed on their responsibility and maintenance tasks and WHS/OHS requirements
  - 7.4 Guidance is provided appropriate to maintenance task and individual experience
  - 7.5 Completed work is checked to ensure maintenance is performed according to organisational procedures
- 8 Clean up**
  - 8.1 Work area is cleared and cleaned for serviceable condition
  - 8.2 Materials are disposed of or recycled according to legislative and organisational requirements
  - 8.3 Tools and equipment are cleaned, checked and stored according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB004 Perform routine maintenance on a vessel up to 24 metres.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **Assessment Requirements for MARB029 Perform routine maintenance on a vessel up to 24 metres**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out inspection of:
  - freshwater or bilge or firefighting pumps
  - steering gear
  - navigation lights
  - windlass or winch or capstan
- carrying out maintenance, including:
  - greasing and oiling
  - lifesaving appliances
- completing required records when performing routine remedial, preventative and survey deck maintenance on a vessel
- demonstrating safe and environmentally responsible work practices when performing routine remedial, preventative and survey deck maintenance on a vessel
- following required work schedule according to organisational requirements
- identifying problems when performing deck maintenance on a vessel, including remedial, preventative and survey maintenance
- identifying structural components from ship's drawings and plans, locating on a vessel and ascertaining the relevant regulation governing the structure
- identifying vessel construction material
- reading and interpreting:
  - instructions for performing remedial, preventative and survey deck maintenance on a vessel
  - manufacturer specifications
  - safety data sheets (SDS)/material safety data sheets (MSDS)
- selecting and using relevant tools, equipment and materials according to instructions.

### **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- component parts, operation and routine maintenance requirements of vessel machinery
- equipment cleaning and preservation techniques
- fire and bilge pumps
- fuel, fresh and ballast water, bilge and fire pumping arrangements
- function of structural components and compliance with conventional maritime design
- inspection and routine maintenance of:
  - corrosion prevention and rectification
  - lifting gear
  - ropes and wires
  - tank sounding and ventilation equipment
- job safety analyses (JSAs) or safe work method statements
- maintenance hazards and associated problems
- maintenance of steering gear
- maintenance procedures required to test and ensure watertight integrity
- maintenance records for a vessel
- nature and causes of corrosion of marine surfaces, structures and available methods of control
- organisational procedures for cleaning and maintenance to ensure operational readiness
- paint types and applications
- pollution control legislation as it relates to maintenance activities
- principal parts of a vessel and basic design methods
- principles and procedures of machinery lubrication as they relate to deck machinery
- procedures for checking deck areas, machinery and fittings of a vessel as part of the planned routine maintenance on a vessel
- procedures for using hand tools for maintenance operations
- procedures to avoid contamination of fuel or drinking water
- relevant work health and safety (WHS)/occupational health and safety (OHS) and personal protective equipment (PPE) requirements
- rust treatment
- safety management system as it relates to planned vessel maintenance
- steering gear arrangements and safety features
- storage principles for paints, chemicals and cleaning agents used in planned maintenance operations
- types, characteristics and functions of:
  - equipment or tools used in cleaning and maintenance
  - vessel machinery and equipment
- use of various construction material and regulations governing structure.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a

minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals, including:
  - manufacturer specifications
  - SDS/MSDS
  - vessel drawings and plans
- a commercial vessel  $\geq 7.5$  m in length
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB030 Slip or dock a vessel and maintain hull on a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to slip or dock a vessel of up to 80 m and carry out all required maintenance procedures to manage hull deterioration and maintain the watertight integrity of the vessel.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <35 m in length within the exclusive economic zone (EEZ) or
- master on vessels <80 m in inshore waters or
- master on commercial vessels <24 m in length in inland waters; and
- chief mate or deck watchkeeper on vessels <80 m within the EEZ.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters), Master <24m NC, Mate <80m NC and Master <35m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Master (Inland waters) and Master <24 m NC.

The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions. Slipping or docking may be done as a group exercise. Where this is not possible, observation of slipping or docking of a vessel must occur.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Safely dock vessel into dry dock or slipway

- 1.1 Slipway or dry dock particulars are assessed for suitability for dry docking or slipping vessel
- 1.2 Ship supports, scaffolding and other service systems are assessed for compatibility to dry dock or slipway particulars
- 1.3 Plan is prepared for docking or slipping vessel
- 1.4 Cradle, supports and/or slings are assessed for suitability for dry docking or slipping vessel
- 1.5 Vessel is made ready for slipping according to organisational and dry dock requirements
- 1.6 Vessel is slipped according to environmental safe work practices and safety instructions

#### 2 Inspect underwater hull, equipment and fittings

- 2.1 Checks of vessel hull, equipment and fittings are carried out according to maintenance schedules and vessel manufacturer instructions
- 2.2 Deterioration in vessel structure, equipment and fittings is identified
- 2.3 Checks on watertight integrity of vessel are carried out according to organisational procedures and safety regulations
- 2.4 Damage to watertight integrity is identified and appropriate action is determined
- 2.5 Listed work plan is prepared to rectify all identified

- faults
- 2.6** Surveyor or authorised person is engaged to ensure appropriate certification can be issued or endorsed on completion of work, as required
- 3 Select and use maintenance equipment and materials**
- 3.1** Tools and equipment are correctly identified, selected and used
- 3.2** Maintenance materials are obtained, prepared and used according to organisational procedures and manufacturer instructions
- 3.3** Environmental procedures are followed and waste from cleaning and maintenance tasks is collected, treated and disposed of, or recycled, according to organisational procedures
- 3.4** Malfunctions, faults, wear or damage to tools are reported according to organisational procedures
- 3.5** Equipment and tools are cleaned, returned to operating order and stored according to organisational procedures and manufacturer instructions
- 3.6** Chemicals are used and stored according to organisational procedures and manufacturer instructions
- 3.7** Paint is used and stored according to organisational procedures and manufacturer instructions
- 4 Carry out required maintenance and repairs to hull, equipment and fittings**
- 4.1** Suitable personal protective equipment (PPE) is selected and used according to work health and safety (WHS)/occupational health and safety (OHS) requirements
- 4.2** Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements
- 4.3** Faults and imperfections in painted surfaces are repaired according to organisational procedures
- 4.4** Weathered surfaces are restored using cleaners and liquid abrasives
- 4.5** Lubricants are applied to moving parts of vessel underwater equipment according to manufacturer

- instructions
- 4.6 Corrosion control is carried out according to organisational procedures and manufacturer instructions
  - 4.7 Action to ensure watertight integrity is completed
  - 4.8 Routine adjustments are made to equipment and fittings according to manufacturer instructions
  - 4.9 Faulty vessel machinery and fittings are identified and replacement procedures are implemented
- 5 Supervise crew completing maintenance and repairs to hull, equipment and fittings**
- 5.1 Workload is organised in order of priority, taking into consideration all listed work, including survey work
  - 5.2 Maintenance tasks are allocated to appropriate crew members with consideration of individual experience and qualifications
  - 5.3 Crew members are clearly briefed on their responsibility, maintenance tasks and WHS/OHS requirements
  - 5.4 Guidance is provided appropriate to the maintenance task and individual experience
  - 5.5 Completed work is checked to ensure maintenance is performed according to dry dock plan and organisational procedures
- 6 Complete duties prior to re-floating**
- 6.1 Final internal inspection of vessel is conducted to ensure all listed work is completed to a satisfactory standard
  - 6.2 External inspection of hull and underside is carried out to ensure all listed work is completed to a satisfactory standard
  - 6.3 All tank plugs that have been drawn are replaced
  - 6.4 Crew are instructed on activities to be completed to make vessel ready for sailing
  - 6.5 Check is conducted to ensure a full set of tank soundings has been taken and the distribution of freshwater, fuel and lubricating oil are according to soundings taken on arrival

- 6.6 Tank quantities are applied to complete stability check to ensure that the vessel has an acceptable Metacentric Height (GM) once the vessel floats clear of the keel blocks or slipway
- 6.7 Hatch covers are closed and watertight integrity of uppermost deck is assured
- 6.8 Anchors and cables are heaved up and stowed correctly, and all shore pipelines and powerlines are disconnected
- 6.9 Confirmation that re-floating can proceed is agreed with person in charge of re-floating operation

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARB005 Slip or dock a vessel and maintain hull on a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB030 Slip or dock a vessel and maintain hull on a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing permits for high risk activities
- completing maintenance records
- inspecting underwater hull, equipment and fittings
- preparing vessel for slipping or docking
- ranging and examining anchors and cables
- reading, interpreting and applying:
  - manufacturer instructions, including all work health and safety (WHS)/occupational health and safety (OHS) requirements
  - operating and service manuals for the slipping or docking of a vessel and the maintenance of its hull
  - safety data sheets (SDS)/material safety data sheets (MSDS)
- recognising faulty equipment
- recognising hull damage and deterioration, and taking appropriate actioning according to organisational procedures
- selecting and using correct tools, equipment and materials for maintenance tasks
- supervising crew completing maintenance, including:
  - allocating tasks
  - briefing crew and providing guidance
  - checking completed work
  - organising workload.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- checks to be carried out prior to re-floating
- component parts, operation and routine maintenance requirements of vessel equipment and fittings

- construction material and regulations governing structure
- dangers of working in confined spaces
- duties prior to re-floating, including:
  - developing effective planning documents for docking or slipping vessel maintenance
  - implementing safe and environmentally responsible work practices
- equipment cleaning and preservation techniques
- factors to be considered in assessing suitability of slipway or dry dock, including:
  - acceptable draught
  - appropriate lifting equipment
  - dimensions
  - electric power supply and other service systems
  - firefighting provisions
  - insurances
  - policy and facility for atmospheric checks of confined spaces
  - responsibility for WHS/OHS
  - safe vessel access and egress
  - vessel supports and scaffolding
- hull damage and deterioration, and action required according to organisational procedures
- maintenance hazards and problems
- nature and causes of corrosion of marine surfaces and structures, and the available methods for its control
- organisational procedures for cleaning and maintenance
- paint types, applications, use and storage preservatives and finishes used in marine maintenance and the related procedures for their handling, preparation, application and storage
- paints, preservatives and finishes used in marine maintenance and the related procedures for their handling, preparation, application and storage
- precautions and procedures for working in confined spaces in compliance with Australian Standards and WHS/OHS
- preparing cradle, supports and or slings
- principal features of structure of vessels
- principles and procedures of lubrication as they relate to underwater vessel equipment and fittings
- procedures for carrying out maintenance tasks, including:
  - applying lubricants
  - corrosion control
  - repairing painted surfaces
  - replacing faulty vessel machinery and fittings
  - restoring surfaces using cleaners and liquid abrasives
  - routine adjustments to equipment and fittings
- procedures for:

- checking and inspecting vessel hull as part of routine maintenance procedures
- initiating and coordinating repair and or replacement of underwater equipment and fittings
- process for liaising with surveyor to ensure work is carried out according to regulatory requirements for the issue or endorsement of relevant certificates
- regulatory vessel certification requirements
- relevant sections of state and territory regulations, and National Standard for Commercial Vessels (NSCV) dealing with master's responsibilities
- relevant WHS/OHS and pollution control legislation
- safe and environmentally responsible work practices when:
  - applying paint
  - disposing of waste from hull scraping operations
  - disposing of waste material
  - transferring fuel
- slipping and docking procedures suitable for various types of hull forms
- slipping or docking a vessel safely
- stability as it applies to slipping and docking a vessel
- stability as it relates to docking or slipping operations and re-floating
- storage principles for paints, chemicals and cleaning agents used in planned maintenance operations
- steering gear arrangements and safety features
- travel lifts
- types, characteristics and functions of:
  - equipment or tools used in cleaning and maintenance
  - underwater vessel machinery and equipment
- use and storage of chemicals
- withdrawal and examination of:
  - propeller and shafts
  - rudder and rudder stock.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or a realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe,

impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals, including:
  - manufacturer instructions
  - operating or service manuals for the slipping or docking of a vessel and the maintenance of its hull
  - WHS/OHS requirements
  - SDS/MSDS
- a commercial vessel  $\leq 7.5$  m in length.
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARB031 Maintain marine internal combustion engines, propulsion plant and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to complete basic maintenance of marine internal combustion engines, propulsion plant and auxiliary systems.

This unit of competency applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <750 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <1500 kW, within the EEZ or
- chief or second engineer with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in an engine room of a vessel < 80 m long with propulsion power <3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 2 NC, as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## Competency Field

B – Equipment Checking and Maintenance

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan maintenance activities**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Maintenance plan is accessed to determine maintenance requirements for engines, propulsion plant and auxiliary systems

**1.2** Inspections are conducted and additional non-routine maintenance requirements are determined

**1.3** Manufacturer specifications for machinery and equipment are obtained

**1.4** Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work

**1.5** Consumables and equipment are selected and checked for serviceability

#### **2 Complete preventative maintenance**

**2.1** Machinery and equipment is safely isolated according to work health and safety (WHS)/occupational health and safety (OHS) requirements and organisational practices

**2.2** WHS/OHS risk control measures and procedures for carrying out work are followed

**2.3** Work area is prepared

**2.4** Preventative maintenance is carried out in compliance with technical specifications

**2.5** Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes

**2.6** Maintenance work is checked to verify that it conforms

- to technical specifications and complies with survey requirements, as required
- 3 Complete breakdown maintenance**
- 3.1** Nature of breakdown is confirmed using maintenance records and or logbook entries related to reported breakdown
- 3.2** Restrictions are applied to operations, where necessary, and Master is informed
- 3.3** Machinery and equipment is safely isolated according to WHS/OHS requirements and organisational practices
- 3.4** Repair work is carried out according to technical specifications
- 3.5** Master is notified of completion of repair work and details are documented
- 4 Complete hull maintenance**
- 4.1** Checks of vessel hull, equipment and fittings are carried out according to maintenance schedules, survey requirements and vessel manufacturer instructions
- 4.2** Deterioration in vessel structure, equipment and fittings is identified
- 4.3** Checks on propeller, stern tube and rudder are carried out in accordance with organisational procedures, safety regulations and survey requirements
- 4.4** WHS/OHS risk control measures and procedures for carrying out work are followed
- 4.5** Work area is prepared
- 4.6** Maintenance work is checked to verify it conforms to technical specifications and complies with survey requirements, as required
- 5 Clean up and complete documentation**
- 5.1** Work area is cleared and cleaned
- 5.2** Materials are disposed of or recycled according to legislative and workplace requirements
- 5.3** Tools and equipment are cleaned, checked and stored according to workplace procedures
- 5.4** Machinery and equipment is returned to service and monitored for correct operation according to

organisational practices

- 5.5 Maintenance report is completed according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Non-essential conditions may be found in the Companion Volume Implementation Guide.

## Unit Mapping Information

This unit replaces and is equivalent to MARB006 Maintain marine internal combustion engines, propulsion plant and auxiliary systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARB031 Maintain marine internal combustion engines, propulsion plant and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria on at least one occasion and include:

- applying safety requirements throughout the work sequence, including the use of personal protective equipment (PPE)
- completing:
  - all work to specifications
  - basic user maintenance of marine internal combustion engine, propulsion plant and auxiliary systems to manufacturer specifications and survey requirements, so as to prevent pollution of the marine environment
- completing maintenance records
- developing effective planning documents
- implementing safe and environmentally responsible work practices
- lubricating
- maintaining emergency equipment
- overhauling pumps
- performing breakdown maintenance in the event of failure of:
  - engine systems
  - auxiliary systems
- planning maintenance activities according to technical, legislative, safety and procedural specifications
- reading and interpreting:
  - manufacturer specifications
  - safety data sheets (SDS)/material safety data sheets (MSDS).

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic hydraulic systems and user maintenance requirements
- basic vessel construction
- bearing types, materials, installation and lubrication
- cleaning chemicals
- coolants
- common faults in:
  - steering gear
  - refrigeration systems
- corrosion prevention
- coupling types, fitting, keys and keyways
- cross connections between bilge systems and seawater systems, including fire main
- electro-hydraulic steering gear
- emergency steering systems
- engine:
  - construction
  - fault-finding techniques
  - fuel injection, timing and control equipment
  - performance and reasons for lack of performance
  - protection arrangements
  - routine/remedial maintenance
- faults that can occur with firefighting equipment and systems
- fire main system and components, including pumps, hoses and nozzles
- fixed firefighting systems and associated remote shut-offs and closing of appliances
- glands, packing and seals
- heat exchanger, keel cooler and raw water cooling systems, including their construction and maintenance
- maintenance of marine two- and four-stroke diesel and petrol engines
- maintenance of watertight openings and hull fittings
- marine gearbox faults and emergency operation
- method of propulsion reversal including controllable pitch propeller construction
- oil filter changing procedures
- oil quality monitoring
- oily water separator
- planned maintenance
- preparation for survey
- process for carrying out checks of the vessel hull, equipment and fittings, including:
  - anodes
  - propeller damage
  - rudder
  - ship side valves
  - stern tube

- water intakes
- watertight hatches and openings
- cleaning and or replacing filters
- process for cleaning:
  - coolers
  - strainers
- propeller types, fitting, keys and keyways, securing nuts and locking
- pump capabilities and requirements for priming
- refrigeration systems and components
- relevant regulations and codes of practice relating to the maintenance of engineering equipment and systems, such as firefighting
- routine and remedial maintenance of steering systems
- rudder and stock bearing supports
- rudder construction and rudder types
- safe operation of hand and power tools
- seawater circulating systems
- shutting down machinery
- statutory and organisational requirements for documentation relating to the maintenance of engineering equipment and systems, such as firefighting
- storage of liquefied petroleum gas (LPG) cylinders
- testing of LPG detectors
- tiller arm attachment
- types of:
  - deck machinery
  - pumps and safety devices
- wet sump lubrication systems
- WHS/OHS requirements.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace only rarely, in particular for situations relating to emergency procedures where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including manufacturer specifications and SDS/MSDS
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate engine, propulsion plant and auxiliary systems ashore
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARB032 Undertake basic maintenance of electrical systems

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to complete basic maintenance of electrical systems.

This unit of competency applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels <80 m long with propulsion power <3000 kW.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 2 NC. Note: Relevant state or territory electrical licensing requirements apply to persons carrying out installation, maintenance and or repair of electrical circuits or systems that are 50 V alternating current (AC) or above, or 120 V direct current (DC) or above.

The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

B - Equipment Checking and Maintenance

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan maintenance activities**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Maintenance plan is accessed to determine electrical system maintenance requirements
- 1.2** Inspections are conducted and additional non-routine maintenance requirements are determined
- 1.3** System specifications and diagrams for electrical systems are obtained
- 1.4** Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work
- 1.5** Consumables and equipment are selected and checked for serviceability

#### **2 Complete preventative maintenance**

- 2.1** Electrical system is safely isolated according to regulatory and work health and safety (WHS)/occupational health and safety (OHS) requirements
- 2.2** WHS/OHS risk control measures and procedures for carrying out work are followed
- 2.3** Preventative maintenance is carried out in compliance with system specifications
- 2.4** Methods for dealing with unexpected situations are selected on the basis of safety and specified work

outcomes

- |  |            |  |
|--|------------|--|
|  | <b>2.5</b> | Work is carried out efficiently without waste of materials and damage to equipment and machinery or other services                       |
|  | <b>2.6</b> | Maintenance work is checked to verify that it conforms with technical specifications   |
| <b>3 Complete breakdown maintenance</b>      | <b>3.1</b> | Nature of breakdown is confirmed using maintenance records and or log book entries related to reported breakdown                         |
|  | <b>3.2</b> | Restrictions are applied to operations, as necessary, and Master is notified   |
|  | <b>3.3</b> | Limits of repair work that can be carried out are established according to relevant state or territory electrical licensing requirements |
|  | <b>3.4</b> | System is isolated   |
|  | <b>3.5</b> | Repair work is carried out according to system specifications  |
|  | <b>3.6</b> | Master is notified of completion of repair work and details are documented   |
| <b>4 Clean up and complete documentation</b> | <b>4.1</b> | Work area is cleared and cleaned   |
|  | <b>4.2</b> | Materials are disposed of or recycled according to legislative and workplace requirements  |
|  | <b>4.3</b> | Tools and equipment are cleaned, checked and stored according to workplace procedures  |
|  | <b>4.4</b> | Electrical system and equipment are put back into service and monitored for correct operation according to organisational practices      |
|  | <b>4.5</b> | Maintenance report is completed according to workplace procedures  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARB007 Undertake basic maintenance of electrical systems.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARB032 Undertake basic maintenance of electrical systems

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying safety requirements throughout the work sequence, including the use of personal protective equipment (PPE)
- carry out maintenance tasks, including:
  - battery maintenance
  - testing:
    - alarm systems
    - emergency generator
    - power and lighting systems
- carrying out simple maintenance of electrical systems in the event of:
  - blown fuses or open circuit breakers
  - earthing
  - failure of electricity generating systems
  - motor brake failure to release
  - motor failure
  - shorting
- implementing safe and environmentally responsible work practices
- performing isolation, lock out and tag out procedures
- planning maintenance activities according to technical, legislative, safety and procedural specifications.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- battery:
  - charging systems
  - maintenance

- operation
- types and associated hazards
- connection to shore power
- earth indicating devices
- electrical distribution systems
- isolation of electrical circuits
- main faults that can occur in:
  - alternating current (AC) electrical systems
  - direct current (DC) electrical systems
- maintenance requirements for:
  - alarm systems
  - emergency electrical supply
  - emergency generators
  - generators
  - motor starting circuits
  - power and lighting
  - shore supply
  - steering gear circuits
  - switchboards
- procedure for connecting batteries in series and parallel
- single and three-phase AC power
- starter motors, alternators and associated equipment
- switchboard and protection devices
- types of protection devices
- use of multi-meter to test voltage and continuity
- uses of fuses and circuit breakers
- work health and safety (WHS)/occupational health and safety (OHS) requirements.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management systems (SMS), workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate engine, propulsion plant, and auxiliary equipment with electrical systems ashore
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARC011 Manage a propulsion unit using appropriate engine systems and support services**

### **Modification History**

Release 2. Range of Conditions updated to include relevant information.

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to operate a propulsion unit using appropriate engine systems and support services according to technical specifications and safe operating limits.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

C – Equipment Operations

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Prepare for operation**

- 1.1 Routine pre-operational checks of propulsion unit, engine systems and support services are completed prior to use according to manufacturer specifications and organisational procedures

- |   |     |  |
|---|-----|--|
|   | 1.2 | Propulsion unit, engine systems and support services are calibrated or set up correctly  |
|   | 1.3 | Faults or malfunctions are identified and reported according to organisational procedures  |
|   | 1.4 | Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified and risk is assessed and reported according to organisational procedures                                       |
| <b>2 Operate propulsion unit, engine systems and support services</b>                       | 2.1 | Risks to self, others and the environment are identified according to organisational procedures  |
|   | 2.2 | Suitable personal protective equipment is selected and used according to organisational procedures   |
|   | 2.3 | Controls of propulsion unit, engine systems and support services are operated in a safe and controlled manner  |
|   | 2.4 | Performance and efficiency of propulsion unit, engine systems and support services operations is monitored   |
|   | 2.5 | Safe operational practices are used to anticipate and control hazards  |
|   | 2.6 | Adverse sea and weather conditions that may impact on operation of propulsion unit, engine systems and support services are identified and operational practices are adjusted to maintain safety of vessel and personnel |
|   | 2.7 | Procedures to be undertaken in the event of emergencies are recognised and implemented   |
| <b>3 Complete operations and check propulsion unit, engine systems and support services</b> | 3.1 | Shut-down procedures are conducted according to manufacturer instructions and organisational procedures  |
|   | 3.2 | Malfunctions, faults, irregular performance or damage to propulsion unit, engine systems and support services are reported according to organisational procedures  |
|   | 3.3 | Propulsion unit, engine systems and support services are cleaned and secured according to organisational procedures  |
|   | 3.4 | Operational records are completed according to organisational procedures   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Propulsion unit and engine systems must include:

- ancillary systems and controls
- bow and stern thrusters units
- controllable pitch propellers (CPP)
- diesel engines
- engine systems and controls
- gearing systems
- hydraulic systems and controls
- performance indicators
- power generating units and controls
- propeller shafting arrangements
- pumps and pumping systems
- safety alarm systems
- speed and fuel consumption indicators
- steering gear

Support services include one or more of the following:

- air conditioning systems
- air starting systems
- bilge systems
- cooling water systems
- fire detection and suppression systems
- fuel pumps, lines and tanks
- lubrication systems
- refrigeration systems
- steering gear systems
- waste management and pollution control systems

- water pumping systems

Emergencies must include:

- fire or explosion
- flooding
- loss of:
  - propulsion
  - electrical power
  - steering

Operational records must include:

- instructions of relevant maritime authorities
- log books
- operational orders from the organisation's safety management system
- plant and equipment manufacturer instructions and recommended procedures
- relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NCSV) and Uniform Shipping Laws (USL) Code related to operation of propulsion plants and ancillary equipment.

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4001A Manage a propulsion unit using appropriate engine systems and support services.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC011 Manage a propulsion unit using appropriate engine systems and support services**

## **Modification History**

Release 2. Performance Evidence and Knowledge Evidence amended to include correct information.

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing propulsion unit
- communicating effectively with other personnel
- keeping records of monitoring and operation of safety and fire detection/suppression equipment, and any required remedial action
- maintaining records of operation and maintenance of propulsion unit, ancillary power units, equipment and any related safety incidents
- monitoring and evaluating performance of propulsion unit, ancillary power units and equipment
- reading and interpreting:
  - manufacturer instructions for operation of propulsion systems and auxiliary systems
  - maritime regulations, rules and instructions
- recognising problems that may occur with remote control of propulsion unit, ancillary power units and equipment, and taking appropriate preventative and remedial action
- recognising when performance of propulsion unit or ancillary power units and equipment is unsatisfactory or outside specified limits and taking appropriate action
- working collaboratively with other shipboard personnel and passengers during vessel operations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics of propulsion units, ancillary power units and equipment including operational limits, vessel stopping distances and turning circles at various draughts, speeds and conditions of loading
- dangers associated with operation of shipboard ancillary power units and related hazard prevention strategies
- marine engineering terms



- methods for controlling and managing operation of shipboard propulsion units, ancillary power units and equipment
- principles of operation and control of various shipboard emergency systems
- problems associated with remote control of propulsion unit, ancillary power units and equipment and appropriate preventative and remedial action and solutions
- procedures for monitoring and evaluating performance of propulsion unit, ancillary power units and equipment
- relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
- relationship between vessel speed and fuel consumption, including meaning of economical revolutions per minute (RPM) and its application
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- requirements for waste management and control systems under the MARPOL Convention
- Sequence of required action when power unit becomes overloaded.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC012 Monitor and manage vessel operations

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to plan and oversee activities associated with the regulatory and operational requirements for the continued performance and safety of a coastal vessel.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Develop operational strategies and procedures**

- 1.1 Action plan is developed to provide a clear and coherent direction according to organisational goals and objectives
- 1.2 Work health and safety (WHS)/occupational health and safety (OHS) and environmental issues are identified, and strategies are implemented to minimise risk factors
- 1.3 Quality system is developed for vessel in line with industry

- standards, compliance and organisational requirements
- 1.4 Performance measures and operational targets are developed to conform with business plan
  - 1.5 Procedures are established and implemented according to organisational and legislative requirements
  - 1.6 Procedures are communicated to crew members
- 2 Supervise crew compliance with regulatory requirements**
- 2.1 Regulatory body requirements are correctly interpreted and applied
  - 2.2 Instructions for crew members are developed and implemented
  - 2.3 Crew members are briefed
  - 2.4 Liaison with regulatory body officials is undertaken
- 3 Plan resources for vessel operations**
- 3.1 Vessel resource and equipment requirements are investigated and documented
  - 3.2 Resource needs are prioritised and matched to vessel budget, and priorities are confirmed after consultation with crew members
  - 3.3 Procurement plan with prioritised purchasing is devised and resources are procured accordingly
- 4 Plan vessel operations logistics**
- 4.1 Operational work plans are developed
  - 4.2 Operations are checked to ensure optimum use of human and physical resources
  - 4.3 Tasks are implemented according to plans and specifications
  - 4.4 Operational plans are implemented and crew members are briefed as to roles and responsibilities
  - 4.5 Operational plans are documented and amended according to procedures and crew expectations
  - 4.6 Proposed variations are investigated and negotiated in consultation with crew members
- 5 Evaluate operational processes**
- 5.1 Operational progress is closely monitored against required quality of work and adherence to both budget and time schedule

- 5.2 Opportunities for preventative or corrective changes are identified using outcomes of monitoring activities and feedback from crew members
- 5.3 Preventative and/or corrective action is recommended and implemented
- 5.4 Changes are communicated to appropriate persons in a logical and easily understood manner
- 5.5 Changes are monitored to confirm improvement in crew efficiency

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Action plan must include:

- cargo plan
- dry-docking and slipping operations
- planned maintenance system
- safety management plan
- voyage planning

Work health and safety (WHS)/occupational health and safety (OHS) and environmental issues

- working at heights
- working in:
  - confined spaces
  - freezer spaces

include:

- working overside on stages

Operational targets include one or more of the following:

- achievement of key performance indicators (KPIs) from the business plan
- optimum fuel usage
- on time completion of survey and docking operations
- passage planning to achieve safe and efficient routing

Vessel resource and equipment requirements include one or more of the following:

- charts and publications for the intended voyage
- stores, fuel and spare parts sufficient for the voyage
- tools and equipment necessary to conduct planned maintenance

Operational work plans include one or more of the following:

- docking and repair plans
- managing confined space entry
- passage planning
- periodic survey requirements

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4002A Monitor and manage vessel operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC012 Monitor and manage vessel operations

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- collecting, organising and understanding information related to vessel resource and logistic requirements
- communicating ideas and information to enable input from crew and understanding by crew of plans developed
- completing a review of and updating the process for, vessel operations
- developing effective planning documents
- liaising with other crew members on a range of operational issues and challenges
- monitoring and responding to compliance issues and measuring progress against agreed objectives
- planning and organising activities including consulting with crew to determine resource and logistics requirements, and developing, implementing and reviewing operational plans
- undertaking a job safety analysis for working in areas of high risk
- using information gathering techniques to determine crew requirements and developing strategies to address these
- using mathematical techniques to correctly interpret budgets and estimate material requirements.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- analytical tools
- decision-making models and techniques
- information gathering strategies
- logistics and procurement management techniques
- operational plan development
- resource availability.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC013 Operate auxiliary machinery systems up to 1500 kW

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate auxiliary machinery systems up to 1500 kW according to technical specifications and safe operating limit.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare for operation**

1.1 Risks to self, others and the environment are identified according to organisational procedures

1.2 Routine pre-operational checks of auxiliary machinery systems are completed prior to use according to manufacturer specifications and organisational procedures

### **2 Operate auxiliary machinery systems**

2.1 Suitable personal protective equipment is selected and used according to organisational procedures



- |          |  |   |
|----------|--|---|
|          | 2.2  | Auxiliary machinery systems are operated in a safe and controlled manner  |
|          | 2.3  | Performance of auxiliary machinery system operations are monitored  |
|          | 2.4  | Adverse sea and weather conditions that may impact on operation of auxiliary machinery systems are identified and operational practices are adjusted to maintain safety of vessel and personnel |
|          | 2.5  | Faults or malfunctions are identified and recorded according to organisational procedures   |
|          | 2.6  | Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures   |
|          | 2.7  | Procedures to be undertaken in emergencies are recognised and implemented   |
| <b>3</b> | <b>Complete operations and check auxiliary machinery systems</b> |   |
|          | 3.1  | Shut-down procedures are conducted according to manufacturer instructions and organisational procedures   |
|          | 3.2  | Operational records are completed as required according to organisational procedures and regulatory requirements  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Auxiliary machinery systems must include:

- cargo discharging or loading systems
- commercial refrigeration and freezer plants
- compressed air
- control air systems
- deck machinery
- hydraulics
- fire, bilge and ballast pumping systems
- fixed gas and foam firefighting systems
- fresh water generation
- fuel and lubricating oil purification systems
- sewage treatment
- steering system including rudder

Emergencies must include:

- loss of:
  - control air pressure
  - electrical power
- failure of steering system
- hydraulic failure

Operational records must include:

- logbooks
- maintenance records
- plant and equipment manufacturer instructions and recommended procedures
- relevant maritime authority documentation relating to operating auxiliary machinery systems
- standard operating procedures from the organisation's safety management system

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4003A Operate auxiliary machinery systems up to 1500 kW.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC013 Operate auxiliary machinery systems up to 1500 kW**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- maintaining records of the operation and maintenance of auxiliary machinery systems and any related safety incidents
- monitoring and evaluating performance of auxiliary machinery systems
- operating all equipment
- reading and interpreting:
  - manufacturer instructions for the operation of auxiliary machinery systems
  - maritime regulations, rules and instructions
- recognising when the performance of auxiliary machinery systems is unsatisfactory or outside specified limits and taking appropriate action
- recognising problems that may occur with auxiliary machinery systems and taking appropriate preventative and remedial action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alarm panels
- auxiliary systems, materials and construction
- awareness of one's surroundings and changes to these surroundings
- causes of deck machinery faults
- characteristics of auxiliary machinery systems
- closing devices and remote shut offs
- dangers associated with operating shipboard auxiliary machinery systems and related hazard prevention strategies
- drive systems, belts, clutches and motors
- electro-hydraulic steering gear
- emergency operation in electrical or hydraulic failure
- emergency shut offs and closures
- fire detection and fire alarm systems
- fixed firefighting installations including CO<sub>2</sub>, foam and water mist

- function of:
  - grease
  - lubricating oil
- hydraulic systems including steering gear
- identification of:
  - refrigeration system components
  - faults in refrigeration systems
- instrumentation used
- methods for controlling and managing operation of shipboard auxiliary machinery systems
- operation of deck machinery
- own ability and limits to rectify irregularities or faults
- problems associated with auxiliary machinery systems, and appropriate preventative and remedial action and solutions
- procedures for monitoring and evaluating performance of auxiliary machinery systems
- pumps and pumping systems for bilge, fire, fuel oil, freshwater and seawater systems
- refrigeration:
  - cycle
  - plant and its operation
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- relevant sections of commonwealth, state and territory maritime regulations, National Standard for Commercial Vessels (NSCV)
- requirements for waste management and pollution control from auxiliary machinery systems under the International Convention for the Prevention of Pollution from Ships (MARPOL)
- rudder and stock support bearings, glands, packing and seals
- rudder construction and rudder types
- safe:
  - operation practices
  - working procedures
- safeguards and protective devices for deck machinery
- simple hydraulic circuits
- strainers, mud-boxes and foot valves
- terminology of materials technology
- types of:
  - fixed firefighting systems including gas and foam flooding systems
  - pumps and associated safety devices
  - refrigerant
- winches and windlass.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC014 Operate deck machinery and steering gear on a vessel up to 80 metres

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate steering gear and deck machinery on a vessel up to 80 metres.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Prepare for operation

- 1.1 Routine pre-operational checks of steering gear or deck machinery are completed prior to use according to manufacturer specifications and organisational procedures
- 1.2 Equipment is set up
- 1.3 Tools and equipment appropriate to work requirements are selected, checked for safety and set up for operation

- |   |     |   |
|---|-----|---|
|   | 1.4 | Equipment faults or malfunctions are identified and reported according to organisational procedures   |
|   | 1.5 | Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified, and risks are assessed and reported according to organisational procedures                     |
| <b>2 Operate steering gear and deck machinery</b> | 2.1 | Suitable personal protective equipment is selected and used according to organisational procedures  |
|   | 2.2 | Steering gear and deck machinery are operated in a safe and controlled manner   |
|   | 2.3 | Performance and efficiency of steering gear and deck machinery operations is monitored  |
|   | 2.4 | Safe operational practices are used to anticipate and control hazards   |
|   | 2.5 | Adverse sea and weather conditions which may impact on the operation of steering gear and deck machinery are identified and operational practices are adjusted to maintain safety of vessel and personnel |
| <b>3 Complete operations</b>                      | 3.1 | Shut-down procedures are conducted according to manufacturer instructions and organisational procedures   |
|   | 3.2 | Malfunctions, faults, irregular performance or damage to steering gear and deck machinery are reported according to organisational procedures   |
|   | 3.3 | Steering gear and deck machinery is cleaned and secured according to organisational procedures  |
|   | 3.4 | Operational records are completed according to organisational procedures  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Steering gear or deck machinery includes one or more of the following:

- basic hydraulic systems
- cranes
- emergency steering gear
- fishing gear
- steering gear
- winches and capstans
- windlass

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4004A Operate deck machinery and steering gear on a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARC014 Operate deck machinery and steering gear on a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with others
- completing required records relating to the operation of steering gear and deck machinery
- following work schedules laid down in organisational instructions and safety management systems
- initiating and operating emergency steering systems
- reading, interpreting and applying instructions on the operation of steering gear and deck machinery
- recognising faulty equipment and taking appropriate action
- recognising routine hazards and problems while operating steering gear and deck machinery
- selecting and using relevant tools and equipment
- working safely and collaboratively with others when operating and maintaining deck machinery and steering gear.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of hydraulics
- communication techniques and signals needed during the operation of steering gear and deck machinery on vessels up to 80 metres
- principal features and operating characteristics of steering gear and deck machinery used on vessels up to 80 metres
- problems related to the operation of steering gear and deck machinery and appropriate actions and solutions
- procedures for checking and inspecting steering gear and deck machinery used on vessels up to 80 metres
- procedures for the safe operation of steering gear and deck machinery
- procedures for, and operation of, emergency steering systems
- records that must be maintained on a vessel up to 80 metres

- relevant state and territory maritime work health and safety (WHS)/occupational health and safety (OHS) and pollution control regulations and policies
- safety, environmental and hazard control precautions and procedures relevant to the operation of steering gear and deck machinery.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials currently used in industry including:
  - greasing and lubrication tools
  - hand and power tools, including screwdrivers, drills, grinders, spanners, wrenches, wire cutters.
  - protective clothing and equipment
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC015 Operate marine internal combustion engines and associated systems up to 1500 kW**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate a marine internal combustion engine and associated systems up to 1500 kW according to technical specifications and safe operating limits.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C - Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare for operation**

- 1.1 Risks to self, others and the environment are identified according to organisational procedures
- 1.2 Routine pre-operational checks of marine internal combustion engines and associated systems are completed prior to use according to manufacturer specifications and

		organisational procedures
<b>2 Operate marine internal combustion engines and associated systems</b>	2.1	Suitable personal protective equipment is selected and used according to organisational procedures
	2.2	Marine internal combustion engines and associated systems are operated in a safe and controlled manner
	2.3	Performance of marine internal combustion engines and associated systems operations is monitored
	2.4	Adverse sea and weather conditions that may impact on operating marine internal combustion engines and associated systems are identified and operational practices are adjusted to maintain safety of vessel and personnel
	2.5	Faults or malfunctions are identified and recorded according to organisational procedures
	2.6	Faults or malfunctions are rectified where possible and corrective actions are taken and recorded according to organisational procedures
	2.7	Restrictions are applied to operations if necessary and are agreed to with the Master
	2.8	Procedures to be undertaken in of emergencies are recognised and implemented
<b>3 Complete operations</b>	3.1	Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
	3.2	Operational records are completed according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Associated systems must include:

- air start
- control systems
- cooling system
- dual fuel systems
- exhaust systems
- lubrication systems

Monitored includes one or more of the following:

- conducting performance tests
- reading gauges and instruments
- responding to alarms

Emergencies must include:

- explosion
- failure or major fault in propulsion engines and associated control systems
- fire
- loss of:
- bridge control
- electrical supply
- propulsion power
- steering
- major breakdowns

Operational records must include:

- logbooks
- maintenance records
- operational orders from organisational safety management system
- plant and equipment manufacturer instructions and recommended procedures
- relevant maritime authorities documentation relating to operating marine internal combustion engines and associated systems

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4005A Operate marine internal combustion engines and associated systems up to 1500 kW.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC015 Operate marine internal combustion engines and associated systems up to 1500 kW**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing marine internal combustion engines and associated systems including calculating:
  - areas and volumes of various shapes and circumference of circles
  - calibration tables
  - lubricating oil and fuel oil consumption, rate of fuel consumption (RFC), specific fuel consumption (SFC), effects on RFC and fuel requirements due to change in vessel speed or voyage deviations
  - relationship between vessel speed and fuel consumption, including the meaning of economical revolutions per minute (RPM) and its application
  - tank capacities and pumping capacities for filling and emptying
- maintaining records of operating and maintaining marine internal combustion engines and associated systems, and any related safety incidents
- reading and interpreting:
  - manufacturer instructions for operating marine internal combustion engines and associated systems
  - maritime regulations, rules and instructions
- reading and monitoring various gauges and instruments to evaluate the performance of marine internal combustion engines and associated systems
- recognising problems that may occur with marine internal combustion engines and associated systems, and taking appropriate preventative and remedial action
- recognising when performance of marine internal combustion engines and associated systems is unsatisfactory or outside of specified limits and taking appropriate action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics of marine internal combustion engines and associated systems including operational limits
- control systems

- cooling water system and components
- crankcase explosions and appropriate preventative and remedial action and solutions
- dangers associated with operating shipboard marine internal combustion engines and associated systems, and related hazard prevention strategies
- engine protection arrangements
- force diagrams
- fuel system including pumps and injectors
- lubricating oil systems and components
- materials and construction techniques of marine internal combustion engines and associated systems
- methods for controlling and managing the operation of shipboard marine internal combustion engines and associated systems
- own ability and limits to rectify irregularities and faults
- pollution control measures under relevant local, state, territory and commonwealth legislation
- problems associated with marine internal combustion engines and associated systems, and appropriate preventative and remedial action and solutions
- procedures for monitoring and evaluating performance of marine internal combustion engines and associated systems
- relationship between vessel speed and fuel consumption, including the meaning of economical RPM and its application
- relevant sections of state and territory maritime regulations and NSCV
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- requirements for emission control from internal combustion engines under the International Convention for the Prevention of Pollution from Ships (MARPOL)
- sequence of required action when there is a major fault on main propulsion engine
- surroundings and changes to these surroundings
- technological changes in engine and control system designs
- turbocharging systems.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.



Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC016 Operate propulsion transmission systems up to 1500 kW

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate propulsion transmission systems up to 1500 kW according to technical specifications and safe operating limits.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Prepare for operation

- 1.1 Risks to self, others and the environment are identified and precautions are taken to minimise risk according to organisational procedures
- 1.2 Routine pre-operational checks of propulsion transmission systems are completed prior to use according to manufacturer specifications and organisational procedures

- |  |   |
|--|---|
| <b>2 Operate propulsion transmission systems</b> | <p>2.1 Suitable personal protective equipment is selected and used according to organisational procedures</p> <p>2.2 Propulsion transmission systems are operated in a safe and controlled manner</p> <p>2.3 Performance of propulsion transmission system operations is monitored</p> <p>2.4 Faults or malfunctions are identified and recorded according to organisational procedures</p> <p>2.5 Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures</p> <p>2.6 Procedures to be undertaken in emergencies are recognised and implemented</p> |
| <b>3 Complete operations</b>                     | <p>3.1 Shut-down procedures are implemented according to manufacturer instructions and organisational procedures</p> <p>3.2 Operational records are completed according to organisational procedures</p>  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |                         |   |
|-------------------------|---|
| Propulsion transmission | <ul style="list-style-type: none"> <li>• control system</li> <li>• fixed pitch and controllable pitch propellers</li> </ul> |
|-------------------------|---|

- systems must include:
- gearbox and reduction gear arrangements
  - intermediate bearings
  - propeller types and arrangements
  - shafting arrangements
  - stern tube and their systems
  - transmission system

- Emergencies must include:
- failure or major fault in:
  - propulsion transmission system or associated systems

- Operational records must include:
- logbooks
  - maintenance scheduling and maintenance records from organisation's safety management system
  - plant and equipment manufacturer instructions and recommended procedures

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4006A Operate propulsion transmission systems up to 1500 kW.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC016 Operate propulsion transmission systems up to 1500 kW**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing propulsion transmission systems including:
  - calculating gear box ratios
  - theoretical distance
  - propeller slip
- maintaining records of operating and maintaining propulsion transmission systems and any related safety incidents
- operating emergency power transmission system
- reading and interpreting:
  - manufacturer instructions for operating propulsion transmission systems
  - maritime regulations, rules and instructions
- reading and monitoring various gauges and evaluating performance of propulsion transmission systems
- recognising problems that may occur with propulsion transmission systems and taking appropriate preventative and remedial action
- recognising when performance of propulsion transmission systems is unsatisfactory or outside of specified limits and taking appropriate action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics of propulsion transmission systems including operational limits
- fault identification on gearbox
- gearbox:
  - construction and materials
  - lubricating and cooling systems and components
- methods for controlling and managing the operation of shipboard propulsion transmission systems
- own ability and limits to rectify irregularities and faults.

- problems associated with propulsion transmission systems and appropriate preventative and remedial action and solutions
- procedures for monitoring and evaluating performance of propulsion transmission systems
- propeller shape, design and materials
- propeller types and arrangements including fixed pitch and controllable pitch propellers
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- reverse and reduction gearbox construction and operation
- shaft:
  - bearings
  - seals and glands
- shafting materials
- steerable/rudder propellers
- stern and jet water drive
- stern tube bearing systems including lubrication, materials and components
- types of gear trains.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC017 Operate 240 to 440 voltage alternating current electrical systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate a 240 to 440 voltage alternating current (AC) electrical system according to technical specifications and safe operating limits.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

WARNING: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

## Pre-requisite Unit

Not applicable.

## Competency Field

C - Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

- |                                |            |  |
|--------------------------------|------------|--|
| <b>1 Prepare for operation</b> | <b>1.1</b> | Risks to self, others and the environment are identified according to organisational procedures  |
|                                | <b>1.2</b> | Routine pre-operational checks of electrical systems are completed prior to use according to manufacturer specifications and organisational procedures |

- |   |   |
|---|---|
| <b>2 Operate electrical systems</b>                       | <ul style="list-style-type: none"><li>2.1 Suitable personal protective equipment is selected and used according to organisational procedures</li><li>2.2 Electrical systems are operated in a safe and controlled manner</li><li>2.3 Performance of direct current (DC) and AC electrical systems is monitored</li><li>2.4 AC electrical demand is monitored and additional generators are paralleled or disconnected as required</li><li>2.5 Ship to shore electrical supply is connected and disconnected when required following established practices and organisational procedures</li><li>2.6 Faults or malfunctions are identified and reported according to organisational procedures</li><li>2.7 Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures</li><li>2.8 Procedures to be undertaken in emergencies are recognised and implemented</li></ul> |
| <b>3 Complete operations and check electrical systems</b> | <ul style="list-style-type: none"><li>3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures</li><li>3.2 Operational records are completed according to organisational procedures</li></ul>  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the



candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Electrical systems must include:

- alternators
- batteries and associated circuits
- control circuits
- fire detection
- motors
- starter circuits
- switchboard

Emergencies must include:

- failure of:
- generator
- emergency generator
- fire
- flooding

Operational records must include:

- logbooks
- maintenance records
- operational orders from the organisation's safety management system
- plant and equipment manufacturer instructions and recommended procedures
- relevant maritime authorities documentation relating to operating electrical systems

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC4007A Operate 240 to 440 voltage alternating current electrical systems.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC017 Operate 240 to 440 voltage alternating current electrical systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out necessary calculations associated with managing electrical systems including:
  - battery ampere-hours and efficiency
  - series and parallel configuration of battery supply
  - adding resistors in series and parallel, and calculating current
- connecting to shore power
- isolating electrical circuits
- maintaining records of operating and maintaining electrical systems, and any related safety incidents
- monitoring and evaluating performance of electrical systems
- performing switchboard operations including the monitoring of electrical supply and procedures for paralleling generators
- reading and interpreting:
  - manufacturer instructions for the operation of electrical systems
  - maritime regulations, rules and instructions
- recognising problems that may occur with electrical systems and taking appropriate preventative and remedial action
- recognising when performance of electrical systems is unsatisfactory or outside of specified limits and taking appropriate action
- starting emergency generator and supply switchboard where available
- using hydrometer
- using multi-meter to test for voltage and continuity.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- battery:
  - operation
  - charging circuits and hazards associated with charging batteries

- types, care and hazards
- characteristics of electrical systems
- dangers associated with operation of shipboard electrical systems and related hazard prevention strategies
- earth detection devices
- electrical distribution systems including emergency arrangements
- faults associated with electrical systems and appropriate preventative and remedial action, and solutions
- methods for managing operation of shipboard electrical systems
- motor and alternator construction
- motor starter circuits
- own ability and limits to rectify irregularities and faults
- principles of operation of various shipboard emergency systems including fire detection system, internal communications system and emergency generator
- procedures for monitoring and evaluating performance of electrical systems
- relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- safety devices fitted to switchboard and other electrical systems including fuses and circuit breakers
- sequence of required action when power unit becomes overloaded
- shore power arrangements
- single and three phase AC power generation.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals

- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC018 Employ tools, equipment and materials in a shipboard context

## Modification History

Release 2. Duplication of information removed from Application.

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to employ tools, equipment and materials to perform maintenance activities on a vessel. It includes the use of hand, power and machine tools, welding equipment, heat treatment processes, soldering operations, adhesives and bonding materials in performing routine and non-routine maintenance activities.

This unit applies to the work of a Marine Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Follow safe work practices

- 1.1 Work health and safety (WHS)/occupational health and safety (OHS) procedures relevant to using tools and equipment in a shipboard context are complied with
- 1.2 Safety hazards are identified and reported according to safety

- and vessel procedures
- 1.3 Prior to use, tools and equipment needed to carry out maintenance activities are checked for correct operation and safety according to safety and vessel procedures
  - 1.4 Before commencing maintenance activities, isolation precautions are implemented according to safety and vessel procedures
- 2 Carry out heat treatment**
- 2.1 Requirements of job are determined from engineering drawings, job sheet or supervisor
  - 2.2 Heat treatment equipment is selected for required heat treatment according to safety, workplace and manufacturer requirements
  - 2.3 Equipment is set up and used according to standard operating procedures and manufacturer instructions
  - 2.4 Personal protective equipment (PPE) is used according to standard operating procedures
  - 2.5 Emergency procedures are complied with according to approved safety instructions
  - 2.6 Safety signs and symbols are identified and complied with according to approved safety instructions
  - 2.7 Heat treatment process is applied according to job, safety and workplace requirements
  - 2.8 Hazardous conditions are identified and risk control measures are implement to maintain a safe work environment
- 3 Use hand tools**
- 3.1 Hand tools are used according to workplace procedures, WHS/OHS requirements and manufacturer instructions.
  - 3.2 Faults with hand tools and equipment are identified and reported to appropriate personnel
- 4 Use hand power tools**
- 4.1 Hand power tools are used according to workplace procedures, WHS/OHS requirements and manufacturer instructions.
  - 4.2 Faults with hand power tools and equipment are identified and reported to appropriate personnel
- 5 Perform onboard pipe work**
- 5.1 Job requirements are determined from engineering drawings, job sheet or supervisor

- 5.2 Sequence of operations is determined according to workplace, WHS/OHS and job requirements
- 5.3 Pipe work is fabricated and joined according to relevant standards, and job, safety and workplace requirements
- 5.4 Pipe work is inspected for defects according to workplace procedures
- 5.5 Pipe work is installed in specified location without damage or distortion to pipe work, surrounding environment or other services
- 5.6 Type of filters and strainers in shipboard piping systems are located and determined using relevant engineering drawings and specifications
- 5.7 Pipe work is tested for compliance with job specification and workplace requirements
- 6 Use machine tools**
  - 6.1 Job requirements are determined from engineering drawings, job sheet or supervisor
  - 6.2 Sequence of operations is determined according to workplace, WHS/OHS and job requirements
  - 6.3 Machine tools are selected according to workplace procedures, WHS/OHS requirements and manufacturer instructions
  - 6.4 Machining operations are performed according to workplace, WHS/OHS and job requirements
  - 6.5 Components are measured in line with workplace, WHS/OHS and job requirements
  - 6.6 Machine is adjusted and maintained according to workplace, safety, manufacturer and job requirements
- 7 Perform welding and thermal cutting operations**
  - 7.1 Job requirements are determined from engineering drawings, job sheet or supervisor
  - 7.2 Materials are prepared for welding using correct tools, equipment, materials and procedures
  - 7.3 Materials are welded using appropriate welding process according to relevant standards and job, safety and workplace requirements

- |   |     |   |
|---|-----|---|
|   | 7.4 | Joints are welded according to relevant standards and job, safety and workplace requirements  |
|   | 7.5 | Oxygen fuel gas cutting torch is used to cut straight lines and curves in mild steel plate up to 10 mm thick according to relevant standards and job, safety and workplace requirements |
|   | 7.6 | Weld is inspected according to relevant standards, and job and workplace requirements   |
| <b>8 Perform soldering operations</b>   | 8.1 | Job requirements are determined from engineering drawings, job sheet or supervisor  |
|   | 8.2 | Materials are prepared for soldering using correct tools, equipment, materials and procedures   |
|   | 8.3 | Materials are soldered according to relevant standards and job, safety and workplace requirements   |
|   | 8.4 | Soldered joints are performed according to relevant standards and job, safety and workplace requirements  |
|   | 8.5 | Soldered joints are inspected according to relevant standards and job, and workplace requirements   |
|   | 8.6 | Materials are desoldered using correct procedure and minimising damage to materials/components  |
| <b>9 Select and use sealants, adhesives, bonding agents, gaskets and packings</b> | 9.1 | Job requirements are determined from engineering drawings, job sheet or supervisor  |
|   | 9.2 | Gaskets and packings are selected and used according to job requirements and manufacturer/component supplier instructions   |
|   | 9.3 | Sealants and adhesives are selected and used according to job requirements and manufacturer/component supplier instructions   |
|   | 9.4 | Plastic bonding is performed according to job requirements and manufacturer/component supplier instructions   |
|   | 9.5 | Sealants, adhesives, bonding agents, gaskets and packings are stored according to workplace and manufacturer/component supplier instructions  |



## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Heat treatment process include one or more of the following:

- annealing
- hardening
- normalising
- tempering

Hand tools include one or more of the following:

- anvil
- benders
- brushes
- chisels
- chucks
- cutters
- drills
- drivers
- files
- gear pullers
- hacksaws
- hammers
- nippers
- pliers
- punchers
- reamers
- scissors
- scrapers
- spanners

- swage block
- taps and dies
- vices
- wrenches

Hand power tools include one or more of the following:

- drills
- grinders
- hand shear and nibbler
- impact wrenches
- portable jigsaw
- sanders

Pipe work defects include one or more of the following:

- ovality
- thinning

Machine tools include one or more of the following:

- drills
- grinder
- lathes
- milling machines

Welding process include one or more of the following:

- gas metal arc welding
- gas tungsten arc welding
- oxy-acetylene welding
- shielded metal arc welding

Joints include one or more of the following:

- butt
- fillet joints:
- corner joints
- lap joints
- tee joint plate edge preparations
- throat length with concave and convex reinforcement

Soldered joints include one of the following :

- hard
- soft

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARC5001A Employ tools, equipment and materials.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC018 Employ tools, equipment and materials in a shipboard context**

## **Modification History**

Release 2. Duplication of information removed from Application.

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- communicating procedures associated with using hand and machine tools and equipment verbally and in writing
- identifying methods, procedures and materials needed for operating hand and power tools on vessels
- initiating timely action in response to defects or damage
- reading and interpreting written information related to operating tools and equipment used for maintenance operations on board vessels, including technical manuals and specifications
- safely using hand and machine tools.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics, limitations and use of metals and non-metallic materials used in ship construction and repair
- hand and power tools and component:
  - types
  - operational characteristics and performance specifications
  - maintenance
- heat treatment:
  - material characteristics
  - applications, equipment and processes
  - emergency procedures
  - material preparation, quenching, preheating requirements
  - material condition during heat treating process

- batch and/or piece loading of furnaces
- safe loading of furnaces
- hazards and control measures associated with heat treatment, including housekeeping
- use and application of personal protective equipment (PPE)
- safe work practices and procedures
- machine tools:
  - reasons for selecting chosen sequence of operations
  - methods of work holding
  - basic marking out techniques including datum points/lines
  - geometry of cutting tools for a range of materials and applications
  - benefits of using correctly sharpened cutting tools
  - machine operation
  - selection of feeds and speeds to suit a range of materials and operations within the scope of this unit
  - correct methods of mounting a variety of cutting tools
  - safety issues with regard to correct clamping, guards and shields
  - tolerances and limits of size
  - situations indicating need for machine adjustment, lubrication and cleaning
  - techniques, tools and equipment to measure materials and machined components
  - use and application of PPE
  - safe work practices and procedures
  - hazards and control measures associated with general machining
- materials used in ship construction and repair:
  - metallurgy principles
  - types of materials
  - limitations of materials
  - properties of materials
- national and international regulations, International Maritime Organization (IMO) Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders applicable to managing shipboard plant and equipment maintenance and repair operations on vessels
- own ability and limits to rectify irregularities and faults
- pipe work:
  - installation techniques
  - purging techniques, applications and precautions
  - capping/sealing pipe work and assembly methods
  - identifying location/layout of pipe work and assemblies, and application and characteristics of enclosure/hanging/supporting systems
  - pipe work, ancillary installation and joining procedures
  - leak testing applications and uses

- procedures for completing temporary and permanent repair and/or replacement procedures for plant and equipment on board vessels at sea, alongside and in dry dock
- properties and parameters of engineering materials
- safety data sheets (SDS)/material safety data sheets (MSDS)
- sealants, gaskets, bonding agents, adhesives and packing:
  - dangers of working with sealants and adhesives
  - operating principles of gaskets and their relationship to other components
  - types, characteristics, uses and limitations of sealants and adhesives
  - gasket installation procedures
  - sealant and adhesives application techniques
- soldering:
  - cleaning solutions and properties, and cleaning procedures
  - use and application of PPE for manual soldering/desoldering
  - methods of joint preparation
  - properties of fluxes and their uses
  - heat and damage protection procedures
  - procedures for preventing electrostatic discharge damage
  - soldered joint testing and inspection procedures
  - reworking procedures and precautions
- testing procedures for materials under load:
  - compressive load testing procedures
  - shear load testing procedures
  - tensile load testing procedures
- welding:
  - characteristics and properties of common metals and welding materials
  - effect of gas and electrical welding operations on metals
  - hazards and control measures associated with gas and electrical welding, including housekeeping
  - welding safety practices and procedures
  - effect of various treatments on a range of commonly used metals
  - use and application of PPE
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC019 Transmit and receive information by marine VHF radio within Australian Territorial Waters**

## **Modification History**

Release 1. This unit first released with MAR Maritime Training Package Version 2.0.

## **Application**

This unit involves the skills and knowledge required to transmit and receive information by marine very high frequency (VHF) radio on a vessel according to regulations and includes operating an emergency position indicating radio beacon (EPIRB).

This unit applies to all boaters using marine VHF radio equipment to transmit and receive information to and from shore and vessel-based operators within Australian Territorial Waters – defined as all waters within 12 nautical miles from the coastal baseline.

This unit is consistent with the requirements of the Radiocommunications (Maritime Ship Station – 27 MHz and VHF) Class Licence 2001.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |   |
|---|---|
| <b>1 Operate VHF radio equipment to transmit and receive messages</b> | 1.1 VHF radio equipment is selected for operation within limits of specifications                             |
|   | 1.2 VHF radio equipment is operated to transmit and receive various types of signal according to manufacturer |



		instructions, established radio operation procedures and regulatory requirements
	1.3	Regulations and procedures applicable to vessel stations equipped with radio and digital selective calling (DSC) facilities are applied during radio communication
	1.4	Work health and safety/occupational health and safety (WHS/OHS) procedures and hazard control strategies are applied when operating radio equipment
<b>2 Access search and rescue VHF radio facilities</b>	2.1	Information that may be required is identified and documented
	2.2	Request is made to the appropriate organisation for the provision of the information in the required format and on the correct channel
	2.3	Information is provided and received in the required format and on the correct channel
<b>3 Operate an EPIRB in a distress situation</b>	3.1	Routine checks are carried out on EPIRBs to confirm their operational capability according to manufacturer instructions and specifications
	3.2	EPIRB is operated according to manufacturer instructions and regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Literacy - required for reading and interpreting regulations and procedures and documenting communication problems.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Radio communications involves the application of principles of marine radio and Digital Selective Calling (DSC) to accurately transmit and receive messages, including distress calls. Use of correct procedures for transmitting and receiving signals using VHF equipment is required.

Radio communication includes one or more of the following:

- Distress, Urgency and Safety communications
- normal vessel to vessel service (ship to ship)
- normal vessel to shore service (ship to shore)

Organisations with which radio communication may be conducted include one or more of the following:

- coast stations
- fishing organisations and co-operatives
- limited coast stations
- private shore stations, including boating clubs
- state/territory police forces

Available radio services include one or more of the following:

- Automated Weather Stations
- DSC
- public communications
- scheduled broadcasts (skeds)
- search and rescue

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC019 Transmit and receive information by marine VHF radio within Australian Territorial Waters**

## **Modification History**

Release 1. This unit first released with MAR Maritime Training Package Version 2.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accurately and consistently using VHF equipment to send and receive messages and signals under normal and emergency situations according to international and national VHF radio regulations/standards
- applying the principles of marine radio and DSC to accurately transmit and receive messages, including distress calls
- cancelling an inadvertent Distress Alert or call
- carrying out radio communications in compliance with the relevant sections of the maritime provisions of the Radio Regulations adopted by the World Radiocommunication Conference (as amended), including Chapters VII and IX
- communicating effectively with other stations by using standard voice procedure, the phonetic alphabet, push to talk (PTT) switch and common radio terminology
- deploying an EPIRB
- sending and receiving Distress Alerts, and Urgency and Safety announcements by DSC
- sending, acknowledging and relaying Distress, Urgency and Safety communications by voice using recognised format
- setting up VHF equipment for use including selecting the channel, adjusting transmitter power level, adjusting squelch and using dual watch facility
- using correct procedures for transmitting and receiving signals using VHF equipment

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles of and procedures for marine VHF radio communications
- basic understanding of the Australian maritime search and rescue system, including satellite distress beacons

- EPIRB frequencies:
  - 406 MHz
  - 121.5/MHz (homing)
- marine VHF repeater stations
- methods of communicating vessel position
- procedures for transmitting and decoding the phonetic alphabet
- purpose of monitoring the VHF Channel 70 used for DSC, including an awareness of the procedures used in making a DSC Distress Alert, Urgency and Safety Announcement
- sections of relevant regulations related to marine VHF radio communications
- VHF radio calling, replying and relaying procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment must occur in operational situations where it is appropriate to do so or where this is not available, assessment must occur via an online radio simulator or simulated VHF radio communications activities and exercises covering a range of normal and emergency communication situations that are typically experienced on a vessel.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- VHF transceiver equipment – either fixed or handheld, or approved PC based simulator, which includes a DSC facility
- documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals including:
  - Marine Radio Operators VHF Handbook
  - Radiocommunications Act 1992 including
  - Radiocommunications (Maritime Ship Station – 27 MHz and VHF) Class Licence 2001
  - Relevant State legislation – for carriage requirements
- a range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC022 Perform mooring and unmooring activities

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to carry out mooring and unmooring activities according to relevant requirements and regulations.

This unit applies to people working in the maritime industry as a Linesperson.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare a berth

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Relevant documentation and records are identified and accessed as required

1.2 Positioning information is obtained, checked and confirmed

as accurate

- 1.3 Bridge marker is set
- 1.4 Briefing is obtained and interpreted on issues related to mooring or unmooring operation
- 1.5 Communications equipment is prepared and set to correct channels
- 1.6 Berth conditions are checked, and made clear and ready for mooring and unmooring
- 1.7 Portainer cranes and gantries/loaders are correctly positioned for berthing of vessel
- 1.8 Safety concerns are communicated to pilot of vessel with due care not to interfere with tug and vessel communications

## **2 Receive heaving line from mooring launch**

- 2.1 First lines are received from mooring launch according to operational procedures and pilot directions
- 2.2 Assistance is provided in pulling mooring line ashore and making it fast to applicable bollard/hooks
- 2.3 Required precautions and safety procedures are followed during receival operations
- 2.4 Correct method for crossing mooring lines over and between another vessel's mooring lines is followed
- 2.5 When another vessel occupies the bollard, mooring line is dipped as required

## **3 Receive heaving lines from vessel**

- 3.1 First lines are received and are made fast to appropriate bollards/ hooks
- 3.2 Two headlines and two sternlines are made available each to two different bollards/hooks
- 3.3 Spring lines from forward and aft are received from vessel and are attached to applicable bollards/hooks
- 3.4 Additional lines are received from vessel and are attached to applicable bollards/hooks
- 3.5 Correct method for crossing mooring lines over and between another vessel's mooring lines is followed
- 3.6 When another vessel occupies the bollard, mooring line is

- dipped as required
- 3.7 Safe distance from snapback zones and demarcated area is maintained during line tensioning
- 4 Return heaving line to vessel**
- 4.1 Vessel crew is made aware of planned heaving line return operations
- 4.2 Lines are returned according to operational procedures
- 4.3 Required precautions and safety procedures are followed during heaving line return operations
- 5 Land a gangway**
- 5.1 Precautions are taken to ensure all personnel are well clear of vicinity of gangway
- 5.2 Vehicle is used to locate gangway in correct position in a safe and efficient manner
- 6 Let go of vessel**
- 6.1 Vessel crew is made aware of intentions to let go
- 6.2 Singling up processes are carried out according to operational procedures and required safety precautions
- 6.3 Due care is taken during singling up processes to ensure all mooring lines are kept clear of propeller
- 6.4 Due care is taken when waiting for order for remaining lines to be released, to stand clear of remaining lines because of tension to which lines may be subjected
- 6.5 Once order is given, remaining lines are released according to operational procedures and required safety precautions
- 6.6 Stand clear procedures are immediately implemented when vessel crew inadvertently heaves on a line being handled by the shore-side team
- 6.7 Required precautions and safety procedures are followed during unmooring operations

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Relevant documentation and records include one or more of the following:

- mooring and unmooring plans, procedures, checklists and instructions
- relevant maritime authority instructions
- relevant sections of maritime regulations concerning mooring and unmooring operations
- reports and records of mooring and unmooring operations or safety incidents
- rope and equipment manufacturer instructions and procedures
- safety instructions and procedures
- bollard/hook and capstan numbers
- special circumstances

Issues related to mooring or unmooring operations include one or more of the following:

Made clear and ready for mooring includes one of the following:

- removing obstructions
- stopping any work that creates excessive dust or noise

Safety precautions include:

- checking:
  - own personal fitness and medical wellbeing
  - whereabouts of edge of wharf
  - whereabouts of other members of mooring and unmooring team
- confirming availability of a personal flotation device on arrival at mooring and unmooring operation
- keeping clear of snapback zone and demarcated areas
- keeping work area hazard-free
- obtaining and using required PPE (such as safety footwear, safety helmet, suitable gloves, safety vest and reflective clothing, personal life vest, safety glasses)
- removing rings from fingers to avoid them being caught on steel wire ropes
- wearing suitable clothing

Mooring or unmooring operations include

- landing a gangway
- positioning lines launch
- positioning mooring lines
- preparing a berth
- receiving mooring lines under a vessel
- receiving heaving line from:
  - a launch

- a vessel
- returning heaving line to a vessel
- towing mooring lines using vehicles
- unmooring and letting go a vessel
- working:
  - by day or night
  - in normal and emergency situations
  - under any permissible conditions of weather
  - at various shore-side terminals and wharves

## Unit Mapping Information

This unit replaces and is equivalent to MARC1001A Carry out shore-based mooring and unmooring operations.

MARC1001A replaces and is equivalent to TDMMR5607A Carry out shore-based mooring and unmooring operations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC022 Perform mooring and unmooring activities

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- being aware of own ability and limits to rectify irregularities and faults
- communicating effectively with other personnel when mooring and unmooring a vessel using standard nautical terms
- complying with relevant maritime regulations and International Maritime Organization (IMO) Conventions and Codes, including the relevant sections of the Australian Maritime Safety Authority (AMSA) Marine Orders as they apply to mooring and unmooring operations on ocean-going vessels
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- following all orders carefully and systematically
- following work instructions
- handling mooring lines on deck of lines launch, flaking and positioning of mooring lines
- handling rope appropriately and correctly:
  - storing and caring for ropes and lines
  - tying knots such as bowline, reef knot, overhand knot, figure of eight knot, sheet bends and clove hitch and splicing and whipping, round turn two half hitches
  - applying a chain stopper to a wire rope
  - heaving on a line in collaboration with other members of a mooring team
  - applying a stopper to a synthetic fibre rope
  - applying a chain stopper to a natural cordage rope
  - attaching a line to a bollard or bitt with all lines in correct order such as up through the eye
  - flaking down a rope
- handling wire mooring lines in lines launch
- identifying and correctly using:
  - various types of ropes, steel wires and mooring equipment
  - personal protective equipment (PPE)

- implementing port and vessel security procedures
- initiating timely action in response to defects or damage
- interpreting and following procedures for mooring and unmooring operations, including safety instructions and precautions
- recognising dangers and hazards before and during mooring and unmooring operations, and taking appropriate action to report and/or rectify them
- recognising problems that may occur during mooring and unmooring operations and taking appropriate action to report and/or resolve them
- taking proper care of ropes and mooring equipment
- using various vehicles for towing mooring lines, as required
- working effectively as a member of a mooring and /or unmooring team.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- awareness of line launches propeller when towing mooring lines
- communications techniques and equipment required during mooring and unmooring operations
- correct method of crossing ship's mooring lines over and or between other vessel's mooring lines already berthed
- dangers associated with mooring systems:
  - being hit by a heaving line being thrown down from a vessel
  - stepping inside the bight of a line
  - being struck by a parting line
  - mixing rings and wire rope
  - falling off the edge of the wharf into the water
  - back strain from carrying a line, heaving on a line or heaving on a line
  - 'snap back' when a line breaks
  - trip hazards such as crane lines
- factors that affect mooring and unmooring operations, including the effects of wind, weather, tides, sea conditions, currents, draft changes and surges from passing vessels on mooring and unmooring operations
- hazards and problems, and appropriate preventative and remedial action and solutions
- maritime regulations applicable to mooring and unmooring vessels
- methods for mooring and unmooring a vessel, including all required rope handling techniques and precautions
- operational characteristics of different types of lines, equipment and facilities used in mooring and unmooring operations

- operational procedures and layouts of various types of shore-side loading and discharging terminals and wharves
- PPE required for use during mooring and unmooring operations
- procedures for assessing stresses on lines and gear used in mooring and unmooring operations
- reason for and correct method of dipping mooring line
- relevant manufacturer guidelines relating to use of machinery, including instructions on equipment capability and limitations
- relevant sections of the Standards of Training, Certification & Watchkeeping (STCW) 95 and AMSA Marine Orders
- relevant work WHS/OHS codes of practice, policies and procedures
- safety drills and equipment used for lines launch
- snapback zone and demarcated areas
- standard nautical terms in relation to mooring activities and related equipment
- technique for releasing fouled mooring lines under wharfs and around ship anchors.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions where mooring and unmooring activities can be demonstrated.

Resources for assessment include access to:

- a range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and PPE currently used in industry
- bridge marker:
  - at night vehicle with flashing hazard light
  - flag
- vehicles used for towing mooring lines.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC023 Operate and maintain a boiler

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate and perform basic maintenance on a boiler according to relevant workplace practices and codes of practice. It includes operating a boiler, monitoring performance and maintaining its operational condition during use.

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Select and use personal protective equipment

- 1.1 Personal protective equipment (PPE) is selected for use according to statutory requirements and workplace procedures
- 1.2 Functions that require use of personal PPE are selected to enable function to be risk assessed

- |  |   |
|--|---|
| <b>2 Carry out pre-operational safety checks</b>           | 2.1 Boiler components are identified and operated according to organisational operating procedures  |
|  | 2.2 Boiler pre-operational safety checks are conducted according to statutory requirements and standard operating procedures                                  |
|  | 2.3 Maintenance requirements are identified and reported according to workplace procedures  |
| <b>3 Maintain health and safety standards in work area</b> | 3.1 Hazards and potential hazards in work area are identified according to statutory requirements and workplace procedures                                    |
|  | 3.2 Hazards are reported according to statutory requirements and workplace procedures   |
|  | 3.3 Prevention/control measures are selected according to organisational practice   |
|  | 3.4 Boiler chemicals are stored and handled according to statutory requirements, manufacturer recommendations and workplace procedures                        |
| <b>4 Operate and monitor boiler</b>                        | 4.1 Boiler is started and brought online safely, according to statutory requirements, workplace procedures and organisational safety management systems (SMS) |
|  | 4.2 Operating status of boiler is monitored according to statutory requirements, workplace procedures and organisational SMS                                  |
|  | 4.3 Boiler water quality tests are conducted according to workplace procedures and organisational SMS   |
|  | 4.4 Boiler water is adjusted as a result of tests, to meet manufacturer recommendations and workplace criteria  |
|  | 4.5 Operating log is maintained clearly and accurately, according to statutory requirements   |
| <b>5 Shut down boiler</b>                                  | 5.1 Boiler is shut down according to statutory requirements, workplace procedures and organisational SMS  |
|  | 5.2 Documentation is maintained according to workplace and organisational requirements  |
| <b>6 Carry out routine maintenance on boiler</b>           | 6.1 Maintenance requirements are identified and reported according to workplace requirements  |
|  | 6.2 Boiler is cleaned internally and externally according to  |



statutory requirements and workplace procedures

- 6.3 Boiler valves and fittings are removed for maintenance according to statutory requirements and organisational SMS
- 6.4 Precautions for entry into confined spaces are observed according to and organisational SMS

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Personal protective equipment includes one or more of the following:

- chemical resistant gloves and apron
- ear protection (muffs or plugs)
- eye protection
- fire-resistant clothing
- hard hat head protection
- respiratory devices
- thermally insulated gloves
- working protective gloves

Boiler components must include:

- ash pan and damper
- boiler controls and safety devices
- lighting and visual warning systems
- oil burning apparatus
- valves

Pre-operational safety checks must include:

- boiler water level
- checks of feed water supply and system
- combustion air supply system
- combustion equipment
- essential fittings
- firefighting equipment
- fuel supply/heat source system
- identifying and managing hazards and maintenance problems
- inspecting and locating explosion doors

Hazards and potential hazards include one or more of the following:	<ul style="list-style-type: none"><li>• operation and position of boiler valves</li><li>• selecting PPE</li><li>• boiler low water condition</li><li>• chemical hazards</li><li>• excessive noise</li><li>• hot exposed steam pipe</li><li>• lack of machinery guards</li><li>• leakage of:<ul style="list-style-type: none"><li>• boiler<ul style="list-style-type: none"><li>• fuel</li><li>• gas</li></ul></li></ul></li><li>• manual handling hazards</li><li>• obstructions and defects in work area</li><li>• poor illumination of work area</li><li>• rubbish and combustibles in area</li><li>• thermal hazards</li></ul>
Chemicals include one or more of the following:	<ul style="list-style-type: none"><li>• extinguishing agent's carbon dioxide</li><li>• feed water additives</li><li>• organic foam and dry powder</li><li>• oxygen scavenger</li><li>• soda acid</li></ul>
Operating log must include:	<ul style="list-style-type: none"><li>• boiler status and operation</li><li>• chemical treatment</li><li>• maintenance/repair requirements</li><li>• steam pressure</li><li>• test results</li><li>• time in use</li></ul>
Documentation includes one or more of the following:	<ul style="list-style-type: none"><li>• boiler certificate</li><li>• boiler operational records and user log books</li><li>• emergency procedures and instructions</li><li>• maintenance notices, records and requests</li><li>• operational instructions, policies and procedures</li></ul>
Maintenance requirements include one or more of the following:	<ul style="list-style-type: none"><li>• blow down valve</li><li>• boiler steam pressure gauge</li><li>• feed water stop valve</li><li>• flame failure detection device</li><li>• gauge glasses</li><li>• main steam stop valve</li><li>• safety valves</li><li>• water level controller</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARC3002A Operate and maintain a boiler.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC023 Operate and maintain a boiler

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- applying precautions and required action to minimise, control or eliminate hazards that may exist when operating and monitoring boiler
- communicating effectively with others when operating and monitoring boiler performance
- completing documentation related to operating and monitoring boiler performance
- identifying and assessing boiler defects and deficiencies, and taking appropriate action to report, isolate, repair or replace identified defective equipment
- implementing contingency plans for emergencies
- initiating timely action in response to defects or damage
- providing required amount and level of detail in recordkeeping and reports
- reading and interpreting instructions, procedures, information and signs relevant to operating and monitoring boiler
- selecting and using required personal protective equipment that conforms to industry and WHS/OHS standards.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable legislation relating to steam plant and nationally approved compliance codes and/or guidelines, and codes of practice
- basic principles of boiler operation, monitoring devices, ancillary systems
- boiler controls, instruments and indicators and their purpose, location and use
- methods for:
  - adjusting controls to maximise efficient and safe running
  - carrying out minor maintenance, cleaning and servicing boiler
  - managing safety incidents and hazardous situations that may arise when operating and monitoring boiler performance
  - operating and monitoring performance of boiler ancillary equipment
- personal protective equipment (PPE) required when operating boiler and procedures for its use
- principles for starting up, operating, monitoring and shutting down boiler
- procedures to be followed:
  - when there is an emergency when operating boiler
  - for confined space entry
- relevant licensing, legislative, regulatory or certification requirements
- relevant WHS/OHS and environmental procedures and regulations
- requirements for completing relevant documentation during and after operating and monitoring boiler performance
- typical faults that can occur with boiler and related action that should be taken to repair, isolate, replace, report and record faulty equipment.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where operating and maintaining a boiler can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry to operate and maintain a boiler

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC024 Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and perform basic maintenance on a reciprocating steam engine up to 750 kW nominal propulsion power according to relevant workplace practices and codes of practice. It includes operating controls, monitoring performance and maintaining operational condition of reciprocating steam engines and steam auxiliary equipment during use.

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare vessel for sea**

1.1 Spares and stores on board are checked to ensure those required for proposed voyage are available

- 1.2 Personal protective equipment (PPE) is selected for use
- 1.3 Hazardous materials are stowed and managed according to regulatory and organisational requirements
- 1.4 Work health and safety/occupational health and safety (WHS/OHS) hazards and potential hazards in engine room are identified and corrective action is taken according to organisational practices
- 1.5 Pre-start checks are conducted on machinery and equipment according to organisational procedures
- 1.6 Means of communication between bridge and engine room are tested
- 1.7 Engines are started according to vessel procedures and organisation safety management systems (SMS)
- 2 Operate and monitor steam engine and steam auxiliary machinery**
  - 2.1 Marine steam plant components are identified and operated according to organisational operating procedures
  - 2.2 Steam engine handling techniques are interpreted and applied to eliminate or minimise risk of injury to personnel or damage to equipment
  - 2.3 Steam plant controls are identified and operated safely according to organisational procedures and technical specifications
  - 2.4 Steam engine auxiliary equipment is monitored and operated to maintain optimum running conditions
  - 2.5 Operational faults are recognised, assessed and rectified according to organisational procedures
  - 2.6 Hazards and potential hazards are recognised and interpreted, and appropriate initiatives and action is taken to minimise risk to personnel and equipment according to workplace procedures and applicable regulatory requirements
  - 2.7 Operating log is maintained clearly and accurately according to statutory requirements
- 3 Shut down steam engine**
  - 3.1 Engine is shut down according to vessel procedures and organisation SMS
  - 3.2 Steam auxiliary systems are shut down according to vessel procedures and organisation SMS



- |   |     |   |
|---|-----|---|
|   | 3.3 | Documentation is maintained according to workplace and organisational requirements  |
| <b>4 Carry out maintenance of steam plant</b> | 4.1 | Maintenance requirements are identified, repairs are carried out and reported according to workplace procedures                                   |
|   | 4.2 | Engine and auxiliary equipment is regularly inspected and maintained for maintenance according to statutory requirements and workplace procedures |
|   | 4.3 | Steam plant maintenance schedule is developed and implemented according to organisational planned maintenance system                              |

## Foundation Skills

*This section describes those language, literacy, numeracy and employment skills that are essential to performance.*

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |  |
|--|--|
| Personal protective equipment includes one or more of the following: | <ul style="list-style-type: none"><li>• chemical resistant gloves and apron</li><li>• ear protection (muffs or plugs)</li><li>• eye protection</li><li>• fire-resistant clothing</li><li>• hard hat head protection</li><li>• respiratory devices</li><li>• thermally insulated gloves</li><li>• working protective gloves</li></ul> |
| Hazards and potential hazards include one or more of the following:  | <ul style="list-style-type: none"><li>• chemical hazards</li><li>• excessive noise</li><li>• hot exposed pipes</li></ul>   |

	<ul style="list-style-type: none"><li>• lack of machinery guards</li><li>• leakage of:<ul style="list-style-type: none"><li>• fuel</li><li>• gas</li></ul></li><li>• manual handling hazards</li><li>• obstructions and defects in work area</li><li>• poor illumination of work area</li><li>• rubbish and combustibles in work area</li><li>• thermal hazards</li></ul>
Pre-start checks must include:	<ul style="list-style-type: none"><li>• checks of cooling water supply and system</li><li>• essential fittings</li><li>• firefighting equipment</li><li>• fuel supply/heat source system</li><li>• identifying and managing hazards and maintenance problems</li><li>• operation and position of steam engine valves</li><li>• selecting PPE</li></ul>
Means of communication includes one or more of the following:	<ul style="list-style-type: none"><li>• bell systems</li><li>• telegraphs</li><li>• voice pipe</li></ul>
Marine steam plant components include one or more of the following:	<ul style="list-style-type: none"><li>• boiler controls and safety devices</li><li>• condensers</li><li>• cylinder cocks</li><li>• economisers</li><li>• feed water controls</li><li>• feed water heaters</li><li>• lever driven long stroke feed pump</li><li>• lubricators</li><li>• operational controls</li><li>• short stroke pump</li><li>• steam plant instrumentation (gauges)</li><li>• vacuum pumps (air pumps)</li><li>• valve gear</li></ul>
Steam engine auxiliary equipment includes one or more of the following:	<ul style="list-style-type: none"><li>• blower</li><li>• feed water pump</li><li>• generator</li><li>• injectors</li><li>• valves</li><li>• water treatment systems</li><li>• whistle</li></ul>
Operating log includes one or more of the following:	<ul style="list-style-type: none"><li>• chemical treatment</li><li>• maintenance/repair requirements</li></ul>

	<ul style="list-style-type: none"><li>• status and operation</li><li>• test results</li><li>• time in use</li></ul>
Documentation includes one or more of the following:	<ul style="list-style-type: none"><li>• emergency procedures instructions</li><li>• maintenance notices, records and requests</li><li>• operational instructions, policies and procedures, records and user log books</li></ul>
Maintenance requirements include one or more of the following:	<ul style="list-style-type: none"><li>• bilge pumps</li><li>• cooling water valves</li><li>• gauge glasses</li><li>• safety valves</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARC3003A Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC024 Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out lubrication processes on an item of steam plant
- communicating effectively with others when operating and monitoring performance of an item of steam plant
- completing documentation related to operating and monitoring performance of an item of steam plant
- identifying and assessing steam plant defects and deficiencies, and taking appropriate action to report, isolate, repair or replace identified defective equipment according to workplace procedures
- implementing contingency plans for emergency situations
- monitoring performance of an item of steam plant
- operating an item of steam plant
- providing required amount of detail in reports and recordkeeping
- reading and interpreting instructions, procedures, information and signs relevant to operating and monitoring an item of steam plant
- recognising problems that may arise when operating and monitoring an item of steam plant and taking appropriate action
- selecting and using required personal protective equipment (PPE) that conforms to industry and WHS/OHS standards.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- own ability and limits to rectify irregularities and faults
- applicable legislation relating to steam plant and nationally approved compliance codes and/or guidelines and codes of practice
- basic principles of steam plant operation, monitoring devices and auxiliary systems
- lubricants including open steam engine oils, enclosed crankcase steam engine oils, compounded steam cylinder oils and non-compounded steam cylinder oils
- methods for:
  - adjusting controls to maximise efficient and safe running
  - operating and monitoring performance of auxiliary steam plant equipment
  - identifying equipment defects and assessing them for appropriate action
- PPE required when operating an item of steam plant and procedures for its use
- procedures for:
  - operating and monitoring an item of steam plant
  - managing safety incidents and hazardous situations that may arise when operating and monitoring performance of an item of steam plant
  - maintaining, cleaning, lubricating and servicing an item of steam plant
- procedures to be followed in an emergency when operating an item of steam plant
- relevant licensing, legislative, regulatory or certification requirements
- relevant WHS/OHS and environmental procedures and regulations
- requirements for completing relevant documentation during and after operation and monitoring of performance of an item of steam plant
- steam plant controls, instruments and indicators and their purpose, location and use
- typical problems that can occur with an item of steam plant and related action that should be taken to repair, isolate, replace, report and record faulty equipment.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where operating and maintaining a steam engine up to 750 kW and steam auxiliary equipment can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry when operating and maintaining a steam engine

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC025 Operate and maintain engines for auxiliary systems other than steam auxiliary systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and perform basic maintenance on non steam driven auxiliary systems according to relevant workplace practices and codes of practice. It includes operating controls, monitoring performance and maintaining operational condition of auxiliary equipment during use.

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare for sea**

- 1.1 Spares and stores required for proposed voyage are acquired
- 1.2 Preparations and checks are completed prior to sailing
- 1.3 Flammable/explosive materials are stowed and managed

- hr/>
- according to regulatory and organisational requirements
- 1.4 Engines are started according to manufacturer specifications and organisational requirements
- 1.5 Deviations from norm are promptly identified and rectified or referred
- 1.6 Adjustments are made to achieve a safe and efficient operation
- 1.7 Inability to start engine is reported, and logged promptly and accurately to appropriate personnel
- 2 Operate internal combustion engines and auxiliary systems**
- 2.1 Engines and auxiliary systems are operated within technical specifications
- 2.2 Engines and auxiliary systems are operated and monitored to ensure they are within operating limits specified by organisational procedures and manufacturer recommendations
- 2.3 Environmental implications associated with operating engines and auxiliary systems are identified and controlled
- 2.4 Operational faults are recognised and rectified according to manufacturer specifications and fault-finding methods
- 2.5 Appropriate action is taken in a malfunction or emergency
- 3 Secure machinery after voyage**
- 3.1 Vessel, equipment and machinery are locked down according to manufacturer specifications and organisational procedures
- 3.2 Operational records are completed according to workplace procedures
- 3.3 Damage and repairs requiring action are reported according to workplace procedures
- 4 Plan maintenance activities**
- 4.1 Maintenance plan is accessed to determine maintenance requirements for engines and auxiliary systems
- 4.2 Inspections are conducted and additional non-routine maintenance requirements are determined
- 4.3 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work



## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Spares and stores include one or more of the following:

- appropriate oils and grease
- cleaning material
- machinery spare parts
- shackles and other lifting equipment
- tools, hand and power

Preparations and checks must include:

- checking:
  - coolants levels
  - fuel level
  - filters
- confirming correct pressures of auxiliary systems
- dip oil
- inspecting:
  - batteries and turn on isolator
  - for leaks and faults
  - safety guards, power take off stubs and shafts
- lubrication
- opening valves as appropriate
- power leads
- spares and stores
- stowage of LPG cylinders

Flammable/explosive materials include one or more of the following:

- liquid fuels
- LPG
- refrigerant gas

Engines and auxiliary systems include one or more of the following:

- auxiliary equipment and associated spaces
- cooling systems
- lubricating systems
- marine two- and four-stroke diesel engines
- paddle and shafting arrangements
- propeller and immediate shafting alignment
- pumping systems

- refrigeration systems
  - steering systems
  - excessive noise and exhaust emissions
  - loss of fuel and oil overside
- Environmental implications must include:
- failure of the auxiliary engines
  - fire
  - flooding
  - loss of steering
- Emergencies include one or more of the following:
- maintenance logs
  - running logs
- Operational records include one or more of the following:
- cleaning:
    - coolers
    - filters
  - greasing
  - maintaining emergency equipment
  - oiling
  - oily water separator
  - overhauling and repairing pumps
  - scheduled survey inspections
  - topping up oils
- Maintenance requirements include one or more of the following:

## Unit Mapping Information

This unit replaces and is equivalent to MARC3004A Operate and maintain engines for auxiliary systems other than steam auxiliary systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC025 Operate and maintain engines for auxiliary systems other than steam auxiliary systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- attending to appropriate level of detail in recordkeeping
- managing:
  - refrigerant gases
  - lubricating systems and prevent pollution of marine environment
  - cooling systems
  - pumping systems and prevent pollution of marine environment
- operating and maintaining steering systems
- operating marine auxiliary internal combustion engines within technical specifications
- preparing machinery for sea
- recognising and rectifying operational faults
- securing machinery after voyage

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic constructional parts of marine auxiliary internal combustion engines
- bilge pumping for vessels with several compartments
- common faults in steering gear
- construction and maintenance of heat exchangers
- corrosion prevention
- cross connections between bilge/ballast/seawater systems and fire main
- dangers associated with:
  - back-flooding and methods to prevent back-flooding

- LPG and petrol vapour
- dangers of refrigerant gas leaks in confined spaces
- diesel engine:
  - construction
  - fuel injection, timing and control equipment
  - operation and routine maintenance
- dry sump and wet sump lubrication systems
- electro-hydraulic steering gear
- emergency steering
- engine:
  - performance and reasons for lack of performance
  - protection arrangements
- heat exchanger, keel cooler and raw water cooling systems
- own ability and limits to rectify irregularities and faults
- oil quality monitoring and filter changing procedures
- planned maintenance
- preparations and checks necessary before sailing
- pump capabilities and requirements for priming
- relevant licensing, legislative, regulatory or certification requirements
- routine maintenance on steering systems
- seawater circulating systems
- securing machinery after voyage
- shutting down machinery
- storage and testing of LPG cylinders
- testing of steering gear
- two- and four-stroke cycles of operation
- types of pumps and safety devices

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where operating and maintaining engines for auxiliary systems can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC026 Operate remote controls of propulsion plant and engineering systems

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to remotely operate shipboard plant, propulsion systems, auxiliary machinery and equipment according to technical specifications and within safe operating limits at all times.

This unit applies to individuals working in the maritime industry as a Master on vessels up to 3000 gross tonnes.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment operation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Operate remote controls

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Remote controls of propulsion plant, other engineering systems and auxiliary machinery are operated according to company procedures and manufacturer instructions

- 1.2 Clear and concise communication is used with engine room and communication is acknowledged according to established procedures
  - 1.3 Performance of propulsion plant, other engineering systems and auxiliary machinery and equipment is monitored and evaluated using remote performance indicators
  - 1.4 Appropriate corrective action is taken in conjunction with the Chief Engineer when performance of propulsion plant or other engineering systems is found to be unsatisfactory or outside of specified limits
  - 1.5 Relationship between speed and fuel consumption is monitored and action is taken as required according to operational instructions
  - 1.6 Safety and hazard minimisation procedures and regulations are followed to maintain the safety of personnel, propulsion and engineering systems, cargo and vessel
- 2 Coordinate deck and engine room resources**
- 2.1 Coordination of deck and engine room operations and resources is maintained during daily vessel operation
  - 2.2 Responses are coordinated and appropriate action is taken in a breakdown in the remote control systems for propulsion plant, other engineering systems and auxiliary machinery
  - 2.3 Correct logbook entries are made relating to equipment operations and incidents during a voyage
- 3 Manage emergencies involving the use of remote controls**
- 3.1 Remote controls of relevant emergency systems and auxiliary machinery and equipment are correctly operated in a shipboard emergency
  - 3.2 Clear and concise communication is used and communication is acknowledged at all times during emergency situations

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Propulsion plant and engineering systems include one or more of the following:

- auxiliary systems and controls
- bridge controls and UMS (unmanned machinery spaces) systems
- electrical systems and controls
- engineering plant performance indicators
- hydraulic systems and controls
- indicators of speed and fuel consumption
- propulsion systems and controls
- pumps and pumping systems
- steering gear
- fire or explosion in engine room
- flooding of engine room
- loss of electrical power
- loss of propulsion
- loss of steering

Emergencies include one or more of the following:

## Unit Mapping Information

This unit replaces and is equivalent to TDMMC207B Operate remote controls of propulsion plant and engineering systems.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARC026 Operate remote controls of propulsion plant and engineering systems

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- adapting to differences in vessels, propulsion plant, remote controls, engineering systems and related standard operating procedures
- applying required safety and hazard control procedures when operating vessel remote controls
- assessing operational capability and performance of propulsion and other engineering plant and auxiliary equipment
- communicating effectively and working collaboratively with other personnel when operating propulsion plant and engineering system remote controls
- identifying and evaluating problems that can occur when operating propulsion plant and engineering system remote controls
- identifying and implementing improvements to engineering control procedures
- interpreting and following standard operating procedures for operating propulsion plant and engineering system remote controls
- interpreting equipment performance readings and instrumentation
- interpreting vessel and machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams
- monitoring and evaluating performance of vessel propulsion plant, other engineering systems, and auxiliary machinery and equipment using remote performance indicators
- selecting and using equipment required for operating propulsion plant and engineering system remote controls safely:
  - in normal and emergency situations
  - in normal and adverse weather conditions
  - in berthing and unberthing operations
  - when anchoring or mooring.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- auxiliary systems and controls:
  - air starting
  - ballast water
  - bilge
  - cooling water
  - fuel
  - lubrication
  - waste management and pollution control systems
- basic principles of operation and functions of various systems and controls, including:
  - pumps and pumping systems
  - various shipboard emergency systems
  - hydraulic systems and controls
  - bridge located engine controls
  - various auxiliary systems and controls such as cooling water, fuel system, air starting, lubrication system, ballast water and bilge system
- bridge communications techniques, including issuing of engine room orders
- dangers associated with shipboard electrical plants and related hazard prevention strategies
- documentation and records such as:
  - Australian Maritime Safety Authority (AMSA) Marine Orders
  - company procedures for the remote control of propulsion plant and other engineering systems
  - instructions of relevant maritime authorities
  - International Maritime Organization (IMO) Standards of Training, Certification & Watchkeeping (STCW) Convention and Code
  - International Safety Management (ISM) Code safety management system plans, procedures, checklists and instructions
  - operational orders
  - plant and equipment manufacturer instructions and recommended procedures
  - relevant Australian and international standards
  - vessel log
- methods for remotely controlling the operation of shipboard propulsion plant and other engineering systems, including auxiliary machinery and equipment
- procedures for monitoring and evaluating the performance of propulsion plant, other engineering systems and auxiliary machinery and equipment
- procedures and precautions for bunkering operations

- procedures for coordinating deck and engineering resources
- propulsion plant configurations:
  - controllable pitch propellers (CPP)
  - direct drive shaft
  - electric diesel
  - reduction gear
  - steam
- relevant sections of applicable maritime regulations
- relationship between vessel speed and fuel consumption, including the meaning of economical revolutions per minute (RPM) and its application
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures
- requirements for waste management and control systems under the International Convention for the Prevention of Pollution from Ships (MARPOL Convention)
- typical characteristics of propulsion machinery and control systems for vessels of 500 gross tonnage or more, including operational limits, fuel consumption/speed relationships, stopping distances and turning circles at various draughts, speeds and loading
- typical problems with the remote control of propulsion plant, other engineering systems and auxiliary machinery and equipment, and appropriate preventative and remedial action and solutions
- vessel safety management system and procedures.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site where the remote operation of propulsion plant and engineering systems can be demonstrated.

Resources for assessment must include access to:

- an Australian or international commercial vessel of 500 gross tonnage or more or an integrated vessel simulator, meeting the requirements of Section A I/12 of the IMO STCW

- company procedures for the remote control of propulsion plant and other engineering systems
- ISM Code safety management system plans, procedures, checklists and instructions
- MARPOL Convention on waste management and control systems
- relevant sections of IMO STCW Convention and Code
- relevant sections of AMSA Marine Orders
- relevant international, commonwealth, state/territory WHS/OHS legislation
- tools, plant and equipment required to remotely operate propulsion plant and engineering systems.
- 

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC027 Contribute to the operation of engine equipment and associated propulsion plant**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to contribute to the operation, monitoring and evaluation of engine performance and associated propulsion plant on a vessel.

This unit applies to an Integrated Rating or Able Seafarer-Engine, who assists under the direction of the officer in charge of the engineering watch, with the operation of engine equipment and associated propulsion plant as required, on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Plan and prepare**

### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Safety issues are identified and safe operational practices are

<b>work</b>	applied to minimise risk and to control hazards
1.2	Work requirements of engine and plant are identified from the officer in charge of the engineering watch and relevant documentation
1.3	Localised engine and plant inspection is carried out according to manufacturer specifications and organisational procedures
1.4	Engine and plant operational prerequisites are established according to manufacturer specifications and organisational procedures
1.5	Sequence of recommissioning of plant is determined to suit existing circumstances according to manufacturer specifications and organisational procedures
<b>2 Operate engines and associated propulsion plant</b>	2.1
	Engines and plant are operated according to manufacturer specifications and organisational procedures
	2.2
	Performance of engines and plant is monitored to detect deviations from normal operating conditions
	2.3
	Faulty and worn engine equipment and components are identified and reported to the officer in charge of the engineering watch
	2.4
	Action is taken when an engine fails or emergencies occur to secure the engine or machinery and to maintain the safety of vessel and persons involved according to organisational procedures
<b>3 Test engines and associated propulsion plant</b>	3.1
	Tests are performed according to manufacturer specifications and organisational procedures
	3.2
	Engines and associated propulsion equipment are observed for correct operational response
	3.3
	Corrective actions are taken to rectify abnormalities according to manufacturer specifications and organisational procedures

- |   |     |   |
|---|-----|---|
| <b>4 Analyse engines and associated propulsion plant faults</b> | 4.1 | Causes of abnormal operating conditions are identified by analysing technical and operational information in a logical and sequential manner  |
|   | 4.2 | Corrective actions are taken to rectify abnormalities according to manufacturer specifications and organisational procedures  |
|   | 4.3 | Plant integrity is maintained according to manufacturer specifications and organisational procedures  |
| <b>5 Complete documentation</b>                                 | 5.1 | Correct records are logged relating to the operation and performance of engines and associated propulsion equipment, according to regulatory requirements and organisational procedures |
|   | 5.2 | Documentation is updated, and engine and plant problems, abnormalities and status are reported, according to regulatory requirements and organisational procedures                      |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |  |   |
|--|---|
| Engine and plant operational prerequisites include one or more of the following: | <ul style="list-style-type: none"><li>• anti-pollution rules and regulations</li><li>• bridge orders</li><li>• hazard control precautions and procedures</li><li>• safety rules and regulations</li><li>• survey requirements</li></ul> |
|--|---|

- Emergencies include one or more of the following:
- technical specifications
  - crankcase and gearbox explosions
  - gearbox failure
  - scavenge and uptake fires
  - starting air-line
- Tests include one or more of the following:
- auxiliary boiler water
  - lubricating oil
  - machinery cooling water

## Unit Mapping Information

This unit replaces and is equivalent to MARC3008A Operate engine equipment and associated propulsion plant.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARC027 Contribute to the operation of engine equipment and associated propulsion plant**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices, including:
  - entry into pump-room, fuel tanks and other confined spaces on a vessel
  - hazards involved in engines, propulsion plan and auxiliary equipment operation
  - pollution control
- attending to appropriate level of detail in recordkeeping
- avoiding polluting the environment
- identifying problems that occur during the operation of engines on vessels
- interpreting and following procedures for the operation, monitoring and evaluation of the performance of engines on vessels
- operating bilge and ballast systems under the supervision of the officer in charge of the engineering watch, according to manufacturer instructions and organisational procedures
- producing reliable documentation
- reading and interpreting:
  - equipment performance readings and instrumentation
  - lock out and tagging procedures
  - safety data sheets (SDSs)/material safety data sheets (MSDSs)
- recognising and reporting electrical hazards and unsafe equipment
- selecting and using tools required for operating, monitoring and evaluating the performance of engines on vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles and functions of machinery space monitoring and alarm systems
- basic principles and operational characteristics of:
  - auxiliary boilers and associated equipment
  - controllable pitch propellers (CPP)
  - direct drive propulsion systems
  - internal combustion engines
  - jet propulsion
  - marine gas engines
  - reduction boxes
  - steam turbines, gearing and associated equipment as they apply to auxiliary systems
  - thrusters (Z-pellers, azimuth, tunnel)
  - Voith Schneider Units
- basic principles of:
  - detection, identification and repair of faults
  - engine cooling and lubrication
  - fuel systems including heavy fuel oil (HFO) and diesel
  - marine control systems
- basic principles of operation of hydraulic and electronic governors and overspeed trips
- causes of electric shock and precautions to be observed to prevent shock
- hazards and problems that can occur during the operation and performance of engines, propulsion plant and auxiliary machinery and appropriate preventative and remedial actions and solutions
- methods of providing air for combustion in the vessel engine room
- national and international regulations, International Maritime Organization (IMO) Conventions and Codes, class rules applicable to the operation and performance evaluation of engines, propulsion plant and auxiliary machinery on vessels
- nature and causes of typical malfunctions and/or poor performance of engines, propulsion plant and auxiliary machinery, and the available methods for their detection and rectification
- procedures for:
  - carrying out performance evaluation of engines, propulsion plant and auxiliary machinery
  - testing and treating auxiliary boiler water, machinery cooling water and lubricating oil
- purpose of safe isolation procedures and application of lock out tags
- relevant WHS/ OHS requirements, work practices and pollution control regulations and policies
- rights and responsibilities of individuals about lock out and tagging of plant and equipment
- safe function, operation and maintenance of bilge and ballast systems
- safe operation of equipment including valves and pumps
- safe use and operation of electrical equipment including safety precautions before commencing work or repair, isolation procedures, emergency procedures and different voltages on board
- safety, environmental and hazard control precautions and procedures relevant to the operation and performance of engines, propulsion plant and auxiliary machinery

- shafting systems, oil fill stern tube, pedestal bearings, thrust bearings
- preventative strategies for scavenge and uptake fires, and starting air-line, crankcase and gearbox explosions
- typical SDSs/MSDSs, vessel and machinery specifications, machine drawings, operation manuals, electrical and control circuit diagrams.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations where the operation of engine equipment and associated propulsion plant under the direction of the officer in charge of the engineering watch can be demonstrated. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, materials, plant and equipment that replicate and are currently used in industry including:
  - alarm systems
  - auxiliary boilers and associated equipment
  - auxiliary machinery
  - fuel systems
  - gas turbines
  - hydraulic and electronic governors
  - internal combustion engines
  - marine control systems
  - overspeed trips
- personal protective equipment currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC028 Operate deck machinery, cargo handling gear and equipment on a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate deck machinery and cargo handling gear and equipment on a vessel.

This unit applies to individuals working as an Integrated Rating or Able Seafarer Deck on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

C – Equipment Operations

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Prepare for**

### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Routine pre-operational checks of deck machinery or cargo handling gear and equipment are completed prior to use

<b>operations</b>	according to manufacturer specifications and organisational procedures
	1.2 Properties of cargo being transported are identified and their impact on safety, the environment and vessel operations is established
	1.3 Preparations for operations are made and lifting equipment is set up according to organisational procedures
	1.4 Tools and equipment appropriate to work requirements are selected, checked for safety and set up for operation
	1.5 Safety equipment appropriate to work requirements are made ready and confirmed to be in good condition
	1.6 Methods of communication are established and agreed to
	1.7 Equipment faults or malfunctions are identified and reported according to organisational procedures
	1.8 Work health and safety (WHS)/occupational health and safety (OHS) hazards in work area are identified, and risks are assessed and reported according to organisational procedures
<b>2 Undertake deck machinery, cargo handling gear and equipment operations</b>	2.1 Suitable personal protective equipment is selected and used according to organisational procedures
	2.2 Hazard control procedures are identified and applied to ensure safe operation of deck machinery and cargo handling equipment
	2.3 Deck machinery and cargo handling gear and equipment are operated in a safe and controlled manner
	2.4 Performance and efficiency of deck machinery and cargo handling gear and equipment operations is monitored
	2.5 Safe operational practices are used to anticipate and control hazards
	2.6 Adverse sea and weather conditions that impact on operation of deck machinery, and cargo handling gear and equipment are identified and operational practices are adjusted to maintain safety of vessel and personnel
	2.7 Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures

- 2.8 Spill containment procedures are correctly implemented according to regulatory requirements and organisational procedures
- 3 Complete operations**
- 3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
- 3.2 Malfunctions, faults, irregular performance or damage to deck machinery and cargo handling gear and equipment are reported according to organisational procedures
- 3.3 Deck machinery and cargo handling gear and equipment are maintained and secured according to organisational procedures
- 3.4 Operational records are completed according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- Deck machinery and equipment includes one or more of the following:
- anchoring equipment
  - blocks and tackle
  - booms
  - cables and chains
  - cranes
  - derricks
  - fibre and wire ropes
  - freeing ports
  - hatches and hatch covers
  - hoists
  - internal ramps associated with bow and stern door loading arrangements

- pipeline systems – bilge and ballast suction and wells
  - side/bow/stern doors or elevators
  - valves and pumps
  - watertight doors
  - welding, brazing, cutting equipment
  - winches and capstans
  - windlasses
  - chemicals and oils
  - explosives
  - general cargo, break bulk, unitised or in containers
  - hazardous or dangerous goods
  - heavy lifts
  - liquids in portable containers
  - liquefied gas
  - livestock
  - mineral concentrates
  - refrigerated cargo
  - scrap, pig iron ingots, steel coils and sheets
  - solid bulk materials
  - timber
  - chain blocks
  - chains
  - eye bolts
  - fibre ropes
  - flexible steel wire rope (FSWR)
  - rigging screws
  - shackles
  - sheaves
  - turnbuckles
  - wire and synthetic slings
  - cargo gear record book entries
  - checking safe working load of equipment
  - establishing communications
  - identifying hazards
  - identifying locations of load site and destination
  - planning lifting operations
  - pre-operational checks
  - safety devices
  - electrostatic hazards
  - environmental hazards
  - explosion and flammability
  - extremely low temperatures
- Cargo includes one or more of the following:
- Cargo handling gear and equipment includes one or more of the following:
- Preparations include:
- Hazards include the following:



Hazard control procedures include one or more of the following:

- insufficient lighting
- low temperatures
- overhead obstructions
- other personnel in area of operation
- pressure hazards
- reactivity and corrosion
- source of ignition
- toxicity
- vapour leaks and clouds
- weather conditions
- anti-static measures
- atmospheric control
- cargo inhibition
- checking compatibility
- confined space entry precautions
- correct use of safety data sheet (SDS)/material safety data sheet (MSDS) information
- ensuring operation is visible to operator at all times or a watchperson is utilised to ensure a lift is monitored at all times
- gas testing
- identifying hazards and assessing risks of the operation
- inerting, drying and monitoring techniques
- inspecting equipment and record books before commencing operations
- providing adequate lighting
- segregation of cargo
- ship/shore checklist
- ventilation
- wearing appropriate protective clothing

## Unit Mapping Information

This unit replaces and is equivalent to MARC3006A Operate deck machinery, cargo handling gear and equipment on a vessel.

MARC3006A replaces and is equivalent to TDMMR3407B Operate deck machinery.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC028 Operate deck machinery, cargo handling gear and equipment on a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying risk assessment and hazard control strategies
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- completing required records related to the operation of deck machinery and cargo handling gear and equipment
- communicating with other workplace personnel using effective:
  - hand signals
  - hand held radios
  - listening techniques
  - questioning to confirm understanding and appropriate worksite protocol
  - signage
  - written instructions
- exercising all safety, environmental and hazard control precautions and procedures during the operation of deck machinery, cargo handling gear and equipment on a vessel
- following work schedules laid down in organisational instructions and safety management systems
- operating anchoring equipment under various conditions such as anchoring, weighing anchor, securing for sea and in emergencies
- reading, interpreting and applying instructions on the operation of deck machinery and cargo handling gear and equipment
- recognising faulty equipment and taking appropriate action
- recognising routine hazards and problems while operating deck machinery and cargo handling gear and equipment
- recognising routine hazards that can arise on a chemical and oil and liquefied gas tanker
- selecting and using relevant tools and equipment
- setting up, shutting down and storing welding, brazing, cutting equipment
- using and handling deck and cargo handling gear and equipment
- using basic signals to operate equipment including winches, cranes, windlasses and hoists
- working safely and collaboratively with others

- working safely at heights, and correctly applying and using safety equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic signals for the operation of equipment including winches, cranes, windlasses and hoists
- boom/jib movements and the safe positioning of the operator for any lift
- characteristics and features of bulk ship, chemical and oil tanker and liquefied gas tanker layouts and cargo
- communication techniques and signals needed during the operation of deck machinery and cargo handling gear and equipment
- correct method of replacing winch wire and/or rope and attaching new wire and/or rope to winch drum
- faulty and damaged wire and/or rope
- fibre and wire ropes, cables and chains including their construction, use markings, maintenance and proper stowage
- function and uses of:
  - cranes, pumps, hoists, cranes, booms and related equipment
  - hatches, watertight doors, ports and related equipment
  - winches, windlasses, capstans and related equipment
- fundamental properties of liquid and liquefied cargo and their impact on safety, the environment and vessel operations
- hazards and control measures associated with bulk ship, chemical and oil tanker, liquefied gas tanker cargo operations
- hazards and related safety precautions relevant to basic welding, brazing and cutting
- piping systems, valves, loading and unloading, care in transit and emergency shut down procedures
- principal features and operating characteristics of steering gear and deck machinery used on a range of vessel types
- problems related to operating deck machinery and cargo handling gear and equipment, and appropriate actions and solutions
- procedures for:
  - checking and inspecting deck machinery and cargo handling gear and equipment used on vessels
  - safe operation of deck machinery and cargo handling gear and equipment
- records that must be maintained on a vessel relevant to cargo handling and stowage
- relevant sections of maritime regulations, codes and conventions related to tankers and gas

carriers

- relevant WHS/OHS requirements, work practices and pollution control regulations and policies
- safe working loads of ropes, wires, blocks, chains and lifting gear
- safety data sheets (SDSs)/material safety data sheets (MSDSs)
- safety, environmental and hazard control precautions and procedures relevant to the operation of deck machinery and cargo handling gear and equipment
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- use and general maintenance of lifting equipment and basic slinging techniques.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment of the operation of deck machinery and cargo handling gear and equipment must occur in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- gas monitoring equipment including:
  - gas monitoring instruments
  - oxygen indicators
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, materials, cargo handling equipment, piping systems and valves that replicate and are currently used in industry including:
  - basic hydraulic systems
  - cargo hatch covers
  - cranes and derricks
  - lifeboat davits
  - lifting equipment
  - mooring equipment
  - safeguards and protective devices for winches

- small cranes, derricks and booms
- gangways and pilot ladders
- winches
- windlasses
- personal protective equipment currently used in industry including:
  - free fall arrest devices
  - safety harness
  - safety nets
  - static safety lines.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC029 Perform rigging on board a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills, knowledge required to perform basic rigging operations and to use associated equipment in the maritime industry.

This unit applies to an Integrated Rating or Able Seafarer-Deck who applies safe work practices when undertaking basic rigging on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Rig and maintain personnel and pilot**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Personnel access equipment is correctly rigged according to shipboard practices and recognised standards

<b>access ways</b>	1.2	Requirements and recommendations for safe access by alternative means are identified and organised, according to shipboard practices and recognised standards
<b>2 Perform tasks aloft and over vessel's side</b>	2.1	Site and equipment for working aloft and over the side are prepared according to shipboard practices and recognised standards
	2.2	Required precautions are taken when working aloft or over the side
	2.3	Chairs, stages, safety harnesses and appropriate safety equipment are used, according to shipboard practices and recognised standards
	2.4	Portable ladders are correctly used and maintained
	2.5	Equipment used when working aloft and over the side is correctly maintained and stored
<b>3 Lash and secure cargo</b>	3.1	Lashing equipment is inspected and maintained according to shipboard practices and recognised standards
	3.2	Faulty lashing equipment is identified and isolated, reported and maintained according to shipboard practices and recognised standards
	3.3	Cargo is lashed and secured according to shipboard practices and recognised standards
	3.4	Appropriate consideration is given to effects of vessel's motion on stowed cargo when lashing cargo
	3.5	Lashing equipment is correctly stored after use
	3.6	Loads are correctly rigged using appropriate ropes and rigging gear, according to procedures and safety requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |                           |   |
|---------------------------|---|
| Personnel access          | • accommodation ladders                                 |
| equipment includes one or | • brows   |
| more of the following:    | • gangways  |
|                           | • man baskets   |
|                           | • pilot ladders   |
|                           | • combined pilot accommodation ladders and pilot hoists |
| Cargo to be lashed        | • containers  |
| includes one or more of   | • general cargo   |
| the following:            | • roll-on-roll-off vehicles                             |
|                           | • timber deck cargo                                     |

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC029 Perform rigging on board a vessel**

## **Modification History**

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- adapting to differences in vessels, equipment and standard operating procedures
- applying basic rigging operations and using associated equipment according to safe working practices including:
  - checking and using rigging gear when rigging loads
  - lashing cargo, in a range of situations
  - using and maintaining ropes, wires and chains
  - splicing natural fibre and synthetic ropes
  - rigging accommodation ladders, gangways and man baskets
  - rigging and unrigging pilot ladders and hoists
  - rigging a sea anchor to control a specified rate and direction of drift and/or angle to sea
- applying basic rigging operations under normal and adverse conditions of sea and weather:
  - during berthing and unberthing operations
  - while anchoring or mooring
  - when berthed, anchored or moored
  - while underway
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating with other personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- completing work systematically with required attention to detail
- complying with relevant maritime regulations
- following required work schedule according to company requirements
- reading and applying instructions, safety and standard operating procedures and precautions including:
  - shipboard rigging procedures
  - International Safety Management (ISM) Code safety management system (SMS) procedures
  - WHS/OHS regulations and hazard prevention policies and procedures
  - manufacturer guidelines
  - housekeeping processes
- recognising routine problems during rigging operations on a vessel
- selecting and using rigging and lifting slings and equipment according operating instructions
- taking action to promptly report and/or rectify accidents, safety incidents and operational problems, according to regulations and procedures
- tying required knots and demonstrating rope handling skills including:
  - becket/buntline hitch

- clove hitch
- common seizing
- common whipping
- double sheet bend
- eye splice
- figure of eight
- marlin spike hitch
- racking seizing
- reef knot
- rolling hitch
- sail maker's whipping
- sheet bend
- sheep shank
- short splice
- timber hitch
- truckie hitch
- west country whipping
- working safely and collaboratively with others during rigging operations on a vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable sections of relevant maritime regulations
- breaking strain and safe working load for slings and equipment
- legal requirements for constructing a pilot ladder
- maintenance and storage procedures for equipment used when working aloft or over the side
- maritime communication techniques
- precautions and procedures for working aloft and over the side
- principles and procedures for lashing and securing cargo, including inspection and maintenance requirements for lashing equipment
- principles of rigging equipment, deterioration and care, and maintenance requirements for different types of rope and wire
- procedures for rigging and preparing personnel access ways
- procedures for rigging and unrigging pilot ladders, hoists, rat-guards and gangways
- procedures for splicing natural fibre and synthetic ropes
- relevant WHS/OHS requirements and work practices
- type and function of rigging, safety and associated equipment, and their limitations
- types of knots, bends and hitches in common use, their characteristics, applications and limitations, and methods of tying them using synthetic and fibre rope of varying construction and size.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations where basic rigging operations can be demonstrated. Where this is not available, assessment must occur in a simulated workplace operational situation that replicates workplace conditions.

Resources for assessment include access to:

- a suitable range of rigging and cargo lashing exercises, case studies and associated resources
- relevant materials, tools, personal protective equipment and equipment that replicate and are currently used in industry for working aloft and over the side including:
  - a range of power and manually operated lifting gear
  - chains, shackles and slings
  - clamps, blocks, eye bolts, turnbuckles, terminators
  - lifting and rigging ropes and hardware
  - gantlines
  - safety harnesses
  - stage
- applicable documentation such as workplace procedures, regulations, legislation, codes of practice and operation manuals including:
  - ISM Code SMS plans, procedures, checklists and instructions
  - relevant international, national, state/territory WHS/OHS legislation
  - relevant Australian and International Standards and regulations
  - supervising engineer orders and instructions
  - vessel and company procedures.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC030 Use and care for hand and power tools

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to use and care for hand tools and air, battery and electric power tools, on board a range of vessel.

This unit applies to individuals working in the maritime industry as an Integrated Rating or Able Seafarer-Engine/Deck.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Select appropriate tools for work

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Work requirements are interpreted according to organisational procedures and manufacturer instructions



- 1.2 Appropriate hand and power tools are selected for required tasks
- 1.3 Selected hand and power tools are checked for serviceability
- 1.4 Defective tools are identified, reported and appropriate repair or replacement action is taken according to organisational procedures
- 1.5 Blunt or worn tools are identified and appropriate action is taken to replace, sharpen or rectify according to organisational procedures and manufacturer instructions
- 1.6 Instructions for the use of tools are accessed and interpreted as required
- 2 Use hand and power tools**
  - 2.1 Work area, work pieces and tools are prepared for required tasks according to organisational procedures
  - 2.2 Other personnel in work area are made aware of work being carried out as required by safety management procedures
  - 2.3 Work is marked out using appropriate marking out tools according to organisational procedures
  - 2.4 Hand and power tools are used as directed according to organisational procedures and manufacturer instructions
  - 2.5 Desired work outcomes are achieved to job specifications
- 3 Follow safety and hazard control procedures**
  - 3.1 Required safety precautions, organisational procedures and regulations are followed when using hand and power tools
  - 3.2 Operational hazards are identified when using hand and power tools and action is taken to minimise or eliminate risk to self, other personnel, the vessel and the environment
- 4 Care for hand and power tools**
  - 4.1 Tools are used for intended purpose according to manufacturer instructions and organisational procedures
  - 4.2 Tools are cleaned and stored after use according to manufacturer instructions and organisational procedures
  - 4.3 Tools are sharpened according to manufacturer instructions and organisational procedures, as required
  - 4.4 Tools are adjusted, tightened and/or lubricated according to manufacturer instructions and organisational procedures, as required

- 4.5 Grinding wheels are dressed and made true according to manufacturer instructions and organisational procedures
- 4.6 Defective or worn tools and tool components are identified, marked as required and reported, and appropriate repair or replacement action is taken according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

## Unit Mapping Information

This unit replaces and is equivalent to TDMMR4707 Use and care for hand and power tools on a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC030 Use and care for hand and power tools

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adapting to differences in vessels, equipment and standard operating procedures
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- caring for air operated tools, their supply hoses and hose connections, safely and correctly
- caring for hand and power tools safely and correctly, including cleaning, sharpening or adjusting tools according to standard operating procedures
- communicating with other workplace personnel using effective:
  - listening techniques
  - questioning to confirm understanding
  - verbal and non-verbal language
- completing work systematically with required attention to detail
- complying with relevant maritime and safety regulatory requirements
- dressing and truing a grinding wheel
- following required work schedule according to company requirements
- following the orders and instructions of the officer of the watch
- marking out work to specifications, and measuring and checking the quality of finished work, including the correct use of:
  - rules and tapes
  - squares
  - scribes
  - dividers
  - trammels
  - adjustable gauge
  - centre punch hammers
  - callipers
  - vernier callipers and micrometer
- reading, interpreting and applying documentation that includes technical specificity, including:

- work specifications and drawings
- basic instructions and standard operating procedures
- recognising routine problems that may occur when using and caring for hand and power tools, including identifying:
  - glazed, loaded or untrue grinding wheel condition
  - hand and power tools that are found to be defective or worn
  - incidents and problems involving the use of hand and power tools
- selecting appropriate hand and power tools to complete assigned tasks
- storing tools and equipment after use according to standard operating procedures
- taking appropriate action to promptly report incidents, problems and hazards including equipment faults
- using personal protective clothing and equipment:
  - eye and ear protection
  - boots
  - masks
- using tools and equipment safely according to:
  - International Safety Management (ISM) Code and associated vessel safety management system and procedures
  - WHS/OHS regulations and hazard prevention policies and procedures
  - tool manufacturer instructions
  - established job procedures and work instructions
  - housekeeping processes
- working safely and collaboratively with others when using and caring for hand and power tools.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- characteristics and identifying features of common engineering drill bits
- environmental protection measures when carrying out basic engineering tasks
- established procedures for the use and care of hand or power tools required for work tasks
- hazards and related safety precautions when using hand or power tools on board a vessel including:
  - electric shock
  - moving and rotating blades and attachments
  - non-compliance with safe working procedures
  - poor housekeeping procedures
  - sharp blades

- sparks in areas where flammable and explosive substances are stored
- unsecured machinery, components or equipment
- using tools beyond safe working limits
- ISM Code safety management procedures as they relate to the use of hand and power tools on board a vessel
- procedures for dressing and/or truing a grinding wheel
- procedures for identifying a glazed, loaded or untrue grinding wheel condition
- relevant WHS/OHS and pollution control legislation and policies including the International Convention for the Prevention of Pollution from Ships (MARPOL)
- standard procedures for marking out work to specifications, and measuring and checking the quality of finished work.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations where the use of a range of hand and power tools can be demonstrated. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, legislation, codes of practice and operation manuals including:
  - ISM Code safety management system plans, procedures, checklists and instructions
  - relevant international, commonwealth, state/territory WHS/OHS legislation
  - supervising officer orders and instructions
  - instructions from manufacturers of tools and equipment
  - vessel and company procedures
- relevant and appropriate materials, equipment and personal protective equipment, that replicates and are currently used in industry
- power tools, air, battery and electric powered including:
  - air operated chisels
  - drilling jigs
  - needle guns

- portable and pedestal power drills
- portable and pedestal grinders
- hand tools and gauges including:
  - chisels
  - drill bits
  - feeler gauge
  - files
  - form gauge
  - hacksaws and nibblers
  - hammers
  - punches
  - radius gauge
  - screw pitch gauge
  - snips
  - spanners, screwdrivers and pliers
  - taps and tap wrench
  - thickness gauge
  - torque wrenches
  - vice grip.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARC031 Shift mooring lines using mechanical means

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to shift mooring lines using mechanical means, including correctly using capstan and quick release systems.

This unit applies to people working in the maritime industry as a Linesperson.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

C – Equipment operations

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### **1 Identify mechanical mooring techniques and their application**

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |     |  |
|-----|--|
| 1.1 | Appropriate mechanical mooring and unmooring techniques and equipment are identified |
| 1.2 | Features of mechanical mooring and unmooring equipment                               |

- are established and their impact on safety is explained
- 1.3 Relevant documentation and records are identified and accessed as required
- 1.4 Types of berth and terminals where mechanical mooring and unmooring are applied are explained and documented
- 2 Prepare equipment**
- 2.1 Appropriate personal protective equipment (PPE) is selected and assembled according to work health and safety (WHS)/occupational health and safety (OHS) requirements
- 2.2 Equipment is located, selected and made ready according to organisational procedures
- 2.3 Routine pre-operational checks are carried out on tools and equipment according to manufacturer specifications and organisational requirements
- 2.4 Adjustments are made to achieve safe and efficient operation
- 2.5 Inability to start equipment is reported promptly and accurately to appropriate personnel
- 3 Respond to hazardous situation**
- 3.1 Hazards associated with mechanical mooring and unmooring are identified
- 3.2 Risk is assessed and hazard control measures are applied to level of responsibility, or referred to appropriate person for further action according to organisational procedures
- 3.3 Inability to start equipment is reported promptly and accurately to appropriate personnel
- 4 Operate mechanical mooring and unmooring equipment**
- 4.1 Appropriate safety procedures are followed and PPE is used to undertake mooring and unmooring operations according to organisational procedures
- 4.2 Tools and equipment are operated in a safe and controlled manner within defined operating limits to achieve optimum safety and efficiency
- 4.3 Malfunctions are promptly identified and appropriate action is taken in a malfunction or emergency
- 4.4 Action is taken to rectify basic operational faults to maintain optimum safety and efficiency
- 4.5 Irregularities or malfunctions are reported to appropriate



		personnel
<b>5 Complete mechanical mooring and shut down equipment</b>	5.1	Equipment is shut down according to manufacturer specifications and organisational procedures
	5.2	Defective, damaged or malfunctioning equipment is recorded and reported according to organisational procedures
	5.3	All required documentation is completed according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- Safety procedures include:
- checking:
    - own personal fitness and medical wellbeing
    - whereabouts of edge of wharf
    - whereabouts of other members of mooring and unmooring team
  - confirming availability of a personal flotation device on arrival at mooring and unmooring operation
  - keeping clear of snapback zone and demarcated areas
  - keeping work area hazard-free
  - obtaining and using required PPE (such as safety footwear, safety helmet, suitable gloves, safety vest and reflective clothing, personal life jacket vest, safety glasses)
  - removing rings from fingers to avoid them being caught on steel wire ropes
- Berth and terminals may include one or more of the following:
- liquefied natural gas (LNG) carrier berths
  - oil berths
  - liquid petroleum gas (LPG) berths
  - bulk liquids berths

	<ul style="list-style-type: none"><li>• coal/iron ore berths</li><li>• RoRo terminals</li><li>• container terminals</li></ul>
Relevant documentation and records include one or more of the following:	<ul style="list-style-type: none"><li>• mooring and unmooring plans, procedures, checklists and instructions</li><li>• relevant maritime authority instructions</li><li>• relevant sections of maritime regulations concerning mooring and unmooring operations</li><li>• reports and records of mooring and unmooring operations or any safety incident</li><li>• rope and equipment manufacturer instructions and procedures</li><li>• safety instructions and procedure</li></ul>
Mooring and unmooring operations include:	<ul style="list-style-type: none"><li>• landing a gangway</li><li>• placing or removing brow onto gangway</li><li>• positioning lines launch</li><li>• positioning mooring lines</li><li>• preparing a berth</li><li>• receiving mooring lines under a vessel</li><li>• receiving heaving line from:<ul style="list-style-type: none"><li>• a launch</li><li>• a vessel</li></ul></li><li>• returning heaving line to a vessel</li><li>• unmooring and letting go a vessel</li><li>• working:<ul style="list-style-type: none"><li>• by day or night</li><li>• in normal and emergency situations</li><li>• under any permissible conditions of weather</li><li>• at various shore-side terminals and wharves</li><li>• buoys</li></ul></li></ul>

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **Assessment Requirements for MARC031 Shift mooring lines using mechanical means**

### **Modification History**

Release 1. New unit of competency.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating effectively with other personnel when mooring and unmooring a vessel
- complying with relevant maritime regulations and International Maritime Organization (IMO) Conventions and Codes, including the relevant sections of the Australian Maritime Safety Authority (AMSA) Marine Orders as they apply to mooring and unmooring operations on ocean-going vessels
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- following work instructions
- following all orders carefully and systematically
- implementing port and vessel security procedures
- initiating timely action in response to defects or damage
- interpreting and follow procedures for mooring and unmooring operations, including safety instructions and precautions
- operating mechanical mooring equipment appropriately and correctly
- receiving mooring lines correctly
- recognising dangers, hazards and problems before and during mooring and unmooring operations, and taking appropriate action to report and/or rectify them
- taking proper care of ropes and mechanical mooring equipment
- using capstans and quick release systems correctly
- working effectively as a member of a mooring and /or unmooring team.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- communications techniques and equipment required during mooring and unmooring operations
- continuous measurement of mooring loads
- correct order of mooring lines
- correct process/technique for receiving mooring lines
- dangers associated with mooring systems:
  - being hit by a heaving line
  - being thrown down from a vessel
  - stepping inside the bight of a line
  - being struck by a parting line
  - mixing rings and wire rope
  - falling off the edge of the wharf into the water
  - back strain from carrying a line, heaving on a line
  - ‘snap back’ when a line breaks
  - trip hazards such as crane lines
- factors that affect mooring and unmooring operations, including the effects of wind, weather, tides, sea conditions, currents, draft changes and surges from passing vessels on mooring and unmooring operations
- hazards and problems, and appropriate preventative and remedial action and solutions
- maritime regulations applicable to mooring and unmooring vessels
- mooring load monitoring systems
- operation, features and application of integrated capstans
- operation, features and application of quick release systems
- operational characteristics of different types of lines and equipment
- operational procedures and layouts of various types of shore-side loading and discharging terminals and wharves
- personal protective equipment (PPE) required for use during mooring and unmooring operations
- procedures for assessing stresses on lines and gear used in mooring and unmooring operations
- reason for and correct method of, dipping mooring line
- relevant manufacturer guidelines relating to use of machinery, including instructions on equipment capability and limitations
- relevant sections of Standards of Training, Certification & Watchkeeping (STCW) 95 and AMSA Marine Orders
- remote control systems for remote hook release
- safety drills and equipment used for lines launch

- snapback zone and demarcated areas
- standard nautical terms in relation to mooring activities and related equipment
- technique for releasing fowled mooring lines under wharfs and around ship anchors
- various types of hook assembly and their application
- WHS/OHS codes of practice, policies and procedures.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations where mechanical mooring and unmooring can be undertaken. Where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and personal protective equipment currently used in industry including:
  - counterbalanced hooks
  - docking aid system
  - integrated capstans
  - mooring instrumentation
  - quick release hooks
  - quick release systems
  - single and multiple hook assemblies.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC032 Perform dogging on board a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills, knowledge required to apply slinging techniques, to select and inspect lifting gear and/or direct crane/operator in moving a load.

This unit applies to an Integrated Rating or Able Seafarer-Engine/Deck who applies safe work practices when undertaking basic dogging on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

C – Equipment Operations

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan job

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Relevant site information is obtained for related task

1.2 Sea conditions and use of taglines are assessed in line with

shipboard best practice

- 1.3 Hazards and potential hazards associated with slinging and directing loads are identified
- 1.4 Hazard control measures consistent with appropriate standards are identified to ensure safety of personnel and equipment
- 1.5 Weight, dimensions and load centre of gravity are identified and assessed
- 1.6 Suitable lifting/slinging points on load are established
- 1.7 Appropriate lifting equipment needs are assessed, including rig/vessel crane limitations
- 1.8 Appropriate communication methods are established in consultation with crane/operators and other appropriate personnel
- 1.9 Manufacturer specifications/information is obtained for special loads as required
- 2 Select and inspect equipment**
  - 2.1 Lifting equipment appropriate to task is selected and inspected for serviceability
  - 2.2 Damaged or excessively worn lifting equipment is identified, labelled and isolated
  - 2.3 Appropriate communications equipment is selected and its serviceability is checked
  - 2.4 Appropriate personal protective equipment (PPE) is selected and checked
- 3 Prepare site and equipment**
  - 3.1 Hazard prevention/control measures are applied consistent with appropriate standards to ensure safety of personnel and equipment
  - 3.2 Clear communications and roles of deck crew are established when working cargo with a rig crane or another vessel
  - 3.3 Appropriate slinging method is selected
  - 3.4 Lifting equipment is prepared and assembled as required
  - 3.5 Load destination is prepared
- 4 Perform tasks**
  - 4.1 Knots, hitches and bends using fibre and synthetic ropes are



correctly made and used in course of deck operations

- 4.2 Eye splices and short splices are made in fibre and synthetic ropes according to established nautical practice
- 4.3 Lifting equipment is attached and secured to lifting hook using appropriate techniques
- 4.4 Lifting hook is positioned over load centre of gravity
- 4.5 Lifting equipment is attached and secured to load in an appropriate manner
- 4.6 Tag line is attached and secured as required
- 4.7 Test lift is conducted to ensure load security
- 4.8 Load is moved, and stability and control are maintained at all times
- 4.9 Appropriate communication methods and communication signals are applied to safely coordinate load movement within sight and out-of-sight of ship's crane operator
- 4.10 Loads are correctly rigged using appropriate ropes and rigging gear according to procedures and shipboard safety requirements
- 4.11 Load is landed to ensure it is stable and secure from movement, is in position to be lashed with appropriate consideration given to effects of vessel's motion on stowed cargo when lashing cargo

**5 Shut down job, clean up and maintain equipment**

- 5.1 Lifting equipment is removed or disconnected from load and prepared for next task or storage.
- 5.2 Unserviceable lifting equipment is inspected and rejected
- 5.3 Defective equipment is isolated and tagged
- 5.4 Lifting equipment is stored according to procedures and appropriate standards
- 5.5 Hazard prevention/control measures are removed as required
- 5.6 Excess materials from work area are removed as required
- 5.7 Defects are reported and recorded according to shipboard practices and procedures, and appropriate action is taken

- 5.8 Rope, wire and cables are stowed and maintained according to company procedures and manufacturer instructions

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

Hazards include one or more of the following:

- insufficient lighting
- other specific hazards (such as trip hazards, heights, radio interference)
- shipboard specific equipment in load path (such as fire monitors, ship cranes, winches)
- traffic (such as pedestrians, plant)
- weather (such as wind, lightning, storms)

Lifting equipment includes one or more of the following:

- blocks
- beam clamps
- chains
- eyebolts
- fibre ropes
- grabs
- hoists
- hooks
- lifting beams
- pallet forks and cages
- personnel boxes
- plate clamps
- spreaders
- shackles
- tackles
- trolleys wire ropes
- winches
- wire and synthetic slings

- Cranes include one or more of the following:
- derrick cranes
  - non-slewing cranes
  - portal boom cranes
  - slewing mobile cranes
  - tower cranes (including self erecting)
  - vehicle loading cranes
- Appropriate personnel include one or more of the following:
- colleagues
  - managers who are authorised to take responsibility for workplace or operations
  - supervisors
- Load destination includes one or more of the following:
- ground
  - loading platforms
  - suspended floors
  - vehicles
  - vessels
- Defective equipment includes one or more of the following:
- broken or stretched wires
  - cut/damaged fibres
  - damaged equipment
  - excessive wear

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC032 Perform dogging on board a vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- adapting to differences in vessels, equipment and standard operating procedures
- applying different methods for making temporary connections to loads using fibre and synthetic ropes
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying risk assessment and hazard control strategies, including hierarchy of control
- calculating rated capacity of lifting equipment
- communicating with other personnel through:
  - appropriate worksite protocol
  - fixed channel two-way radio
  - hand signals
  - listening
  - questioning to confirm understanding
  - signage
  - written instructions
- directing crane operators to move loads in a safe manner, using a slewing crane
- inspecting and caring for a wide range of lifting equipment to appropriate Australian Standards and/or manufacturer specifications
- interpreting rated capacity and working load limit tags
- selecting and inspecting lifting equipment, ropes and chains
- splicing natural fibre and synthetic ropes
- taking action to promptly report and/or rectify accidents, safety incidents and operational problems according to regulations and procedures
- using and maintaining ropes, wires and chains
- using communications signals including:
  - stop – hand
  - stop – whistle
  - hoist up – hand

- hoist up – whistle
- hoist down – hand
- hoist down – whistle
- luff boom down – hand
- luff boom down – whistle
- luff boom up – hand
- luff boom up – whistle
- telescope out – hand
- telescope out – whistle
- telescope in – hand
- telescope in – whistle
- slew left – hand
- slew left – whistle
- slew right – hand
- slew right – whistle
- working safely and collaboratively with others during lifting operations on a vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- appropriate mathematical procedures for estimating and measuring loads
- appropriate standards relevant to the full range of techniques for undertaking dogging activities including:
  - International Safety Management (ISM) Code safety management system (SMS) plans, procedures, checklists and instructions
  - manufacturer specifications
  - relevant WHS/OHS requirements and work practices
  - relevant Australian and International Standards and regulations
  - vessel and company procedures
- hierarchy of hazard identification and control:
  - elimination
  - substitution
  - isolation
  - engineering controls
  - administrative controls
- load stability and safety factors in line with manufacturer specifications

- personal protective equipment (PPE)
- procedures for splicing natural fibre and synthetic ropes
- site information including:
  - deck conditions (even, uneven, steel, wood)
  - local conditions such as access and egress
  - sea conditions
  - work method statements
- types of cranes and their functions
- types of knots, bends and hitches in common use, their characteristics, applications and limitations, and methods of tying them using synthetic and fibre rope of varying construction and size
- types of lifting equipment and slinging techniques, and their limitations and performance in a wide range of conditions (including slings, beams, accessories, clamps, work-boxes, bins and pallets).

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations, where this is not available, assessment must occur in a simulated workplace operational situation that replicates workplace conditions.

Resources for assessment include access to:

- a suitable range of dogging, lifting and cargo lashing exercises, case studies and associated resources
- communications equipment including:
  - bells
  - fixed channel two-way radio
  - whistles
- PPE including:
  - gloves
  - hard hat
  - high visibility clothing

- reflective vest
- safety boots
- relevant and appropriate materials, tools, and equipment that replicates and is currently used in industry for working aloft and over the side including:
  - a range of power and manually operated lifting gear
  - chains, shackles and slings
  - clamps, blocks, eye bolts, turnbuckles, terminators
  - gantlines
  - lifting and rigging ropes and hardware
  - safety harnesses
  - stage
- relevant breathing, hearing, sight, skin and sun protection.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARC033 Complete engine room tasks

### Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### Application

This unit involves the skills and knowledge required to perform tasks to support the operation of marine internal combustion engines, marine propulsion systems, vessel machinery and auxiliary systems.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels <80 m long with propulsion power <3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC and Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 3 NC and Marine Engine Driver Grade 2 NC.

The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer, issued under the Navigation Act 2012.

### Pre-requisite Unit

Not Applicable



## Competency Field

C – Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan tasks

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Work plan is developed and sequenced in conjunction with others involved in or affected by work plan, according to organisational procedures

**1.2** Timelines, jobs and work priorities are confirmed with Master and other relevant authorities, as required

#### 2 Conduct refuelling operations

**2.1** Tank levels are correctly measured and reported before and after fuelling operations

**2.2** Fuel capacity is calculated and recorded

**2.3** Tools and equipment are selected and checked for serviceability

**2.4** Safety boundary and signage for refuelling operation are accessed and used

**2.5** Fire and spill prevention equipment is correctly deployed

**2.6** Personal protective equipment (PPE) is accessed and used

**2.7** Refuelling operations are performed safely and effective communication is maintained with relevant personnel to ensure safety and integrity of vessel and crew

**2.8** Appropriate action is taken to handle incidents arising during fuelling operations according to organisational procedures and regulatory requirements

#### 3 Maintain stock and

**3.1** Stock levels and consumables are monitored and

<b>consumables</b>		maintained at required levels
	<b>3.2</b>	Stock and consumables are reordered as required
	<b>3.3</b>	Records of stock inventories and consumables are maintained and discrepancies are identified
<b>4 Perform general housekeeping tasks</b>	<b>4.1</b>	Housekeeping tasks are clarified against work plan
	<b>4.2</b>	Appropriate equipment for specific tasks is determined, prepared and used
	<b>4.3</b>	Housekeeping tasks are performed and assessed against task requirements
	<b>4.4</b>	Procedures for handling, storing and disposing of cleaning liquids are implemented according to regulatory requirements
<b>5 Stow and manage flammable and explosive materials</b>	<b>5.1</b>	Hazards related to flammable and explosive materials are identified
	<b>5.2</b>	Suitability of stowage areas is verified against regulatory requirements and organisational procedures
	<b>5.3</b>	Procedures for safe handling and stowage of flammable and explosive materials are implemented according to regulatory requirements and organisational practices
<b>6 Prepare simple reports</b>	<b>6.1</b>	Requirements for simple reports are identified
	<b>6.2</b>	Information is prepared according to organisational procedures
	<b>6.3</b>	Calculations for fuel consumption and voyage duration are completed
	<b>6.4</b>	Information is assessed for accuracy, currency and relevance for inclusion in report
	<b>6.5</b>	Report is written using appropriate terminology

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC001 Complete engine room tasks.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC033 Complete engine room tasks

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) practices, including hazard identification, risk assessment and risk control options
- carrying out housekeeping tasks, including:
  - correct disposal of waste
  - pumping of bilges
  - removal or lashing of loose items
- completing all work to specifications
- converting:
  - fractions to decimals
  - units to multiples of base units
- keeping running and maintenance logs
- performing calculations involving:
  - consumption of fuel and lubricating oil, hourly fuel consumption, theoretical steaming times and distances
  - volume and capacity of regular shaped tanks
- sequencing tasks
- writing simple reports.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate action to address the following incidents during refuelling operations:
  - fire
  - spillage on board
  - spillage over the side
- common International System of Units (SI units), such as kilogram, tonne, litre and metre

- correct storage and use of:
  - chemicals
  - equipment
  - tools
- hazards related to flammable and explosive materials, including:
  - battery generated gases
  - chemicals
  - fuels
  - liquefied petroleum gas (LPG)
  - lubricating oils
  - oil soaked rags (spontaneous combustion)
- identification of hazardous goods
- principles of simple report writing
- procedures and requirements for cleaning and housekeeping
- procedures for monitoring and maintaining levels, and re-ordering of, stock and consumables
- relevant parts of legislation, regulations, codes of practice
- safe handling and stowage of flammable and explosive materials
- safety data sheets (SDS)/material safety data sheets (MSDS)
- WHS/OHS practices, including hazard identification, risk assessment and risk control options.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management systems (SMS), workplace procedures, operational manuals and SDS/MSDS
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate engine, propulsion plant and auxiliary systems ashore
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) that are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARC034 Maintain hull out of water

### Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### Application

This unit involves the skills and knowledge required to carry out basic maintenance to vessel hull while it is out of water.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels <80 m long with propulsion power <3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC and Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 3 NC and Marine Engine Driver Grade 2 NC.

The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer, issued under the Navigation Act 2012.

### Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Prepare for work**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Planned maintenance program for hull type and construction material is accessed to determine hull maintenance requirements
- 1.2** Vessel is inspected and additional maintenance requirements are determined
- 1.3** Maintenance tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work
- 1.4** Repair tools and equipment are selected and checked for serviceability
- 1.5** Work area is prepared

#### **2 Carry out required maintenance and repairs to hull, equipment and fittings**

- 2.1** Suitable personal protective equipment is selected and used according to work health and safety (WHS)/occupational health and safety (OHS) requirements
- 2.2** Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements
- 2.3** Tasks are performed according to manufacturer specifications, maintenance yard requirements and organisational practices

#### **3 Clean up and complete documentation**

- 3.1** Work area is cleared and cleaned so it is in a serviceable condition



- 3.2** Materials are disposed of or recycled according to legislative and organisational requirements
- 3.3** Tools and equipment are cleaned, checked and stored according to organisational procedures
- 3.4** Maintenance report is completed according to workplace procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC002 Maintain hull out of water.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC034 Maintain hull out of water

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) practices, including hazard identification, risk assessment and risk control options
- carrying out maintenance tasks, including:
  - examining anchors and cables
  - inspecting:
    - anodes
    - hull fittings
    - propeller, shafts and seals
    - rudder, rudder stock and seals
    - watertight and weather tight hatches
- explaining procedures and techniques for hull maintenance according to regulations and vessel operating procedures
- implementing safe and environmentally responsible work practices
- planning and preparing for maintenance
- reading, interpreting and complying with:
  - manufacturer instructions, including all WHS/OHS requirements
  - operating and service manuals for maintenance of vessel hull
  - safety data sheets (SDS)/material safety data sheets (MSDS)
- recognising faulty equipment and taking appropriate action according to organisational procedures
- recognising hull damage and deterioration and taking appropriate action according to organisational procedures
- selecting and using correct tools and equipment for maintenance task.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- component parts, operation and routine maintenance requirements of vessel, equipment and fittings
- differences in vessels, hull structures and equipment
- functions of underwater equipment
- hazards of working in confined spaces
- maintenance hazards and problems
- nature and causes of corrosion of marine surfaces and structures, and available methods for its control
- organisational procedures for maintenance
- principles and procedures of lubrication as they relate to underwater vessel equipment and fittings
- procedures for:
  - checking and inspecting vessel hull as part of routine maintenance program
  - initiating and coordinating repair and or replacement of underwater equipment and fittings
- process and requirements for hull maintenance
- types, characteristics and functions of equipment or tools used in maintenance
- use of sacrificial anodes
- WHS/OHS practices, including hazard identification, risk assessment and risk control options.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures, operational manuals and SDS/MSDS
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate vessel ashore
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC035 Operate and maintain extra low and low voltage electrical systems and equipment**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to operate, test and maintain extra low and low voltage electrical systems and equipment.

Note: Extra low voltage (ELV) systems are those not exceeding 50 V alternating current (AC) or 120 V direct current (DC). Low voltage systems are those not exceeding 1000 V AC or 1500 V DC

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels <80 m long with propulsion power <3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 3 NC and Marine Engine Driver Grade 2 NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

Note: Relevant state or territory electrical licensing requirements apply to persons carrying out installation, maintenance and or repair of electrical circuits or systems that are 50 V AC or above, or 120 V DC or above.

## Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Operate electrical systems and equipment**

#### **2 Carry out routine maintenance on electrical systems and equipment**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |            |   |
|------------|---|
| <b>1.1</b> | Routine pre-operational checks are carried out on electrical systems and equipment according to manufacturer specifications |
| <b>1.2</b> | Systems and equipment are operated according to manufacturer specifications   |
| <b>1.3</b> | Faults are identified and appropriate action is taken to rectify them   |
| <b>1.4</b> | Faults are reported and logged promptly and accurately to appropriate personnel   |
| <b>2.1</b> | Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work                      |
| <b>2.2</b> | Tools and equipment are selected and checked for serviceability   |
| <b>2.3</b> | Components to be maintained are isolated  |

- |   |            |   |
|---|------------|---|
|   | <b>2.4</b> | Systems are tested and test results are compared with manufacturer specifications                                 |
|   | <b>2.5</b> | Maintenance tasks are carried out to specifications   |
|   | <b>2.6</b> | Unserviceable components are tagged according to organisational procedures and appropriate personnel are notified |
| <b>3 Isolate faulty components for repair</b> | <b>3.1</b> | Faulty items or components are isolated according to workplace procedures   |
|   | <b>3.2</b> | Serviceable items are fitted according to manufacturer specifications   |
|   | <b>3.3</b> | Operational checks are carried out on equipment or system to ensure compliance with manufacturer specifications   |
| <b>4 Clean up and complete documentation</b>  | <b>4.1</b> | Work area is cleared and cleaned  |
|   | <b>4.2</b> | Materials are disposed of or recycled according to legislative and workplace requirements                         |
|   | <b>4.3</b> | Tools and equipment are cleaned, checked and stored according to workplace procedures                             |
|   | <b>4.4</b> | Maintenance report is completed according to workplace procedures   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC003 Operate and maintain extra low and low voltage electrical systems and equipment.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARC035 Operate and maintain extra low and low voltage electrical systems and equipment**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying safety requirements throughout the work sequence, including the use of personal protective equipment (PPE)
- carrying out maintenance tasks, including:
  - replacing fuses
  - testing battery voltage and specific gravity
  - topping up battery electrolyte levels
  - testing charging system voltage output
- completing all work to specifications
- communicating with other crew members
- connecting and disconnecting shore power
- ensuring correct requirements and details of basic maintenance of electrical systems and equipment are available
- implementing safe and environmentally responsible work practices in testing and maintenance activities
- initiating timely action in response to defects or damage
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating direct current (DC) systems and conducting operator preventive maintenance according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- operating extra low and low voltage electrical systems and equipment according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- performing isolation, lock out and tag out procedures
- recognising and rectifying electrical system faults and, where necessary, taking steps to make them immediately safe, including:
  - battery faults
  - failure of alternators

- failure of starter motors
- selecting and using appropriate processes, tools and equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- AC system not exceeding 50 V and DC systems not exceeding 32 V
- basic care and fault recognition of electrical systems and equipment
- batteries:
  - care and maintenance
  - hazards
  - types
- charging systems:
  - alarms or indicators
  - regulators
- electrical systems:
  - above 32 V DC
  - above 50 V AC up to 415 V AC
- fault identification, location and safety implications
- how to recognise and rectify electrical system faults and, where necessary, steps to make them immediately safe, including:
  - battery faults
  - failure of alternators
  - failure of starter motors
  - faults with shore power connections including phase rotations using on-board switching equipment
  - blown fuses
  - tripping circuit breakers
- method of connecting batteries
- protective devices on switchboards
- relevant state/territory training and qualification requirements for carrying out installation, maintenance and/or repair of electrical systems and equipment
- shore power connection
- starter motors, alternators and associated equipment:
  - maintenance
  - operation
- uses of fuses and circuit breakers – selection of correct capacity
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate engine, propulsion plant, and auxiliary equipment with low and extra low voltage (ELV) electrical systems ashore
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC036 Operate deck machinery

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to safely use deck machinery on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on a vessel with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer and
- worker in the engine room on vessels <80 m in length with propulsion power <3000 kW.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 3 NC and Marine Engine Driver Grade 2 NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Prepare lifting equipment and deck machinery for use**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Relevant personal protective equipment and machinery is selected, used and stored according to work health and safety (WHS)/occupational health and safety (OHS) requirements

**1.2** Routine pre-operational checks are carried out on lifting equipment and deck machinery according to manufacturer specifications, regulatory and organisational requirements

**1.3** Deviations from the norm are promptly identified and rectified

**1.4** Adjustments are made to achieve a safe and efficient operation

**1.5** Inability to start machinery is reported promptly and accurately to appropriate personnel

#### **2 Operate lifting equipment and deck machinery**

**2.1** Machinery is operated in a safe and controlled manner

**2.2** Machinery is operated within defined operating limits when running, to achieve optimum safety and efficiency

**2.3** Deviations from normal operations are promptly identified

**2.4** Action is taken to rectify basic operational faults to maintain optimum safety and efficiency

**2.5** Appropriate action is taken in a malfunction or

emergency

**3 Check and complete lifting equipment and deck machinery operations**

- 3.1** Equipment and machinery shutdown procedures are carried out according to manufacturer specifications and organisational procedures
- 3.2** Equipment and machinery damage, malfunctions or irregular performance is recorded and reported according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC004 Operate deck machinery.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC036 Operate deck machinery

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating with other crew members
- safely using deck machinery, including:
  - basic hydraulic system
  - capstans
  - electric or hydraulic winches or windlasses
  - lifting equipment
- undertaking pre-operational checks, including:
  - checking oils, lubricants and hydraulic lines
  - inspection of safety guards
  - operation of emergency stops.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic hydraulic systems and their operation
- basic operational faults
- capstans
- communication techniques
- electric and hydraulic winches and windlasses
- legislation affecting lifting equipment
- lifting equipment and deck machinery
- machinery shutdown procedures
- manufacturer recommendations, regulations and vessel operating procedures
- operational techniques for specific location and weather conditions
- procedures and requirements for selecting and using appropriate machinery and equipment

- process for maintaining workloads within specifications
- safe working procedures
- stability implications as it relates to lifting gear
- techniques for identifying basic faults, including:
  - failure of hydraulic lines
  - structural failure
- watertight and or weather tight hatches
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate deck machinery ashore
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARC037 Operate inboard and outboard motors

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to operate inboard and outboard motors, and to diagnose basic faults.

This unit applies to people working in the maritime industry in the capacity of:

- coxswain on vessels <12 m in length, with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine, operating in inshore or designated waters or
- coxswain on tenders or auxiliary vessels operating within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 2 NC and a Coxswain Grade 1 NC, as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

C – Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Operate inboard and outboard motors

- 1.1 Pre-start checks are performed on the motor
- 1.2 Fuel is checked to ensure there is adequate fuel, including a reserve, on board
- 1.3 Motor is started and stopped safely and correctly
- 1.4 Motor controls are used to manoeuvre the vessel safely to complete work tasks
- 1.5 Motor is operated within safe limits during normal manoeuvres

#### 2 Secure vessel on completion of work task

- 2.1 Vessel is moored safely
- 2.2 Fuel system is closed down
- 2.3 Vessel is secured
- 2.4 Fuel is stored to minimise environmental and fire hazards as appropriate
- 2.5 Unserviceable equipment is reported and tagged out as unserviceable

#### 3 Maintain inboard and outboard motors

- 3.1 Fuel filters are drained of excess water
- 3.2 Batteries and connections are maintained to ensure reliable electrical supply to the motor
- 3.3 Engine and gearbox oil is checked and lubrication is applied
- 3.4 Engine mounting gear is checked as necessary

- |   |            |  |
|---|------------|--|
| <b>4 Identify basic inboard and outboard motor faults</b> | <b>4.1</b> | Operating difficulties caused by fuel-related factors are identified |
|   | <b>4.2</b> | Electrical faults are identified, tagged out and reported            |
|   | <b>4.3</b> | Motor propulsion faults are identified, tagged out and reported      |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC005 Operate inboard and outboard motors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC037 Operate inboard and outboard motors

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- conducting pre-start checks, including checking:
  - fuel
  - lubricating oil
  - cooling system
  - motor attachment points
  - water depth
- conducting shutdown checks on inboard and outboard motors, and tagging out and reporting faults
- estimating fuel consumption
- reading and interpreting company standard operating procedures (SOPs) about operating inboard and outboard engines
- storing inboard or outboard motors
- using inboard and outboard motor steering system.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- battery connection and hazards
- International Convention for the Prevention of Pollution from Ships (MARPOL) requirements as it applies to operating inboard and outboard motors
- motor:
  - cooling systems
  - fuel systems
  - lubricating systems
- risks associated with portable fuel tanks

- standard procedures to tag out and report faults
- starting motors
- troubleshooting techniques
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system, workplace procedures and operational manuals
- a vessel  $\geq 5.0$  metres in length with propulsion power of  $\geq 75$  kW, or appropriate engine ashore
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC038 Operate main propulsion unit and auxiliary systems

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to safely operate the main propulsion unit and auxiliary systems on a vessel <12 m in length.

This unit applies to people working in the maritime industry in the capacity of:

- coxswain on vessels <12 m in length, with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine, operating in inshore or designated waters or
- coxswain on tenders or auxiliary vessels <12 m in length operating within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under the Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate as master, engineer or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

C – Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Prepare propulsion unit and auxiliary system for use**

- 1.1** Appropriate personal protective clothing and equipment is selected, used, maintained and stored according to work health and safety (WHS)/occupational health and safety (OHS) requirements
- 1.2** Routine pre-operational checks are carried out on equipment according to manufacturer specifications and workplace requirements
- 1.3** Deviations from the norm are promptly identified and rectified
- 1.4** Adjustments are made to achieve a safe and efficient operation
- 1.5** Inability to start up equipment is reported promptly and accurately to appropriate personnel

#### **2 Operate propulsion unit and auxiliary system**

- 2.1** Equipment is operated in a safe and controlled manner
- 2.2** Performance and efficiency of equipment is monitored according to manufacturer instructions
- 2.3** Equipment is maintained within defined operating limits when running, to achieve optimum safety and efficiency
- 2.4** Environmental implications associated with operating equipment are identified and controlled
- 2.5** Deviations from normal operations are promptly identified
- 2.6** Action is taken to rectify irregularities to maintain optimum safety and efficiency

#### **3 Check and complete propulsion unit and**

- 3.1** Equipment shutdown procedures are carried out according to manufacturer specifications and workplace

**auxiliary system operation**

procedures

- 3.2 Equipment operational records are maintained according to workplace procedures
- 3.3 Equipment damage, malfunctions or irregular performance are recorded and reported according to workplace procedures
- 3.4 Equipment is cleaned according to manufacturer specifications and workplace procedures

**Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

**Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

**Unit Mapping Information**

This unit replaces and is equivalent to MARC006 Operate main propulsion unit and auxiliary systems.

**Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARC038 Operate main propulsion unit and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- carrying out pre-operational checks, including:
  - checking fuel system
  - checking leads, lines and connections
  - checking oils and lubricants
  - inspecting safety guards
- implementing safe and environmentally responsible work practices
- maintaining engine work load within specifications
- measuring and calculating volumes, consumption and servicing requirements
- monitoring noise levels for correct operation
- operating propulsion machinery and ancillary equipment
- recordkeeping
- using appropriate personal protective clothing and equipment (PPE).

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic operating principles of two and four-stroke engines
- environmental impacts and minimisation measures associated with operating propulsion machinery and auxiliary equipment
- environmental responsibilities
- factors associated with the safe operation of propulsion and auxiliary equipment
- hazards of refrigerant gases
- identification of components
- manufacturer specifications for operating propulsion machinery and auxiliary equipment
- operating principles and operating methods for propulsion machinery and auxiliary

equipment

- potential hazards and risks associated with operating propulsion machinery and auxiliary equipment
- potential hazards and risks involved with types of fuels, for example, petrol, diesel and liquefied petroleum gas (LPG)
- preparing for the use of propulsion machinery, auxiliary equipment and other mechanical equipment
- propulsion machinery and ancillary equipment, including:
  - ancillary equipment
  - bilge systems
  - cooling, lubricating and fuel systems
  - diesel engines
  - drive train assembly
  - low voltage electrical systems
  - machinery monitoring equipment
  - outboard engines
  - shore power leads and connections
  - steering gear
- routine checks required with the operation of propulsion machinery, auxiliary equipment and other mechanical equipment
- shore power connections and associated hazards
- use of low voltage electrical systems
- what to do in the case of malfunctions and emergencies with propulsion machinery, auxiliary equipment and other mechanical equipment
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- a commercial vessel  $\geq 5.0$  m in length with propulsion power of  $\geq 75$  kW, or appropriate engine ashore
- applicable documentation, such as legislation, regulations, codes of practice, safety

- management system, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) that are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARC039 Operate marine internal combustion engines, and propulsion and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to safely operate marine internal combustion engines, and propulsion and auxiliary systems on a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on a vessel with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels <80 metres long with propulsion power <3000 kW.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 3 NC and Marine Engine Driver Grade 2 NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer issued under the Navigation Act 2012.

Note: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere.

## Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Prepare engine, and propulsion and auxiliary systems for use**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Appropriate personal protective equipment (PPE) is selected, used, maintained and stored according to work health and safety (WHS)/occupational health and safety (OHS) requirements

**1.2** Routine pre-operational checks are carried out on equipment according to manufacturer specifications and workplace requirements

**1.3** Engine is started according to manufacturer specifications and organisational requirements

**1.4** Deviations from the norm are promptly identified and rectified

**1.5** Adjustments are made to achieve a safe and efficient operation

**1.6** Inability to start equipment is reported, and logged promptly and accurately to appropriate personnel

#### **2 Operate engine, and propulsion and auxiliary systems**

**2.1** Engine, and propulsion and auxiliary systems are operated in a safe and controlled manner

**2.2** Performance and efficiency of engine, and propulsion and auxiliary systems are monitored according

manufacturer instructions

- 2.3** Engine, and propulsion and auxiliary systems are operated within defined operating limits when running, to achieve optimum safety and efficiency
  - 2.4** Environmental implications associated with operation of engine, and propulsion and auxiliary systems are identified and controlled
  - 2.5** Deviations from normal operations are promptly identified
  - 2.6** Action is taken to identify and rectify basic operational faults to maintain optimum safety and efficiency
  - 2.7** Appropriate action is taken in the event of a malfunction or emergency
- 3 Complete operations**
- 3.1** Equipment shutdown procedures are carried out according to manufacturer specifications and workplace procedures
  - 3.2** Engine, propulsion and auxiliary system operational records are maintained according to workplace procedures
  - 3.3** Equipment damage, malfunctions or irregular performance is recorded and reported according to workplace procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC007 Operate marine internal combustion engines, and propulsion and auxiliary systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC039 Operate marine internal combustion engines, and propulsion and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- checking pressures, temperatures and revolutions during start-up and warm-up periods according to technical specifications
- complying with vessel operating procedures and manufacturer recommendations for start-up and making available fuel, lubricants, cooling water and air
- complying with work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- implementing safe and environmentally responsible work practices
- initiating timely action in response to defects or damage
- managing fuel systems safely according to regulations, manufacturer instructions and vessel procedures, so as to prevent pollution of the marine environment
- operating:
  - lubricating systems according to established procedures so as to prevent pollution of the marine environment
  - main propulsion plant auxiliary systems to ensure safe operating conditions
  - marine internal combustion engines within technical specifications
  - pumping systems according to manufacturer instructions, operational procedures and regulations to ensure safety of operation and prevention of pollution of the marine environment
  - refrigeration system according to manufacturer instructions, operational procedures and regulations to ensure safety of operation and prevention of pollution of the marine environment
- preparing shutdown and supervising cooling down of engine according to vessel operating procedures and manufacturer recommendations
- undertaking pre-operational and start-up checks, including:
  - coolant levels
  - pressures and temperatures
  - filters
  - fuel level



- batteries and turning on isolator
- oil level
- starting system
- sufficient power available on switchboard before closing isolator or breaker
- inspecting for leaks and faults on engines, equipment, lines and connections
- inspecting safety guards and shafts
- operating valves as required
- visual check electrical leads.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- air filters
- back-flooding prevention
- basic:
  - combustion process
  - governor operation
  - timing diagrams
- bearing types, materials, installation and lubrication
- causes and effects of vibration and undue wear
- circulating pumps
- controllable pitch propellers
- cooling systems, including keel cooling or heat exchangers, circulating pumps, ship's side valves, coolant circulation and thermostats
- corrosion
- couplings types, fittings, keys and keyways
- cross connections between bilge/ballast/seawater and fire systems
- differences between two-stroke and four-stroke cycles of operation
- drive systems, belts, clutches and motors
- emergency procedures in the event of:
  - failure of main engine
  - fire
  - flooding
  - loss of steering
- engine watchkeeping
- environmental implications and control of:
  - excessive noise
  - exhaust emissions
  - loss of fuel and oil overside
- fault identification, maintenance and prevention of corrosion

- fuel system fault-finding, rectification and possible emergency operation
- fuel systems, including petrol or diesel, carburettors or fuel injectors, and common rail
- gear box fault identification, rectification and emergency operation
- glands and packing seals
- identification and rectification of basic operational faults, including:
  - failure of:
    - cooling systems
    - lubrication systems
    - pumping systems
    - refrigeration systems
    - steering systems
  - starting faults
- identification of components of refrigeration systems
- injection pumps
- inspection and checks of main and auxiliary machinery and associated spaces
- instrumentation
- keeping running and maintenance logs
- lubricating systems, including lube oil circulating systems, lube oil system components, general lubrication, cooling effects and lubrication system problems
- maintenance logs and running logs
- marine two-stroke and four-stroke:
  - diesel engines
  - petrol engines
- major parts of marine internal combustion engines
- operation of firefighting equipment in engine space
- outlining operation and servicing propulsion system within the technical and manufacturer specifications
- power transmission operation
- propeller shaft and intermediate shaft alignment
- pumping systems, including fire or bilge or tank circulating systems
- recognising and repairing basic operational faults including:
  - organising maintenance assistance
  - testing steering arrangements according to manufacturer instructions, operational procedures and regulations
- refrigeration systems, including hazards of refrigerant gases
- relevant environmental responsibilities, regulations and legislative requirements
- relevant state/territory training and qualification requirements for carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere
- rudder and stock support bearings
- running checks
- start-up and shutdown procedures

- steering operation of hydraulic and cable, rod and gear
- steering systems, including rudder construction and rudder types
- stern drive and water jet drive units
- strainers, mudboxes and foot valves
- testing of steering and hydraulic systems
- tiller arm attachment
- turbo charging and supercharging
- use of flexible materials and hoses
- valve types
- ways of arranging maintenance according to relevant technical and manufacturer specifications
- ways of identifying:
  - major parts of marine internal combustion engines
  - marine propulsion systems components and explaining their functions
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate engine with propulsion and auxiliary systems ashore
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARC040 Manage fuel systems

### Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### Application

This unit involves the skills and knowledge required to manage the fuel and fuel oil systems of a vessel to ensure safety of operation and to avoid pollution of the marine environment.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW, within the EEZ or
- chief or second engineer on a vessel with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels <80 m in length with propulsion power <3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as Marine Engine Driver Grade 2 Near Coastal (NC), Marine Engine Driver Grade 1 Near Coastal (NC) and a Marine Engine Driver Steam as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 2 NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer issued under the Navigation Act 2012.

### Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan refuelling

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Fuel tanks are dipped to establish current level of fuel

**1.2** Amount of fuel on board vessel is calculated and positioning of fuel is determined

**1.3** Impact of refuelling on vessel safety is determined

**1.4** Fuel is ordered according to organisational procedures

#### 2 Prepare vessel for refuelling

**2.1** Vessel is positioned and secured for refuelling

**2.2** Refuelling equipment is correctly deployed according to organisational procedures

**2.3** Communication between all people involved in refuelling procedures is established

**2.4** Tank valves are opened as necessary and refuelling operations are performed according to organisational procedures and regulatory requirements

**2.5** Tanks are dipped to ensure correct amount of fuel has been received

#### 3 Complete refuelling operations

**3.1** Shutdown procedures are conducted according to organisational procedures

**3.2** Refuelling equipment is secured according to organisational procedures

**3.3** Refuelling records are completed according to organisational procedures and regulatory requirements

- 3.4 Malfunctions, faults, irregular performance or damage to refuelling equipment are recorded according to organisational procedures
- 4 Manage an emergency
  - 4.1 Appropriate response is made to emergency situation according to organisational procedures
  - 4.2 Personnel are correctly notified and their activities are managed to ensure their safety according to organisational procedures
  - 4.3 Waste containment measures are implemented to protect the environment
  - 4.4 Appropriate authorities are notified when required
  - 4.5 Incident is recorded according to regulatory requirements and organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC008 Manage fuel systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC040 Manage fuel systems

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) and pollution control, legislation and policies
- carrying out accurate and reliable calculations dealing with bunkering capacity, consumption of fuel, speed and range of vessel, volumes and conversion of volumes to litres
- completing required records
- conducting refuelling completion procedures, including communications with fuel supplier and valve closure
- managing refuelling to ensure safety of operation and avoid pollution of marine environment
- measuring tank levels
- recognising faulty equipment and taking appropriate action
- recognising problems and hazards during refuelling operations and taking appropriate action
- selecting and using relevant equipment required for refuelling operations
- taking appropriate action in response to an accidental spillage or safety incident during refuelling operations.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- appropriate authorities to be notified in the event of an emergency
- arrangement of fuel oil systems
- calculations of volumes
- condensation in fuel tanks
- conversion of volumes to litres
- effect of slack tanks on vessel stability
- emergency situations, including:
  - fire
  - hose rupture or bunker line leak

- ignition of released fuel vapours
- loss of stability
- spillage on deck or overboard
- environmental protection measures to be applied during refuelling or transfer operations
- fuel oil tank components
- fuel tank filling
- functions and responsibilities of crew during refuelling or transfer operations
- hazards and safety precautions to be observed during refuelling or transfer operations
- manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- methods of fuel oil tank content measurement
- process for completing required records including:
  - logbook
  - oil record book
  - port authority documentation
- refuelling and fuel transfer procedures applying to commercial vessels
- refuelling records
- shutdown procedures including communications with fuel supplier and valve closure
- specific fuel consumption
- WHS/OHS and pollution control, legislation and policies.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management systems (SMS), workplace procedures and operational manuals, including:
  - logbook
  - oil record book
  - port authority documentation
  - SDS/MSDS
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate engine ashore



- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARC041 Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Application**

This unit involves the skills and knowledge required to safely operate marine internal combustion engines, propulsion plant and auxiliary systems on a vessel up to 750 kW.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on a vessel with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels up to 80 metres in length with propulsion power <3000 kW.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 2 NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer issued under the Navigation Act 2012.

Note: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere.

## Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare for sea

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Fuels and lubricating fluids required for proposed voyage are acquired
- 1.2 Spares and stores required for proposed voyage are acquired
- 1.3 Flammable or explosive materials are stowed and managed according to regulatory and organisational requirements
- 1.4 Work health and safety (WHS)/occupational health and safety (OHS) hazards in engine room are identified, risk assessed and corrective actions taken according to organisational practices
- 1.5 Pre-start checks are conducted on machinery and equipment according to organisational procedures and manufacturer specifications
- 1.6 Engines are started according to manufacturer specifications and vessel procedures
- 1.7 Starting faults are recognised and rectified according to manufacturer specifications and fault-finding procedures

#### 2 Operate engines, propulsion plant and

- 2.1 Engines, propulsion plant and auxiliary systems are operated within technical specifications

## **auxiliary systems**

- 2.2** Main propulsion plant and auxiliary systems are operated and monitored to ensure they are within operating limits specified by vessel procedures and manufacturer recommendations
  - 2.3** Environmental implications associated with operation of engine, propulsion plant and auxiliary systems are identified and controlled where possible
  - 2.4** Accidental or operational discharge of polluting substances are recorded according to regulatory requirements and organisational procedures
  - 2.5** Operational faults are recognised and rectified in accordance with manufacturer specifications and fault-finding procedures
  - 2.6** Operational records are kept according to regulatory requirements and organisational procedures
  - 2.7** Appropriate action is taken when a malfunction or emergency occurs
- 3 Secure vessel after voyage**
- 3.1** Engines, propulsion plant and auxiliary systems are shut down according to manufacturer specifications and vessel procedures
  - 3.2** Damage and repairs requiring action are recorded according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC009 Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC041 Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) and pollution control, legislation and policies
- identifying constructional parts of marine internal combustion engines
- maintaining logs, including:
  - maintenance logs
  - oil record book
  - running logs
- managing:
  - cooling systems
  - lubricating systems and preventing pollution of marine environment
  - pumping systems and preventing pollution of marine environment
- stowage of flammable or explosive materials and refrigerant gases
- operating main propulsion plant and auxiliary systems within recommended parameters
- preparing vessel and machinery for sea
- recognising and rectifying operational faults
- securing vessel and machinery after voyage
- taking action in the event of malfunction or emergency.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action taken in the event of malfunction or emergency, including:
  - fire
  - flooding
  - main engine failure

- steering failure
- bilge pumping for vessels with several compartments
- causes and effects of vibration and undue wear
- characteristics of flammable/explosive materials, including:
  - liquid fuels
  - liquefied petroleum gas (LPG)
- common faults:
  - in steering gear
  - of deck machinery
- construction of heat exchangers
- controllable pitch propellers (CPP) operation
- coolant circulation and thermostats
- corrosion prevention
- cross connections between:
  - bilge or ballast or seawater systems and fire main
  - seawater systems and bilge systems
- dangers associated with:
  - back-flooding and methods to prevent back-flooding
  - LPG and petrol vapours
  - refrigerant gas leaks in confined spaces
- diesel engine:
  - construction
  - fuel injection, timing and control equipment
  - operation
- dry sump and wet sump lubrication systems and components
- electrohydraulic steering gear
- engine:
  - protection arrangements
  - performance and reasons for lack of performance
- engine room hazards and their minimisation
- environmental responsibilities, regulations and legislative requirements
- gearbox fault identification and emergency operation
- governor operation
- hazards of refrigerants
- heat exchanger, keel cooler and raw water cooling systems
- lubrication and cooling:
  - effects of gearboxes
  - lubricating oil system faults
- marine two-stroke and four-stroke engines
- method of propulsion plant reversal including CPP

- operation of marine gearboxes
- other flammable gases
- polluting substances and their effect on the environment, including:
  - chemicals
  - excessive noise
  - exhaust emissions
  - fuel and oil overboard
  - pumping bilges
  - refrigerant gas
  - sewage
- preparations and checks necessary before sailing
- pressure and flow regulators
- procedures and requirement for operating main propulsion plant and auxiliary systems within recommended parameters, including:
  - cooling systems
  - fuel systems
  - gearbox
  - lubricating systems
  - pumping systems
  - refrigeration systems
  - steering systems
- pump capabilities and requirements for priming
- refrigeration system and components
- relevant state/territory training and qualification requirements for carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere
- refrigerant gas
- routine for operating and maintaining steering systems
- seawater circulating systems
- securing vessel after voyage
- ship side valves
- shutting down machinery
- stern drive and water jet drive units
- storage of LPG cylinders
- testing:
  - LPG detectors
  - steering gear
- turbo charging and supercharging arrangements
- two- and four-stroke cycles of operation
- types and operation of deck machinery, including basic hydraulic systems
- types of:



- gear trains
- pumps and safety devices
- watchkeeping duties
- WHS/OHS and pollution control, legislation and policies.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or an appropriate internal combustion engine, propulsion plant and auxiliary systems ashore
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARC042 Operate electrical systems

### Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### Application

This unit involves the skills and knowledge required to operate 220 to 440 V alternating current (AC) electrical systems.

This unit applies to people working in the maritime industry in the capacity of:

- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the exclusive economic zone (EEZ) or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on a vessel with an outboard engine with unlimited propulsion power within the EEZ or
- assistant under direct supervision of a chief engineer; and
- worker in the engine room on vessels up to 80 metres in length with propulsion power up to 3000 kW.

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 2 NC and a Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification as a Marine Engine Driver Grade 2 NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as engineer issued under the Navigation Act 2012.

### Pre-requisite Unit

Not Applicable

## Competency Field

C - Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Prepare electrical systems and equipment for operation**

**1.1** Risks to self, others and the environment are identified according to organisational procedures

**1.2** Pre-operational checks are carried out according to manufacturer specifications and organisational procedures

#### **2 Operate electrical systems and equipment**

**2.1** Electrical systems and equipment are operated according to manufacturer specifications, regulations and vessel procedures

**2.2** Performance of electrical equipment is monitored

**2.3** Alternating current (AC) electrical supply is monitored and demand is adjusted

**2.4** Operational faults are recognised and recorded, and corrective action is taken according to manufacturer specifications and fault-finding procedures

#### **3 Connect and disconnect ship to shore electrical supply**

**3.1** Vessel is positioned and secured for connecting to shore electrical supply

**3.2** Power cable is inspected and connected to shore supply

**3.3** Procedures for changing from vessel supply to shore supply are implemented following vessel procedures

**3.4** Electrical supply is monitored for correct operation according to vessel procedures

- 3.5 Operational faults are recognised and recorded, and corrective action is taken according to vessel procedures
- 3.6 Procedures for changing from shore supply to vessel supply are implemented following vessel procedures
- 3.7 Power cable is disconnected, inspected and stored

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARC010 Operate electrical systems.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARC042 Operate electrical systems

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adjusting electrical supply to accommodate load demand
- applying work health and safety (WHS)/occupational health and safety (OHS) and pollution control, legislation and policies
- connecting and disconnecting shore supply
- locating, interpreting and applying manufacturer specifications for electrical systems and equipment
- operating and monitoring alternating current (AC) and direct current (DC) electrical systems according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- operating electrical systems and equipment
- performing isolation, lock out and tag out procedures
- recognising and rectifying operational faults.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- adjusting low voltage electrical supply to accommodate load demand, including:
  - changing electrical supply to a larger alternator
  - connecting further alternators in parallel
- basic care of electrical systems and equipment in general - fault recognition
- batteries:
  - care
  - hazards
  - types
- charging systems:
  - alarms or indicators

- regulators
- connecting batteries in series and parallel
- earth indicating devices
- electric systems above 32 V DC and up to 415 V AC
- emergency supply and regulatory requirements
- fault identification, location and safety implications
- operation of fuses and circuit breakers
- operation of protection devices on the switchboard
- operation of starter motors, alternators and associated equipment
- personal safety
- process for recognising and rectifying operational faults, including:
  - activation of protection devices on the switchboard
  - battery faults
  - blown fuses and open circuit breakers
  - earth faults
  - failure of alternators to produce voltage
  - failure of starter motors
  - faults with shore power connections including phase rotations
- process for recognising non-essential electrical systems be isolated.
- process for requesting non-essential electrical systems be isolated
- shore power connection
- single and three-phase power
- uses of fuses and circuit breakers and selection of correct capacity
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management systems (SMS), workplace procedures and operational manuals
- a commercial vessel with inboard diesel propulsion power of  $\geq 150$  kW or appropriate

electrical systems ashore

- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARC043 Transmit and receive information by marine radio

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to:

- transmit and receive information by marine radio, including using marine very high frequency (VHF) and high frequency (HF) radio according to regulations
- carry out user maintenance and fault-finding procedures on radio equipment and power supplies
- operate emergency position indicating radio beacons (EPIRBs), search and rescue radar transponders (SARTs), automatic identification system search and rescue transmitters (AIS-SARTs), AIS man overboard (AIS-MOB) devices and digital selective calling MOB (DSC-MOB) devices.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <80 m in length within the exclusive economic zone (EEZ) or
- chief mate or deck watchkeeper on a vessel <80 m in length within the EEZ.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. The Radiocommunications Act 1992 (the Radcomm Act), through the Radiocommunications Licence Conditions (Maritime Ship Licence) Determination 2015 requires that operators of VHF maritime ship stations are appropriately qualified to operate the stations. This means that operators are required to hold a relevant Australian maritime radio operator's certificate of proficiency or an equivalent overseas qualification.

The Australian Maritime College (AMC) acts as the Australian Communications and Media Authority (ACMA) delegate in providing marine radio certificate services under the Radcomm Act, including the issue of Long Range Radio Operator's Certificates of Proficiency (LROCPs). Operators who have attained a Statement of Attainment from a Registered Training Organisation (RTO) for this unit can apply to the AMC for the issue of a LROCP without the need to sit a further examination. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as defined in the National Standard for Commercial Vessels (NSCV) Part D.

## Pre-requisite Unit

Not Applicable



## Competency Field

C – Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Operate VHF and HF radio equipment to transmit and receive messages**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Appropriate VHF and HF radio equipment is selected for operation within limits of specifications
- 1.2** Radio equipment is operated to transmit and receive various types of signal according to manufacturer instructions, established radio operation procedures and regulatory requirements
- 1.3** Regulations and procedures applicable to vessel stations equipped with radio voice communications (radiotelephony) and digital selective calling (DSC) facilities are applied during radio communication
- 1.4** Work health and safety (WHS)/occupational health and safety (OHS) procedures and hazard control strategies are applied when operating radio equipment according to vessel safety management system
- 1.5** Radio communication problems are documented and promptly reported according to organisational procedures

#### **2 Maintain and fault-find radio equipment**

- 2.1** Routine maintenance checks are carried out on radio voice communications (radiotelephony) equipment according to manufacturer instructions and specifications, and organisational procedures
- 2.2** Out-of-specification performance and faults in radio equipment are correctly identified and investigated using prescribed fault-finding techniques according to

		established user maintenance procedures and manufacturer instructions
<b>3 Access search and rescue radio facilities</b>	<b>3.1</b>	Request is made to the appropriate organisation for the provision of the required search and rescue services
	<b>3.2</b>	Information required by the Modernised Australian Ship Tracking and Reporting System (MASTREP) is supplied and received in the required format
<b>4 Deploy and operate an EPIRB, SART and AIS-SART</b>	<b>4.1</b>	Routine checks are carried out on EPIRBs, SARTs and AIS-SARTs to confirm their operational capability according to manufacturer instructions and specifications
	<b>4.2</b>	Appropriate action is taken to rectify or replace EPIRBs, SARTs or AIS-SARTS that are found to be malfunctioning or are inoperable according to manufacturer instructions and organisational procedures
	<b>4.3</b>	EPIRBs, SARTs and AIS-SARTs are deployed as required according to manufacturer instructions and established search and rescue procedures
<b>5 Operate a MOB device as a locating device in an emergency</b>	<b>5.1</b>	Routine checks are carried out on AIS-MOB and DSC-MOB devices to confirm their operational capability according to manufacturer instructions and specifications
	<b>5.2</b>	AIS-MOB and DSC-MOB devices are operated according to manufacturer instructions and regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC020 Transmit and receive information by marine

radio.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC043 Transmit and receive information by marine radio**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) procedures and precautions when using and checking radio equipment
- simulating radio voice communications (radiotelephony) accurately and consistently in both normal and emergency situations using very high frequency (VHF) and high frequency (HF) radio equipment in compliance with the relevant sections of radio regulations, including:
  - distress, urgency and safety communications
  - medical service
  - navigational
- communicating effectively with others during radio communication
- conducting operational checks on radio equipment
- identifying and evaluating radio communication problems and determining appropriate courses of action
- maintaining records of radio communication
- operating radio equipment according to manufacturer instructions
- operating VHF and HF radio equipment to transmit and receive messages, including:
  - operating normal vessel-to-vessel service (ship-to-ship)/normal vessel-to-shore service (ship-to-shore)
- performing operational checks on emergency position indicating radio beacons (EPIRBs), search and rescue radar transponders (SARTs), automatic identification system search and rescue transmitters (AIS-SARTs), AIS man overboard (AIS-MOB) devices and digital selective calling MOB (DSC-MOB) devices.
- reading and interpreting marine radio regulations, rules and instructions
- recognising typical faults and problems with radio equipment and taking appropriate action
- simulating the operation of AIS-MOB devices and DSC-MOB devices
- using the phonetic alphabet.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of

the requirements of the elements and performance criteria and include knowledge of:

- Australian marine search and rescue system
- available radio services, including:
  - Modernised Australian Ship Tracking and Reporting System (MASTREP)
  - medical advice services
  - public correspondence
  - scheduled broadcasts (skeds)
  - search and rescue
- different types of marine radio equipment, their features, applications, operating characteristics, limitations and operating procedures
- EPIRB frequencies
- hazards associated with radio transmission, the repair and maintenance of radio equipment, and related hazard control measures
- marine VHF repeater stations
- methods of communicating vessel position
- operational checks of radio equipment
- principles and procedures for marine radio communication
- procedures for:
  - deploying and operating EPIRBs and SARTs
  - keeping radio communication records
  - transmitting and decoding the phonetic alphabet, excluding the figure code
- purpose of, and procedures for monitoring, calling and working frequencies
- radio calling, replying and relaying procedures
- radio communication log
- radio equipment manufacturer specifications and instructions
- relevant organisations, and their services, including:
  - coast stations
  - limited coast stations
  - Maritime Communication Stations
  - state or territory police forces
- relevant sections of maritime regulations related to radio operation, including:
- radio regulations adopted by the World Radio Communication Conference (as amended), including Chapters VII and IX
- typical radio communication problems and appropriate action and solutions
- typical radio equipment faults, defects and related fault-finding techniques and remedial procedures
- WHS/OHS regulations appropriate to the operation and maintenance of radio equipment.

## Assessment Conditions

Assessors of this unit must hold as a minimum:

- a Long Range Radio Operator's Certificate of Proficiency (LROCP) or equivalent, issued under the Radio communications Act 1992, with a minimum 12 months relevant experience.

Assessors must also satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) shall be undertaken in accordance with its instructions, ensuring the assessment covers a range of the items identified in the Performance Evidence.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the *Navigation Act 2012*.

Resources for assessment must include access to:

- documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures, guidelines and operational manuals relating to the use of radio communication equipment, including:
  - Marine Radio Operators Handbook
  - Radiocommunications Act (1992)
  - radio regulations adopted by the World Radiocommunication Conference (as amended)
- tools, equipment, materials and relevant personal protective equipment (PPE) currently used in industry, including:
  - AIS-MOB devices
  - AIS-SARTs
  - DSC-MOB devices
  - EPIRBs
  - medium frequency (MF) or HF radio transceiver with DSC capabilities
  - SARTs
  - VHF radio transceiver with DSC capabilities.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARC044 Transmit and receive information by marine VHF radio

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to:

- transmit and receive information by marine very high frequency (VHF) radio according to regulations
- carry out user-maintenance and fault-finding procedures on radio equipment and power supplies
- operate emergency position indicating radio beacons (EPIRBs), search and rescue radar transponders (SARTs), automatic identification system search and rescue transmitters (AIS-SARTs), AIS man overboard (AIS-MOB) device, and digital selective calling MOB (DSC-MOB) device.

This unit applies to people working in the maritime industry in the capacity of:

- coxswain on vessels <12 m in length with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine operating in inshore or designated waters or
- coxswain on tenders or auxiliary vessels <12 m in length operating within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

This unit covers VHF radio equipment only; *MARC020 Transmit and receive information by marine radio or telephone* should be selected where competency in both VHF and high frequency (HF) radio is required.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. The *Radiocommunications Act 1992* (the *Radcomm Act*), through the Radiocommunications Licence Conditions (Maritime Ship Licence) Determination 2015, requires that operators of VHF maritime ship stations are appropriately qualified to operate the stations. This means that operators are required to hold a relevant Australian Maritime Radio Operator's Certificate of Proficiency or an equivalent overseas qualification.

The Australian Maritime College (AMC) acts as the Australian Communications and Media Authority (ACMA) delegate in providing marine radio certificate services under the *Radcomm Act*, including the issue of Short Range Radio Operator's Certificates of Proficiency (SROCP). Operators who have attained a Statement of Attainment from a Registered Training Organisation (RTO) for this unit of competency can apply to the AMC for the issue of a SROCP without the need to sit a further examination. This unit of competency is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 1 Near Coastal



(NC), as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification.

## Pre-requisite Unit

Not Applicable

## Competency Field

C – Equipment Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Operate VHF radio equipment to transmit and receive messages**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** VHF radio equipment is selected for operation within limits of specifications
- 1.2** VHF radio equipment is operated to transmit and receive various types of signal according to manufacturer instructions, established radio operation procedures and regulatory requirements
- 1.3** Regulations and procedures applicable to vessel stations equipped with VHF radio and DSC facilities are applied during radio communication
- 1.4** Work health and safety (WHS)/occupational health and safety (OHS) procedures and hazard control strategies are applied when operating VHF radio equipment according to vessel safety management system
- 1.5** Radio communication problems are documented and promptly reported according to established procedures
- 2 Maintain and fault-find VHF radio equipment**
  - 2.1** Routine maintenance checks are carried out on VHF radio equipment according to manufacturer instructions

- and specifications, and company procedures
- 2.2** Out-of-specification performance and faults in VHF radio equipment are correctly identified and investigated using prescribed fault-finding techniques according to established user maintenance procedures and manufacturer instructions
- 3 Access search and rescue VHF radio facilities**
- 3.1** Request is made to the appropriate organisation for the provision of the required search and rescue services
- 3.2** Information required by the Modernised Australian Ship Tracking and Reporting (MASTREP) system is supplied and received in the required format
- 4 Deploy and operate an EPIRB, SART and AIS-SART**
- 4.1** Routine checks are carried out on EPIRBs, SARTs and AIS-SARTs to confirm their operational capability according to manufacturer instructions and specifications
- 4.2** Appropriate action is taken to rectify or replace EPIRBs, SARTs or AIS-SARTs that are found to be malfunctioning or are inoperable according to manufacturer instructions and company procedures
- 4.3** EPIRBs, SARTs and AIS-SARTs are deployed according to manufacturer instructions and established search and rescue procedures
- 5 Operate a MOB device as a locating device in an emergency**
- 5.1** Routine checks are carried out on AIS-MOB and DSC-MOB devices to confirm their operational capability according to manufacturer instructions and specifications
- 5.2** AIS-MOB and DSC-MOB devices are operated according to manufacturer instructions and regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARC021 Transmit and receive information by marine VHF radio.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARC044 Transmit and receive information by marine VHF radio**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing search and rescue radio facilities
- adapting to changes in equipment and procedures in the workplace
- applying work health and safety (WHS)/occupational health and safety (OHS) procedures and precautions when using and checking very high frequency (VHF) radio equipment
- carrying out radio communication accurately and consistently in both normal and emergency situations using shipboard VHF radio equipment and using emergency position indicating radio beacons (EPIRBs), search and rescue radar transponders (SARTs), in compliance with the relevant sections of the Radio Regulations adopted by the World Radio Communication Conference (as amended) and maritime regulations, including:
  - distress, urgency and safety communications
  - medical service
  - navigational
  - normal vessel-to-vessel service (ship to ship)
  - normal vessel-to-shore service (ship to shore)
- communicating effectively with others during VHF radio communication
- conducting operational checks on VHF radio equipment
- deploying and operating an EPIRB and a SART
- maintaining and fault-finding radio equipment
- maintaining records of radio communication
- operating VHF radio equipment to transmit and receive messages in accordance with manufacturer instructions
- operating automatic identification system man overboard (AIS-MOB) devices and digital selective calling MOB (DSC-MOB) devices
- performing operational checks on EPIRBs, SARTs, AIS-SARTs, AIS-MOB devices and DSC-MOB devices
- recognising typical faults and problems with VHF radio equipment and taking appropriate action
- reading and interpreting marine VHF radio regulations, rules and instructions
- using the phonetic alphabet.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- Australian marine search and rescue system
- available radio services, including:
  - Modernised Australian Ship Tracking and Reporting (MASTREP)
  - medical advice services
  - public correspondence
  - scheduled broadcasts (skeds)
  - search and rescue
- different types of marine VHF radio equipment, their features, applications, operating characteristics, limitations and operating procedures
- EPIRBs
- guidelines relating to the use of VHF radio communication equipment
- hazards associated with VHF radio transmission, and the repair and maintenance of VHF radio equipment, and related hazard control measures
- limitations on the performance of different types of marine VHF radio equipment
- marine VHF repeater stations
- methods of communicating vessel position
- operational checks, including:
  - checking VHF radio performance
  - measuring capacity of batteries and the specific gravity of the electrolyte
  - measuring on and off load voltage
  - testing fuses
- principles and procedures for marine VHF radio communication
- procedures for:
  - deploying and operating EPIRBs, SARTs and AIS-SARTs
  - keeping records of VHF radio communication
  - transmitting and decoding of the phonetic alphabet, excluding the figure code
- purpose of, and procedures for, the monitoring of calling and working frequencies
- relevant organisations and their services, including:
  - coast stations
  - company bases
  - fishing organisations and cooperatives
  - limited coast stations
  - private shore stations
  - state or territory police forces
- sections of relevant regulations related to marine VHF radio communication

- VHF radio calling, replying and relaying procedures
- VHF radio equipment faults and defects and related fault-finding techniques and remedial procedures
- VHF radio communication problems and appropriate action and solutions
- WHS/OHS regulations appropriate to the operation and maintenance of VHF radio equipment.

## Assessment Conditions

Assessors of this unit must hold as a minimum:

- a Short Range Radio Operator's Certificate of Proficiency (SROCP) issued under the *Radiocommunications Act 1992* (the *Radcomm Act*), with a minimum 12 months relevant experience.

Assessors must also satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- documentation, such as legislation, regulations, codes of practice, safety management system, workplace procedures and operational manuals, including:
  - Marine VHF Radio Operators Handbook
  - *Radiocommunications Act 1992* (the *Radcomm Act*)
  - Radio Regulations adopted by the World Radiocommunication Conference (as amended)
- tools, equipment, materials and relevant personal protective equipment (PPE) currently used in industry, including:
  - VHF radio transceiver
  - DSC equipment
  - aerials
  - batteries
  - electrical and radio cable connections
  - electrical fuses
  - EPIRBs
  - SARTs
  - AIS-SARTs
  - AIS-MOB devices

- DSC-MOB devices.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARD001 Manage business and administration on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to manage the business and administration of a commercial ocean-going vessel and its personnel in compliance with Australian and international regulations and guidelines, and to ensure the protection of the marine environment and the safety of the vessel and people on board.

Managing vessel business operations and resources includes legal and commercial responsibilities, the safety management system (SMS), procedures to obtain a safety management certificate and subsequent audits, managing work health and safety (WHS)/occupational health and safety (OHS) procedures and practices, monitoring and controlling expenditure, and analysing and preparing reports.

It also involves organising and managing crew, and includes allocating duties, conducting required training, and assessing and maintaining expected standards of work and behaviour.

This unit applies to people who work in the maritime industry as Master or Chief Mate on a vessel of up to 500 gross tonnage (GT) or as a Watchkeeper on a vessel up to 3000 GT or as Master or Chief Mate on vessels up to 3000 GT operating in near coastal waters.

The unit is consistent with the relevant sections of STCW 95 and Marine Orders under the Australian Navigation Act 2012.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

D – Administration and Human Resources



## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Develop plans for general and specific vessel operations**

- 1.1 Vessel operation goals and objectives are identified according to company procedures, operational orders, regulatory requirements and established marine management practice
- 1.2 General and specific vessel operations plans are drawn up according to company procedures
- 1.3 Correct procedures for emergency response on board a vessel are developed according to company procedures, operational orders, regulatory requirements and established marine management practice
- 1.4 Appropriate validation measures and standards are devised to monitor progress in operations against plans, and appropriate contingency plans are developed for any discrepancies or variations that may occur during operations
- 1.5 Service procedures and systems improvement opportunities are identified and appropriate measures are taken to act on these opportunities according to company procedures and established marine management practice
- 1.6 Plans, goals, objectives and instructions for general and specific vessel operations and emergency and contingency procedures are distributed to relevant personnel according to company procedures and established marine management practice

### **2 Ensure legal requirements are fulfilled**

- 2.1 Legal basis under which a commercial vessel operates is interpreted and followed, and shipmaster safety, legal and commercial obligations are identified and carried out in a relevant range of operational circumstances
- 2.2 National and international conventions, laws and regulations pertaining to vessel operations and contingencies are implemented
- 2.3 Entries are made into vessel log books as required and carriage of all required vessel certification is confirmed and

- ensured
- 2.4 Appropriate arrangements are made for preparing vessel for statutory survey and certification
  - 2.5 Relevant code of conduct and industrial agreements are applied to vessel operations and management, and shipmaster responsibilities as they relate to crew health and safety are implemented
  - 2.6 Vessel security procedures are consistent with International Maritime Organization (IMO) International Ship and Port Facility Security Code (ISPS Code)
  - 2.7 Procedures and requirements relating to state port control are implemented
  - 2.8 Procedures and requirements relating to customs, quarantine and immigration clearances are implemented
- 3 Ensure commercial and business requirements are fulfilled**
- 3.1 Contracts of carriage and bills of lading under which vessel owners and cargo owners operate are interpreted and adhered to according to company procedures, legal requirements and established marine management practice
  - 3.2 Commercial and legal aspects of general average, salvage and towage are identified, interpreted and implemented according to company procedures, legal requirements and established marine management practice
  - 3.3 Commercial and legal aspects of marine hull and cargo insurance are identified, interpreted and implemented according to company procedures, legal requirements and established marine management practice
  - 3.4 Accident and incident investigation processes are identified and implemented according to company procedures, legal requirements and established marine management practice
- 4 Monitor and control vessel expenditure**
- 4.1 Accrual accounting procedures are correctly used to monitor and control vessel expenditure and where relevant, vessel budget is prepared according to established vessel financial procedures and established accounting practice, with relevance to commercial market in which a vessel operates
  - 4.2 Plans and appropriate contingency procedures are developed to correct any variation from vessel budget and identified expenditure, and records are maintained according to established vessel financial procedures and established

		accounting practice
	4.3	Appropriate action is taken when expenditure varies from vessel budget according to contingency plans, company procedures and established accounting practice
<b>5 Develop and implement vessel safety management system</b>	5.1	Vessel SMS is developed according to relevant maritime regulations and company procedures
	5.2	SMS safety procedures and related documentation are developed in collaboration with relevant vessel personnel
	5.3	SMS documentation structure and content is maintained according to requirements, and appropriate action is taken to ensure correct procedures are followed to obtain a safety management certificate according to maritime regulatory requirements
	5.4	Appropriate measures are taken to ensure all personnel on board vessel are familiar with SMS documentation, that familiarisation arrangements for new crew members are carried out, and that all personnel apply SMS procedures relevant to their functions
	5.5	Correct procedures are followed to obtain a safety management certificate according to maritime regulatory requirements
<b>6 Monitor and control vessel physical resources</b>	6.1	Vessel inventory of plant, equipment and other physical resources is maintained accordance to company procedures, vessel survey requirements and established marine management practice
	6.2	Reports on status of vessel physical resources are prepared and submitted to relevant personnel within company and regulatory authorities according to company procedures, vessel survey requirements and established practice
<b>7 Analyse and compile operational and voyage data</b>	7.1	Operational and voyage data is collected and compiled according to company practice, regulatory requirements and established marine management practice
	7.2	Voyage report is prepared and validated according to company procedures, vessel survey requirements and established marine management practice
	7.3	Voyage report is submitted to designated personnel according to company procedures, vessel survey requirements and established practice

- |   |   |
|---|---|
| <b>8 Provide leadership to officers and crew</b>                            | <p>8.1 Feedback and support are provided to crew on achievements and performance in their day-to-day work</p> <p>8.2 Crew are treated fairly, equitably, effectively and honestly in matters related to their day-to-day work</p> <p>8.3 Appropriate action is taken to prevent harassment and where it has occurred, harassment is dealt with promptly, effectively and fairly</p> <p>8.4 Crew suggestions for work improvements are listened to, acted upon and credit for achievements is shared with crew</p> <p>8.5 Good example is provided of a responsible, fair, sympathetic, equitable and diligent member of shipboard team</p>  |
| <b>9 Allocate duties and maintain set standards of work on board vessel</b> | <p>9.1 Work requirements and crew competencies required for work duties are identified and clarified</p> <p>9.2 Crew member competencies are assessed and confirmed, and duties are assigned to crew according to crew competencies and capabilities</p> <p>9.3 Competency deficiencies in personnel are identified and remedial action is initiated through counselling and training</p> <p>9.4 Crew members are advised of rostered duties and required performance standards are set in conjunction with crew members according to company procedures</p> <p>9.5 Crew members are motivated to achieve set standards of work performance using appropriate methods</p> <p>9.6 Performance of crew members is monitored as required using appropriate methods according to company procedures, performance assessments are discussed with relevant crew members and agreement is reached on appropriate action to be taken where performance is below set standards</p> |
| <b>10 Resolve conflict</b>  | <p>10.1 Conflict situations are recognised and issues are clarified with personnel involved</p> <p>10.2 Solutions to conflict are negotiated using appropriate mediation and conflict resolution techniques</p>   |
| <b>11 Plan, organise, promote and evaluate shipboard training and</b>       | <p>11.1 Workplace trainer and assessor requirements are identified and appropriate staff are trained and assigned as required</p> <p>11.2 Work related training opportunities are planned and organised for crew according to identified needs and</p>  |

## **assessment**

## **company policy**

- 11.3 Shipboard drills are organised according to regulations and company procedures
- 11.4 Assessment of crew members during and after training activities and shipboard drills is carried out to confirm required competencies and related knowledge have been acquired
- 11.5 Crew members are debriefed after training, drill and assessment activities using appropriate methods and efficacy of training, drill and assessment activities is evaluated based on feedback from participating crew members and other relevant evidence
- 11.6 Outcomes of evaluations of training and assessment are discussed with trainers and assessors, and appropriate action is taken to make required improvements
- 11.7 Reports on training and assessment are evaluated and resultant action is maintained and/or entered into vessel log as required

## **Foundation Skills**

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Vessel include one or
- vessels up to 500 GT (in the case of a Master or Chief Mate)
  - vessels up to 3000 GT (in the case of a Watchkeeper)

more of the following:

- vessels up to 3000 GT (in the case of a Master or Chief Mate) operating in near coastal operations

Vessel operations include one or more of the following:

- berthing and unberthing
- bridge operations
- cargo handling and care
- catering operations
- commercial operations (Australian and international regulations and conventions)
- deck operations and maintenance
- emergency and damage control operations
- engine room operations and maintenance
- mooring operations
- navigation
- passenger service operations
- personnel training
- pollution control operations
- radio operations
- safety/emergency drills
- slipping operations
- state port control

Laws and regulations pertaining to vessel operations and contingencies include one or more of the following:

- agency
- customs and quarantine
- deaths and disappearances
- drugs
- immigration
- marine pollution (Australian laws and IMO conventions)
- operational safety (Australian regulations and IMO conventions)
- security and anti-terrorism
- smuggling and piracy
- stowaways and refugees
- wrecks, salvage and towage

Vessel inventory of plant, equipment and other physical resources include one or more of the following:

- recording resources that are:
  - faulty
  - worn
  - damaged

Vessel physical resources include one or more of the following:

- accommodation equipment and facilities
- bridge equipment and resources
- catering equipment and facilities
- documents and certification
- engine room propulsion plant and equipment and related auxiliary systems
- navigation charts, marine publications, manufacturer manuals and other reference documentation
- radio equipment and facilities
- tools and maintenance equipment
- vessel deck equipment, fittings and related systems
- vessel structures and fittings

Training includes one or more of the following:

- distance learning for shipboard personnel
- onboard:
  - group training activities
  - individual instruction
- shipboard drills required by regulations or company policies
- shore-based training for shipboard personnel

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARD5001A Manage business and administration on vessels limited by tonnage or near coastal operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARD001 Manage business and administration on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- analysing and compiling operational and voyage data, and preparing reports
- communicating effectively verbally and in writing
- complying with mandatory rules and regulations and International Maritime Organization (IMO) Conventions and Codes, including the relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders and ensuring applicable codes, guidelines and standards recommended by IMO, classification societies and maritime industry organisations are taken into account
- conducting management meetings
- coordinating an audit to maintain a safety management certificate
- developing effective planning document
- establishing and developing dynamic groups and teams on board a vessel
- following correct procedures for obtaining a safety management certificate
- implementing human resources management responsibilities
- interpreting and applying information on contracts of carriage, marine insurance, salvage and towage
  - national administrative procedures for accident investigation, and vessel and port security
  - procedures relating to customs, quarantine and immigration clearance
  - labour-related regulations
- investigating and arbitrating shipboard conflict
- investigating, analysing and compiling casualty data and preparing related reports
- leading officers and crew
- maintaining vessel security
- motivating shipboard personnel
- organising training evaluation processes
- planning, implementing and monitoring goals and performance requirements for vessel operations and emergencies
- planning, implementing and monitoring requirements related to:



- Master duties, obligations, commercial and legal responsibilities under national and international laws and conventions
- state port control
- vessel documentation, certification and survey
- planning, implementing and monitoring work health and safety (WHS)/occupational health and safety (OHS) procedures and practices
- planning, organising and promoting shipboard training programs
- promoting correct safety management on board vessels
- providing high quality reports
- recognising and interpreting non-verbal communication
- taking action promptly to report and/or rectify management problems according to established procedures
- using management skills effectively.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- competency requirements for typical shipboard operations
- conflict resolution and mediation strategies and techniques
- contracts of carriage, marine insurance, salvage and towage
- established marine resource management procedures and practice
- equal employment policies and regulations
- general principles of integrated vessel and bridge management
- human resource management problems, and appropriate action and solutions
- legal issues relevant to Master responsibilities such as:
  - functions and responsibilities of Master, vessel owner and charterer in various types of charters and contracts of carriage
  - vessel owner obligation of reasonable dispatch
  - lay time, demurrage and dispatch
  - functions of a bill of lading
  - characteristics of a contract of carriage
  - international conventions relating to liability of a sea carrier
  - salvage and towage contracts
  - tort liability
  - legal principles of pilotage
  - insurance arrangements
  - vessel registration requirements
  - investigations and courts of marine inquiry
- maritime communication techniques, including barriers to effective communication and how to overcome them
- methods for:

- evaluating efficacy of shipboard training, drills and competency assessment
- motivating shipboard personnel
- identifying problems in services to other departments or in procedures and systems
- national administrative procedures for accident investigation, and vessel and port security
- national Training Packages and competency standards relevant to shipboard personnel
- principles of effective leadership and teamwork
- procedures for:
  - collecting, compiling, analysing and reporting on safety incidents and casualties on board a vessel, including format and characteristics of a good safety incident report
  - obtaining a safety management certificate and undergoing subsequent audits to maintain it
  - planning, implementing and monitoring goals and performance requirements for vessel operations and emergencies
  - relating to customs, quarantine and immigration clearance
- regulatory requirements for shipboard drills
- relevant:
  - industrial award requirements as they relate to shipboard personnel responsibilities, obligations and entitlements
  - maritime regulations
  - WHS/OHS and marine pollution control legislation, codes of practice, policies and procedures
- requirements related to:
  - state port control
  - vessel documentation, certification and survey
- role of vessel Master, including duties, obligations, and commercial and legal responsibilities under national and international laws and conventions
- techniques for:
  - evaluating and seeking alternatives for improvement of shipboard operational and emergency procedures and systems
  - setting of performance standards and evaluating performance of shipboard personnel
- training and competency assessment techniques and options suitable for shipboard personnel
- vessel safety management system (SMS) and:
  - its aims, objectives, advantages and disadvantages
  - general provisions for developing and monitoring vessel SMS
  - requirements of relevant maritime authorities for SMS.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARD002 Manage operations and maintenance on vessels limited by tonnage or near coastal operations**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to manage the operations of a commercial ocean-going vessel limited by tonnage or near coastal operations. It includes administration of vessel stability, cargo operations and planned maintenance system in compliance with Australian and international regulations and guidelines, protection of the marine environment and the safety of the vessel and people on board.

This unit applies to people who work in the maritime industry as Master or Chief Mate on a vessel of up to 500 gross tonnage (GT) or as a Watchkeeper on a vessel up to 3000 GT or as Master or Chief Mate on vessels up to 3000 GT operating in near coastal waters.

The unit is consistent with the relevant sections of STCW 95 and Marine Orders under the Australian Navigation Act 2012.

This unit has links to legislative and certification requirements.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

D – Administration and Human Resources

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
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<b>1 Manage maintenance of vessel stability and safety parameters</b>	1.1	Vessel dynamic stability is interpreted and analysed
	1.2	Vessel stability is correctly maintained in normal and adverse operational conditions
	1.3	Vessel safety parameters are correctly maintained within normal operational limits during cargo operations
<b>2 Administer planning of cargo operations on vessel limited by tonnage or near coastal operations</b>	2.1	Impact of cargo operations on vessel stability is managed
	2.2	Draft survey is conducted and used
	2.3	Appropriate procedures are administered for all cargo operations
<b>3 Administer planned maintenance system</b>	3.1	Vessel routine preventative maintenance plan is correctly interpreted and implemented
	3.2	Arrangements are made for maintenance activities to be carried out at required times
	3.3	Repairs to vessel hull or equipment and/or repair or replacement of equipment or components are organised according to procedures
<b>4 Dock or slip vessel limited by tonnage or near coastal operations</b>	4.1	Type of slipway, dock or vessel lifting facility is identified and suitability for type of hull assessed
	4.2	Hull data is correctly interpreted and recorded
	4.3	Appropriate plan is prepared for procedures to be taken onboard vessel prior to, during and on completion of proposed slipping or docking operations
	4.4	Cradle is correctly prepared prior to slipping of vessel
	4.5	Appropriate precautions are taken prior to slipping and refloating of vessel and when shoring/supporting vessel
	4.6	Vessel is correctly refloated after slipping and maintenance operations
<b>5 Carry out inspection and maintenance procedures on vessel limited by tonnage or near coastal operations</b>	5.1	Inspections of vessel hull, equipment and components are carried out according to company maintenance schedules and vessel manufacturer instructions
	5.2	Deterioration of vessel structure and fittings is identified and appropriate maintenance action is initiated according to work health and safety (WHS)/occupational health and safety (OHS) and pollution control requirements, company

		procedures and manufacturer instructions
	5.3	Lubricants, marine preservatives or finishes are applied correctly using appropriate application equipment according to WHS/OHS requirements, company procedures and manufacturer instructions
	5.4	Problems in application of lubricants, marine preservatives, finishes and other maintenance materials and chemicals are identified and reported, and appropriate remedial action is initiated
	5.5	Records of maintenance and lubrication work carried out are completed according to procedures
<b>6</b>	<b>Administer correct selection and use of maintenance equipment and materials</b>	
	6.1	Tools and equipment are correctly identified and used according to WHS/OHS requirements
	6.2	Maintenance materials are obtained
	6.3	Defective equipment and materials are identified and reported

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Vessel include one or more of the following:

- vessel up to 500 GT operating in international waters
- vessel up to 3000 GT operating in near coastal waters

Deterioration of vessel structure and fittings include one or more of the following:

- corrosion of hull fittings and equipment
- decay of timber surfaces
- osmosis and underwater blistering of painted and fibreglass finishes

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARD5002A Manage operations and maintenance on vessels limited by tonnage or near coastal operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARD002 Manage operations and maintenance on vessels limited by tonnage or near coastal operations**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out operational management of vessel while underway, when berthed or moored, when slipped or in dry dock, during routine or unplanned events
- communicating effectively with other personnel when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- communicating with multilingual crew using established techniques
- complying with relevant maritime regulations
- identifying problems that can occur when managing operations and maintenance of vessel and initiating appropriate action
- interpreting and following all safety management procedures and precautions when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- interpreting and monitoring application procedures for managing operations and maintenance of vessel limited by tonnage or near coastal operations
- monitoring selection and use of publications, materials, tools and other equipment involved in managing operations and maintenance of vessel limited by tonnage or near coastal operations
- preparing appropriate reports on outcomes of inspection and maintenance activities
- providing leadership to other shipboard personnel when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- reading and interpreting:
  - safety data sheets (SDS)/material safety data sheets (MSDS)
  - vessel and machinery specifications, gross and net tonnage, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams
- recognising and adapting appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others
- taking appropriate precautions to prevent pollution of marine environment
- taking prompt action to report and/or rectify operational and maintenance problems.



## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable legislation, regulations and codes of practice
- documents and records, including:
  - relevant maritime regulations
  - company maintenance procedures
  - instructions of relevant maritime authorities related to operations and maintenance of vessels
  - maintenance schedules and records
  - vessel and equipment manufacturer instructions, specifications and recommended procedures
  - stability and cargo documents pertaining to vessel limited by tonnage or near coastal operations
- maintenance records that must be kept on vessel to meet requirements of company and regulatory authorities
- nature and causes of corrosion of marine surfaces and structures, and available methods for its control
- operational management and maintenance:
  - routine maintenance inspections
  - administering repairs of minor faults and imperfections in painted surfaces and managing preparation of marine surfaces prior to application of prescribed marine coating
  - identifying deterioration of vessel structure and fittings
  - identifying faulty equipment or fittings and arranging for repair or replacement
  - managing application of lubricants to moving parts of vessel equipment
  - managing vessel stability both normal and adverse operational conditions
  - managing vessel cargo operation procedures
- principal features of structure of vessel, with a basic understanding of properties and application of materials used in vessel construction
- procedures for:
  - checking and inspecting vessel stability during a range of operational conditions, including loading and discharging of cargo as part of routine procedures to ensure compliance with company requirements and established safety rules and regulations
  - initiating and coordinating repair and/or replacement procedures on board vessels
- publications, tools and equipment required for operational management and maintenance:
  - cargo and stability calculators and publications
  - electric and pneumatic power tools such as grinders, sanders, drills and hand tools, including chipping hammers and scrapers
  - marine preservative finish application equipment such as brushes, spay guns, rollers and greasing and lubrication tools
  - rinsing and storing equipment

- protective clothing and equipment (eye and ear protection, safety boots, dust and fume masks)
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation and policies
- safety, environmental and hazard control precautions and procedures relevant to inspection and maintenance operations
- slipping and docking procedures suitable for various types of hull forms, including communication techniques used
- typical problems relating to slipping and maintaining vessels and appropriate action and solutions.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARD003 Manage legal requirements of a vessel

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to comply with legislative obligations and requirements specific to the vessel.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

D – Administration and Human Resources

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Determine legislative obligations and requirements

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Legal obligations in relation to vessel operations are ascertained
- 1.2 Legislative requirements relating to vessel operations are recognised

- 1.3 Obligations and legislative requirements are clarified with relevant government and licensing agencies
- 2 Develop strategies for compliance with legislative obligations and requirements**
  - 2.1 Obligations and legislative requirements are analysed to develop compliance strategies
  - 2.2 Strategies are reviewed with relevant stakeholders to determine suitability
  - 2.3 Strategies are used to develop regular, cyclical compliance checks
  - 2.4 Strategies and compliance requirements are communicated to crew members
  - 2.5 Relevant training is conducted to facilitate compliance
- 3 Undertake scheduled compliance checks**
  - 3.1 Compliance checks are delegated to relevant crew members
  - 3.2 Problems that may lead to potential noncompliance are identified and reported
  - 3.3 Timing and outcomes of compliance checks are recorded according to regulatory and organisational requirements
  - 3.4 Information from compliance checks is analysed to identify noncompliance or potential noncompliance instances
- 4 Rectify noncompliance with legislative obligations and requirements**
  - 4.1 Course of action to take to address noncompliance instances is determined
  - 4.2 Timely remedial action is undertaken and legislative obligations and requirements are complied with
  - 4.3 Training and instruction is conducted to ensure compliance with regulations
  - 4.4 Checks are made to ensure noncompliance has been addressed
  - 4.5 Specific area is monitored to ensure continuing compliance

- 4.6 Reason for noncompliance is analysed to guide future compliance
- 5 Maintain required certification of shipboard items and equipment**
  - 5.1 Documentation held by the vessel is completed against authorised inventory
  - 5.2 Continuous validity of certification extensions and requirements for renewals is ensured through timely attention
  - 5.3 Continuing effectiveness of tests, checks and maintenance programs is reflected in certificate conditions of surveyed items and equipment
  - 5.4 Organisational and issuing authority requirements are complied with through timely survey arrangements
- 6 Maintain documentation related to legislative requirements**
  - 6.1 Certificates and documentation are stored in a manner that optimises their use and accessibility for vessel operations
  - 6.2 Clear, concise and accurate records are kept
  - 6.3 Regulatory and organisational requirements, and format for records are complied with
  - 6.4 Validity of records is maintained when required corrections to records are made
  - 6.5 Documentation is secured and confidentiality is maintained according to organisational procedures
  - 6.6 Organisational procedures are followed to back-up computer
  - 6.7 Records and reports are distributed to required authorities at appropriate times

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |  |
|---|--|
| Legal obligations include:                                      | <ul style="list-style-type: none"><li>• responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended</li><li>• responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended</li><li>• responsibilities under the International Convention for Prevention of Pollution from Ships, as amended</li><li>• responsibilities under international instruments affecting the safety of the ship, passengers, cargo and crew</li></ul> |
| Legislative requirements include:                               | <ul style="list-style-type: none"><li>• certificates and other documents to be carried on board ships by international conventions</li><li>• maritime declarations of health and the requirements of International Health Regulations</li><li>• methods and aids to prevent pollution of the maritime environment by ships</li><li>• national legislation for implementing international agreements and conventions</li></ul>  |
| Strategies for compliance include one or more of the following: | <ul style="list-style-type: none"><li>• conducting drills required under SOLAS and relevant Marine Orders applicable to firefighting and lifesaving appliances</li><li>• ensuring survey items are subject to required checks, inspections and maintenance programs</li><li>• maintaining correct documentation and records</li><li>• maintaining valid certification dates</li><li>• using relevant safety management system checklists</li></ul>   |

## Unit Mapping Information

This unit replaces and is equivalent to MARD6001A Manage legal requirements of a vessel.

MARD6001A replaces and is equivalent to TDMMF307B Manage business and legal requirements on a vessel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARD003 Manage legal requirements of a vessel

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- attending to appropriate level of detail in recordkeeping
- developing effective planning documents
- ensuring procedures for monitoring operations and maintenance comply with legislative requirements
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring currency of relevant reference material
- identifying potential noncompliance promptly and fully
- interpreting information relevant to legislative requirements to ensure the security and safety of life of crew, passengers and others at sea
- planning renewal and extension of certificates to ensure continued validity of surveyed items and equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- international maritime law embodied in international agreements and conventions in relation to:
  - certificates and other documents to be carried on board ships by international conventions, how they may be obtained and their period of validity
  - responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended
  - responsibilities under the relevant requirements of the International Convention for the



Safety of Life at Sea (SOLAS), 1974, as amended

- responsibilities under the International Convention for Prevention of Pollution from Ships, as amended
- maritime declarations of health and the requirements of International Health Regulations
- responsibilities under international instruments affecting the safety of the ship, passengers, cargo and crew
- methods and aids to prevent pollution of the maritime environment by ships
- national legislation for implementing international agreements and conventions
- procedures for maintaining security and confidentiality of information
- relevant regulations, codes and conventions related to business and legal requirements, security and safety of life of crew, passengers and others on a vessel
- sources of reference and information on detailed survey and certification requirements
- systems and methods for recording, retrieving and storing information
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- relevant equipment, materials and documentation including
  - cargo record book
  - daily logbook
  - official logbook
  - operation manuals
  - radio logbook
  - statutory certificates
  - survey reports
  - waste disposal logs.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARE001 Communicate effectively when performing engineering duties**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to communicate effectively when performing engineering duties on board a commercial vessel and includes communicating with others; reading and interpreting engineering publications, specifications, instructions and other documents; reading and interpreting equipment performance indications; using available tools to communicate between the bridge, engine control room and main engine room; and using a computer to enter and retrieve engineering information.

This unit applies to the work of a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW and an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

E - Communication

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |
|---|--|
| <b>1 Apply information to engineering</b> | <b>1.1</b> Relevant engineering publications and other documentation are identified and accessed |
|---|--|

- |   |     |   |
|---|-----|---|
| <b>watchkeeping duties</b>  | 1.2 | Required information is extracted from relevant engineering publications and other documentation and is appropriately applied to work activities according to established marine engineering practice |
|   | 1.3 | Information in relevant engineering publications and other documentation used in day-to-day work is applied to work activities  |
|   | 1.4 | Engineering specifications and drawings are correctly read and interpreted, and information is applied according to established marine engineering practice   |
| <b>2 Apply engineering information</b>  | 2.1 | Readings on performance indicators are correctly made and interpreted   |
|   | 2.2 | Engineering information, procedures, instructions and directions are obtained, interpreted and applied  |
|   | 2.3 | Standard drawing symbols, appropriate instrumentation and process control terms are correctly used in relation to actions and functions of marine equipment and plant                                 |
|   | 2.4 | Engineering drawings and control loops are correctly sketched as required   |
|   | 2.5 | Engineering reports, running sheets and other engineering documentation relevant to the performance of engineering duties are correctly and accurately completed                                      |
| <b>3 Communicate between bridge, engine control room and main engine room</b> | 3.1 | Available tools are correctly used to communicate between bridge, engine control room and main engine room  |
|   | 3.2 | Appropriate records of engineering communications are completed according to organisational procedures and regulatory requirements  |
| <b>4 Communicate with officers, crew and others</b>                           | 4.1 | Clear and precise communication is used and established communication practices are followed  |
|   | 4.2 | Communication misunderstandings are avoided using appropriate confirmation techniques and established communication practices   |
|   | 4.3 | Messages concerning vessel safety and operations are received, read, clarified as required, correctly interpreted and applied to engineering activities   |
|   | 4.4 | Appropriate techniques are used when communicating with   |

multilingual crew to ensure communication is effective and messages are clearly understood

- 4.5 Non-verbal communication is appropriately used when working and communicating with others
- 4.6 Feedback, instruction and training on work performance is effectively provided to engine room crew according to vessel procedures and established engineering practice

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Relevant engineering publications and other documentation include one or more of the following:

- anti pollution and environmental protection regulations and procedures, including relevant sections of the International Convention for the Prevention of Pollution from Ships (MARPOL)
- instructions of relevant maritime authorities and classification societies concerning shipboard machinery operations, maintenance and repair
- International Safety Management (ISM) Code safety management system plans, procedures, checklists and instructions
- machinery and vessel manufacturer specifications, instructions and recommended procedures
- marine engineering publications and manuals
- relevant sections of national and international regulations, International Maritime Organization (IMO) Conventions and

Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders and class society rules dealing with shipboard machinery maintenance and repair

- operational and maintenance logs, running sheets and records, including computer databases of running information and maintenance records
- vessel and organisational planned operational and maintenance procedures and instructions
- vessel safety and emergency contingency plans and procedures, including relevant sections of the International Convention for the Safety of Life at Sea (SOLAS)
- vessel survey as it relates to shipboard plant, equipment and machinery

Performance indicators include one or more of the following:

- computer screens
- gauges
- instrumentation

Available tools include one or more of the following:

- alarms
- hand held radios
- internal communication systems

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARE5001A Communicate effectively when performing engineering duties.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARE001 Communicate effectively when performing engineering duties**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- communicating effectively verbally and in writing
- identifying and interpreting numerical and graphical information in marine engineering publications
- identifying, collating and processing information required to prepare verbal and written reports
- imparting knowledge and ideas as required through oral, written and visual means
- interpreting documentation related to marine engineering operations
- maintaining effective records
- reading and interpreting written information needed to perform basic marine engineering tasks
- resolving misunderstandings in written and verbal communication
- using computer and relevant equipment to enter, access and retrieve engineering information
- using established marine engineering vocabulary as required.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- established engineering practice for the operation, checking, maintenance and repair of marine plant, machinery, equipment and systems
- established written, verbal and non-verbal marine engineering communication practices
- marine engineering communication techniques, including barriers to effective communication and how to overcome them
- national and international regulations, International Maritime Organization (IMO) Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders applicable to the operation, maintenance and repair of plant, machinery and equipment on vessels of unlimited propulsion power
- principles of effective communication

- protocols and procedures for communicating with others on board vessels
- relevant industrial award requirements as they relate to shipboard engineering personnel responsibilities, obligations and entitlements
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation, codes of practice, policies and procedures
- standard nautical vocabulary as described in IMO Standard Marine Communication Phrases
- techniques for communicating effectively with a multilingual crew
- tools typically available for communication between bridge, engine control room and main engine room
- typical communication problems and appropriate action and solutions
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## **MARE002 Communicate during mooring and unmooring activities**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to communicate effectively with others involved in mooring and unmooring activities.

This unit applies to people working in the maritime industry as a Linesperson.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

E – Communication

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

#### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Prepare to communicate with**

#### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Work health and safety (WHS)/occupational health and safety (OHS) procedures are followed

- |                                  |  |
|----------------------------------|--|
| <b>others</b>                    | <ul style="list-style-type: none"><li>1.2 Prior to mooring or unmooring activities, all radios and other communications equipment is checked to confirm they are functioning correctly</li><li>1.3 Batteries are checked to confirm they are operational and fully charged</li><li>1.4 Relevant documentation and records are identified and accessed as required</li><li>1.5 Radios are set to operate on channels required for mooring and unmooring</li><li>1.6 Faulty communications equipment is reported, rectified or replaced</li></ul>  |
| <b>2 Communicate with others</b> | <ul style="list-style-type: none"><li>2.1 Correct communication is maintained with others involved in mooring and unmooring activities, throughout mooring and unmooring activities</li><li>2.2 Clear and concise verbal and non-verbal communication is used and appropriate action is taken to confirm others have correctly heard and interpreted the communication</li><li>2.3 VHF radio communication is conducted using required procedures and protocols</li><li>2.4 Appropriate methods are used to communicate with foreign crews on vessels</li><li>2.5 Safety concerns are promptly and clearly communicated to pilot prior to and during, mooring and unmooring activities</li><li>2.6 Due care is taken when using radio communication equipment, so as not to interfere with operational communication between tug crews and pilot of vessel</li></ul> |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Safety procedures include:
- checking:
    - own personal fitness and medical wellbeing
    - whereabouts of edge of wharf
    - whereabouts of other members of mooring/unmooring team
  - confirming availability of a personal flotation device on arrival at mooring operation
  - keeping clear of snapback zone and demarcated areas
  - keeping work area hazard-free
  - obtaining and using required personal protective equipment (such as safety footwear, safety helmet, suitable gloves, safety vest and reflective clothing, personal life vest, safety glasses)
  - removing rings from fingers to avoid them being caught on steel wire ropes
- Relevant documentation and records include one or more of the following:
- maritime authority instructions
  - mooring and unmooring plans, procedures, checklists and instructions
  - relevant sections of maritime regulations concerning mooring and unmooring operations
  - reports and records of mooring operations or safety incidents
  - rope and equipment manufacturer instructions and procedures
  - safety instructions and procedures
- Communication includes one or more of the following:
- oral communication with mooring supervisor or Master and other members of mooring or unmooring team
  - radio between mooring supervisor (shore-side) and:
    - pilot on vessel
    - wharf mooring personnel (bow) forward
    - wharf mooring personnel (stern) aft
  - VHF radio between:
    - tug crew and pilot on vessel
    - tug crew and mooring launch crew
    - mooring launch crew and pilot on vessel
  - visual contact and hand signals
- Others involved in mooring and unmooring activities include one or more of the following:
- lines launch driver
  - mooring launch crew
  - mooring master or supervisor
  - mooring team
  - pilot and crew on vessel being moored or unmoored and tug
  - shorelines crew on wharf

- tug crew
- vessel crew

## Unit Mapping Information

This unit replaces and is equivalent to MARE1001A Communicate during shore-based mooring and unmooring operations.

MARE1001A replaces and is equivalent to TDMME907A Communicate during shore-based mooring and unmooring operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARE002 Communicate during mooring and unmooring activities

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- being aware of own ability and limits to rectify irregularities and faults
- checking functioning of radios and communications equipment
- communicating effectively with others when mooring and unmooring a vessel
- complying with relevant maritime regulations and International Maritime Organization (IMO) Conventions and Codes, including relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders as they apply to mooring and unmooring operations on ocean-going vessels
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- following all orders carefully and systematically
- following work instructions
- identifying and correctly using various types of radios and other relevant communications equipment
- implementing port and vessel security procedures
- initiating timely action in response to defects or damage
- interpreting and following procedures for communicating with others during mooring and unmooring operations
- recognising and responding appropriately to cultural differences in the workplace
- recognising problems that may occur when communicating with others during mooring and unmooring operations and taking appropriate action to report and resolve these problems
- taking proper care of radios and communications equipment
- testing and recharging batteries used in radios and other communications equipment
- using hand held VHF radios correctly when communicating with ship's crew, pilot and wharf supervisor.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles and procedures for marine VHF radio communication:
  - by day or night
  - in normal and emergency situations
  - under any permissible conditions of weather
  - at a range of shore-side terminals and wharves
- communications techniques and equipment required during mooring and unmooring operations, including protocols for radio use
- correct use of handheld VHF radio
- factors that affect communication during mooring and unmooring operations, such as effects of noise, faulty equipment, discharged batteries, wind, weather
- maritime regulations applicable to communication during mooring and unmooring of vessels
- methods of visual contact and hand signals
- operational characteristics of different types of radios and other forms of communications equipment used in mooring and unmooring operations
- practices and procedures for communicating with others during mooring and unmooring operations
- purpose of silence periods when operating radio equipment
- radio calling and replying procedures
- relevant manufacturer instructions relating to use of radios and other communications equipment
- relevant maritime and radio communications regulations
- relevant port and vessel security procedures, including operating radio communications channel instructions
- relevant WHS/OHS codes of practice, policies and procedures.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- a range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF003 Follow vessel security procedures

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to recognise and report security threats.

This unit applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

F - Operational Quality and Safety

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Contribute to enhancing security through heightened awareness**

- 1.1 Legislative and organisational requirements related to maintaining security of a vessel are identified and followed
- 1.2 Organisational security procedures are identified and followed
- 1.3 Duty of care requirements are ascertained and complied with
- 1.4 Need for and methods of, maintaining security awareness and vigilance, are appreciated



- |   |     |  |
|---|-----|--|
|   | 1.5 | Own role and responsibilities are recognised   |
|   | 1.6 | Role of designated personnel for security response is ascertained  |
|   | 1.7 | Work health and safety (WHS)/occupational health and safety (OHS) requirements are recognised and complied with    |
| <b>2 Recognise potential security threats</b> | 2.1 | Potential security threats relating to a vessel are identified   |
|   | 2.2 | Procedures for monitoring security of a vessel are recognised  |
|   | 2.3 | Factors with increased security risk are identified  |
|   | 2.4 | Types and purpose of security equipment are explained  |
|   | 2.5 | Emergency and evacuation procedures are identified and implemented   |
|   | 2.6 | Appropriate actions for maintaining security and safety of self, others and the vessel are identified and followed |
| <b>3 Comply with reporting processes</b>      | 3.1 | Organisational procedures for reporting security risks and incidents are accessed and followed                     |
|   | 3.2 | Chain of command of designated personnel is ascertained  |
|   | 3.3 | Communication modes are recognised and used appropriately  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |  |
|--|--|
| Legislative requirements include one or more of the following: | <ul style="list-style-type: none"><li>• applicable crime Acts and codes of practice</li><li>• award and enterprise agreements</li><li>• general duty of care responsibilities</li><li>• maritime industry codes of practice</li><li>• maritime transport Acts and regulations</li></ul>  |
| Designated personnel include one or more of the following:     | <ul style="list-style-type: none"><li>• Company Security Officer</li><li>• emergency services</li><li>• First Aid Officer</li><li>• Master</li><li>• Port Security Officer</li><li>• Ship Security Officer</li><li>• WHS/OHS representative</li></ul>  |
| Security threats include one or more of the following:         | <ul style="list-style-type: none"><li>• injury to persons</li><li>• persons carrying weapons</li><li>• persons causing a public nuisance</li><li>• persons demonstrating suspicious behaviour</li><li>• persons under the influence of intoxicating substances</li><li>• persons with criminal intent</li><li>• piracy and armed robbery</li><li>• terrorism</li><li>• theft</li><li>• unattended packages, goods, baggage or cargo</li><li>• unattended vehicles in areas not designated for parking</li><li>• vandalism</li><li>• violence or physical threats</li></ul> |
| Security equipment includes one or more of the following:      | <ul style="list-style-type: none"><li>• alarms</li><li>• locked and secure areas</li><li>• mirrors</li><li>• surveillance equipment</li></ul>  |
| Appropriate action includes one or more of                     | <ul style="list-style-type: none"><li>• access control to the vessel</li><li>• monitoring restricted areas</li></ul>   |

the following:

Procedures for reporting security risks include one or more of the following:

- completing documentation such as logs and activity reports
- completing police reports
- contacting designated personnel
- requesting security assistance

Communication modes include one or more of the following:

- alarms
- call codes and signs
- hand signals
- megaphone
- mobile phone
- public address system
- telephone
- two-way radio
- verbal communication

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF1003A Follow vessel security procedures.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF003 Follow vessel security procedures

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying basic security legislative requirements applicable to a vessel
- applying procedures for monitoring security in a marine environment
- being aware of one's surroundings and changes to these surroundings
- identifying a range of security threats and risks relevant to a vessel
- observing chain of command and communication channels
- operating security equipment
- recognising potential security threats
- reporting identified security threats and risks in a marine environment and providing appropriate level of detail in these reports.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable legislation relevant to the marine environment and own work role
- applicable WHS/OHS requirements
- communication chain of command
- communication modes and security equipment and systems relevant to the marine environment
- duty of care requirements of self and others
- enabling recognition of potential security threats including elements related to piracy and armed robbery
- enabling recognition of weapons, dangerous substances and devices and awareness of the damage they can cause
- general procedures for emergency, evacuation and first aid response
- handling security related information and security related communications
- international marine security policy and responsibilities of governments, organisations and individuals
- maritime security levels and their impact on security measures and procedures aboard ship and in port facilities

- maritime security terms and definitions including elements relating to piracy and armed robbery
- need for and methods of maintaining security awareness and vigilance
- reporting procedures
- security related contingency plans
- techniques used to circumvent security measures
- training, drill and exercise requirements under relevant conventions, codes and International Maritime Organization (IMO) circulars including those relevant for anti-piracy and anti-armed robbery
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF006 Observe personal safety and social responsibility

### Modification History

Release 2. ISC upgrade. KE amended to better align with the STCW.

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to contribute to the safety management system processes where there is responsibility for own work outputs.

This unit applies to people working in the maritime industry requiring a Certificate of Safety Training.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

F - Operational Quality and Safety

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan and conduct work safely

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Individual rights and responsibilities on board a vessel are interpreted and fulfilled
- 1.2 Work is planned in accordance with work health and safety (WHS)/occupational health and safety (OHS) legislation and safety management system requirements

- 1.3 Work is carried out according to established performance standards
- 1.4 Hazards are identified as part of work planning and work processes
- 1.5 Identified hazards are addressed prior to starting work
- 1.6 Inadequacies in control measures are reported according to the safety management system
- 1.7 Incidents and injuries are reported according to organisational procedures
- 1.8 WHS/OHS housekeeping is undertaken in own work area
- 2 Contribute to WHS/OHS participation processes**
  - 2.1 WHS/OHS representatives and committees are supported to undertake their roles and responsibilities
  - 2.2 WHS/OHS issues are raised according to organisational procedures
  - 2.3 Contributions to WHS/OHS meetings, vessel inspections or other consultative activities are provided in a constructive manner to improve safety
- 3 Contribute to hazard identification, risk assessment and risk control activities**
  - 3.1 Vessel is checked for hazards using itemised checklists according to the safety management system
  - 3.2 Identified hazards and inadequacies in risk controls are reported according to the safety management system
  - 3.3 Contributions to risk assessments are made
  - 3.4 Input is provided to development and implementation of control measures, with reference to the hierarchy of control
  - 3.5 Where relevant, procedures and precautions for entry into pump room, fuel tanks or other confined spaces on a vessel are correctly followed
- 4 Participate in controlling WHS/OHS emergency situations**
  - 4.1 Scale of the emergency situation is correctly recognised
  - 4.2 Prompt, accurate and clear information is given on raising alarm
  - 4.3 Initial action is taken to control/confine emergency according to organisational procedures, taking account of the nature and scope of the emergency

- |                                   |     |   |
|-----------------------------------|-----|---|
|                                   | 4.4 | Emergency response procedures are implemented   |
| <b>5 Complete WHS/OHS records</b> | 5.1 | WHS/OHS records for vessel are correctly completed  |
|                                   | 5.2 | Legal requirements for the maintenance of records of occupational injury and disease are followed |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Individual rights and responsibilities include one or more of the following:

- avoiding and preventing harassment of others
- avoiding drug and alcohol abuse on board vessel
- implementing appropriate precautions to avoid contributing to the spread of the human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS) and other communicable diseases
- maintaining appropriate standards of hygiene and cleanliness
- providing a good example to others as a responsible, fair, sympathetic, and equitable member of the shipboard team
- respecting the religious and cultural habits of crew members

Hazards include one or more of the following:

- contact with chemicals and hazardous substances
- contaminants
- contact with electricity
- contact with plant and marine life
- dangerous organisms



- equipment operation and maintenance
- falls, trips and slips
- exposure to heat, cold and water
- hitting or being hit by stationary or moving objects
- immersion in water without a personal flotation device (PFD)
- ladders
- manual handling
- noise
- poor housekeeping and lack of deck space
- repetitive movements and awkward postures
- smoking and alcohol
- unventilated holds
- weather and water conditions
- working in confined spaces
- working with inappropriate clothing
- working with knives

Emergency situations include one or more of the following:

- beaching with and without heavy surf
- chemical spills
- collisions
- disabled vessel
- electrocution
- falling or being dragged overboard
- fire
- flood
- grounding
- hull damage
- immersion in water
- injuries associated with dangerous organisms (such as bites, stings, poisoning)
- injuries associated with machines, vehicles, vessels, diving
- loss of rudder
- lost or fouled propeller
- rescue activities
- rough weather and heavy seas
- vessel capsize

WHS/OHS records include one or more of the following:

- accident reports
- incident reports
- injury reports
- hazard reports

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF3002A Observe personal safety and social responsibility.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF006 Observe personal safety and social responsibility**

## **Modification History**

Release 2. ISC upgrade. KE amended to better align with the STCW.

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying the hierarchy of control (the preferred order of risk control measures from most to least preferred, that is, elimination of risk, substitution, engineering controls, administrative controls and personal protective equipment)
- communicating with crew and others as appropriate about WHS/OHS matters
- conforming to established emergency response procedures for initial and follow-up action
- keeping accurate records/minutes of discussions with consultation forums on WHS/OHS matters
- identifying WHS/OHS training needs of crew
- interpreting and following information on WHS/OHS legislation, safety management system, organisational procedures, written job instructions, specifications, standard operating procedures, charts, lists, and other applicable reference documents
- investigating incidents according to organisational procedures
- keeping records for monitoring the effectiveness of practices and procedures with respect to the safety of the vessel
- maintaining incident records according to standard workplace procedures
- obtaining results of safety audits according to organisational procedures
- participating in consultation forums
- participating in safety drills
- reporting and documenting the processes and outcomes of WHS/OHS requirements
- scheduling meetings with the relevant consultation forums to discuss WHS/OHS matters.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable commonwealth, state or territory WHS/OHS legislation, regulations, codes of practice, standards
- dangers of drug and alcohol abuse

- difference between hazards (something or a source or situation with the potential to harm life or health) and risks (chance of something occurring that will result in injury or damage)
- fatigue management and the importance of adequate rest
- handling and stowage of dangerous, hazardous and harmful substances and liquids
- hazard identification procedures such as vessel inspections and review of WHS/OHS data
- hierarchy of control and its application
- international measures for accident prevention at sea, including the International Labour Organization (ILO) Conventions
- legal rights and responsibilities of management, crew and others as appropriate
- location of escape routes
- location and use of fire fighting equipment
- nature of common hazards for example chemicals, bodily fluids, noise, manual handling, work postures, underfoot hazards and moving parts of machinery
- organisation specific information including:
  - hazards of the particular work environment
  - hazard identification procedures relevant to hazards in the organisation
  - designated person for raising WHS/OHS issues
  - organisation and work procedures particularly those related to performance of own work, specific hazards and risk control, reporting of hazards, incidents and injuries and WHS/OHS issue resolution, consultation, use of personal protective equipment and emergency response
  - potential emergency situations, alarms and signals, and required response
- personal protective equipment requirements, including use, storage and maintenance
- principles of basic risk assessment
- potential emergency situations, alarms and signals, and required response
- purpose of Safe Data Sheets (SDS)
- roles and responsibilities of:
  - employees, supervisors and managers in the organisation
  - safety representatives and committees
- safety signs and their meanings, including signs for:
  - personal protective equipment
  - emergency equipment
  - dangerous goods class signs
- sources of WHS/OHS information within in the organisation with knowledge of external sources of WHS/OHS information
- specific hazards, such as sharps and radiation
- standard emergency signals, alarms and required responses.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF007 Operate survival craft and other lifesaving appliances

## Modification History

Release 2. ISC upgrade. KE amended to include awareness of MLC and International code of signals included in KE.

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to comply with accepted safety practices and standards in responding to abandon ship and survival situations.

This unit applies to crew members required to assist in the operation of survival craft and other lifesaving appliances on a range of vessels.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Launch survival craft and rescue boats**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Preparations for the launch of the survival craft or rescue boat are made according to manufacturer instructions and organisational procedures
- 1.2 Launch strategy is adopted appropriate to the prevailing

		circumstances and conditions
	1.3	Launching equipment is operated according to manufacturer instructions and organisational procedures
	1.4	Survival craft or rescue boat is launched smoothly according to accepted safety practices and standards
<b>2 Operate survival craft and rescue boats</b>	2.1	Pre-start checks are conducted on the engine
	2.2	Engine is started according to manufacturer instructions and organisational procedures
	2.3	Orders are given for survivors to board the survival craft
	2.4	Survival craft is cleared of the vessel and operated according to manufacturer instructions and organisational procedures
	2.5	Survival craft is manoeuvred appropriately for the prevailing circumstances and conditions
<b>3 Operate lifesaving and survival equipment</b>	3.1	Location and accessibility of all lifesaving and survival equipment is established
	3.2	Survival equipment is checked and operated according to manufacturer instructions and organisational procedures
	3.3	Lifesaving clothing is correctly donned and used according to manufacturer instructions and organisational procedures
	3.4	Strategies are implemented to counter threats to survival according to accepted survival practice
<b>4 Recover survival craft</b>	4.1	Persons are disembarked from the survival craft according to organisational procedures
	4.2	Survival craft is recovered according to manufacturer instructions and organisational procedures
	4.3	Survival craft and equipment are checked for signs of damage and faulty equipment
	4.4	Identified faulty equipment or damage is reported according to organisational procedures
<b>5 Organise abandon vessel musters and drills</b>	5.1	Abandon vessel musters and drills are arranged according to regulatory requirements and organisational procedures
	5.2	Instruction is provided to others on organisational procedures and the correct use of lifesaving equipment

- 5.3 Musters and drills are reviewed against objectives
- 5.4 Reporting obligations are completed according to regulatory requirements and organisational procedures
- 5.5 Risk control processes are implemented

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Survival craft and rescue boats must include:

- life rafts
- lifeboats
- rescue boats

Launching equipment must include:

- cranes
- davits
- life raft launching and inflation equipment

Lifesaving and survival equipment must include:

- immersion suits
- life jackets
- person overboard combination light and smoke float
- portable radio equipment
- pyrotechnic distress signals
- search and rescue transponders (SARTs)



- satellite emergency position indicating radio beacons (EPIRBs)
- thermal protective aids

Strategies must include:

- beaching survival craft
- deploying exposure cover on an open lifeboat
- handling survival craft in rough weather
- helicopter rescue from survival craft
- maximising detect-ability of survival craft
- preventing and treating hypothermia
- rationing food and water
- using rescue boat to marshal life rafts
- using rescue boat to retrieve survivors in the sea

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF3004A Operate survival craft and other lifesaving appliances.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF007 Operate survival craft and other lifesaving appliances

## Modification History

Release 2. ISC upgrade. KE amended to include awareness of MLC and International code of signals included in KE.

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- acting appropriately in the prevailing circumstances and conditions in response to abandon ship and survival situations according to accepted safety practices and standards
- communicating effectively with others as required when operating survival craft and ancillary survival equipment
- conducting inspections of other survival equipment at intervals determined by the safety management system
- conducting tests and pre-start checks of equipment at intervals determined by the safety management system
- giving correct commands for launching and boarding survival craft and clearing the ship
- interpreting and applying International Convention for the Safety of Life at Sea (SOLAS) practices and regulations
- launching and operating various types of survival craft
- organising abandon vessel drills
- reading and interpreting instructions relevant to the safe operation of lifesaving appliances on board a vessel
- recovering survival craft and rescue boats and resetting release devices
- rowing and steering a survival craft and rescue boat
- safely operating off-load and on-load release devices
- selecting and using appropriate lifesaving appliances and communications equipment
- using a compass
- using portable radio equipment, pyrotechnics and other signalling equipment
- using survival craft equipment including rigging devices to aid location.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- construction and outfit of survival craft and rescue boats
- dangers associated with the use of on-load release devices
- emergency muster and abandon vessel signals
- International code of signals (ICS), purpose and meaning of signals
- International Maritime Organization (IMO) safety symbols
- International Safety Management (ISM) Code safety management system plans, procedures, checklists and instructions
- maintenance procedures for survival craft and rescue boats
- manoeuvring characteristics of survival craft and rescue boats
- Maritime Labour Convention (MLC) amendments 2014
- operation of survival craft and rescue boats, their launching appliances and arrangements and their equipment
- procedures and sequences for launching, carrying out pre-start engine checks and operating survival craft and rescue boats in a variety of sea and weather conditions
- procedures for correctly operating and using lifesaving appliances and personal safety equipment on vessels and survival craft
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation
- SOLAS regulations
- symptoms of hypothermia, its prevention and treatment
- threats to survival on abandonment of a vessel and appropriate strategies for countering these threats
- typical manoeuvring and engine characteristics for survival craft
- ways of maximising detectability and location of survival craft using radio lifesaving appliances, pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs), and search and rescue transponders (SARTs).

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF008 Prevent and fight fires on board a vessel

### Modification History

Release 2. ISC upgrade. KE amended to better align with the STCW and working effectively as part of a team included in KE and PE.

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to prevent fires and to respond effectively to any fire emergency on board a vessel.

This unit applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

F - Operational Quality and Safety

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Actively prevent fire

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |     |   |
|-----|---|
| 1.1 | Fire hazards (pre-conditions for fire) on board a vessel are identified and rectified according to workplace procedures |
| 1.2 | Onboard procedures for preventing fire are accessed and implemented   |

- |  |   |
|--|---|
| <b>2 Prepare response to fire</b>      | <ul style="list-style-type: none"><li>2.1 Location and class of fire is identified</li><li>2.2 Alarm is raised</li><li>2.3 Condition of firefighting equipment and systems in work area is monitored according to planned maintenance schedules</li><li>2.4 Realistic drills and musters are practised to ensure pre-incident readiness of response personnel</li><li>2.5 Appropriate protective clothing and equipment including self contained breathing apparatus (SCBA) is made ready</li><li>2.6 All available means to limit the spread of fire and smoke are employed</li><li>2.7 Appropriate pump/s and ancillary equipment are readied to support firefighting operations</li><li>2.8 Extinguishing media/agent is selected according to the class/classes of fire</li></ul>       |
| <b>3 Combat fire</b>                   | <ul style="list-style-type: none"><li>3.1 Threats to life or health are identified within the emergency area</li><li>3.2 Activities and tactics to combat the fire are selected so that the safety of the vessel and all on board is not compromised</li><li>3.3 Fire is located and access is gained in the safest and most timely manner</li><li>3.4 Fire is attacked using the extinguishing media/agent and application techniques appropriate to the class and size of fire</li><li>3.5 SCBA is donned and used correctly while undertaking fire extinguishment and rescue</li><li>3.6 Effectiveness of combat activities and tactics is evaluated and altered as required</li><li>3.7 Communication is maintained to ensure safety and efficiency of firefighting operation</li></ul> |
| <b>4 Complete post-fire activities</b> | <ul style="list-style-type: none"><li>4.1 Fire watch is maintained to prevent further outbreak</li><li>4.2 Equipment is restored to operational condition</li><li>4.3 Fire scene is preserved prior to investigation, if appropriate</li></ul>  |

- 4.4 Information relating to the incident is provided as part of fire debriefing session

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Fire hazards must include:

- accommodation
- cargo areas
- engine rooms
- electrical distribution systems
- fuel handling systems
- galleys
- lack of maintenance
- laundry
- poor housekeeping
- smoking
- stores areas

Classes of fire must include:

- A Carbonaceous Solids
- B Flammable Liquids
- C Flammable Gases
- D Combustible Metals
- E Energised Electrical Equipment
- F Cooking Oils and Fats

Firefighting equipment and systems must include:

- hoses
- fixed fitted detection and suppression systems
- foam applicators
- international ship-to-shore connection
- nozzles
- portable and semi-portable extinguishers
- stretchers/ropes and lines

Protective clothing and equipment must include:

- head protection /helmet
- hand protection /gloves
- radiant heat protection /coat
- foot protection/ boots
- firefighter outfit as per current Fire Safety Systems Code (as applicable)
- SCBA

Extinguishing media/agent must include:

- extinguishing powder
- foam
- gaseous extinguishing agents
- water

Firefighting activities must include:

- boundary control
- containing the spread of fire
- evacuation of casualties from heated smoke filled environments
- extinguishment
- overhaul/fire watch

Firefighting tactics must include:

- combination of attack
- cooling the fuels
- direct offensive (attack team)
- direction of attack
- exclusion of oxygen – smothering
- indirect defensive (fixed system)
- interrupting the chemical chain reaction
- removal of fuels - starvation



Restoring equipment must include:

- cleaning
- re-stowing
- recharging according to Australian Standards
- servicing

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF3005A Prevent and fight fires on board a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF008 Prevent and fight fires on board a vessel

## Modification History

Release 2. ISC upgrade. KE amended to better align with the STCW and working effectively as part of a team included in KE and PE.

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying extinguishing media to fire
- applying safe working practices at all times
- assisting in the setting up and use of foam making equipment
- correctly donning and using self contained breathing apparatus (SCBA) while undertaking fire extinguishment and rescue in a heated smoke filled compartment
- entering and moving through a compartment filled with high expansion foam with the aid of a lifeline and without breathing apparatus
- extinguishing a fire with a fire blanket
- logging SCBA wearers correctly on a control board
- operating charged hose-lines and nozzles
- operating portable firefighting extinguishers
- performing after-use maintenance on SCBA
- working effectively with team members when responding to a fire.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken:
  - in an emergency
  - on board ship
- alarms and signals during onboard emergencies
- chemistry of fire, including the fire tetrahedron and its relationship to materials typically found on vessels
- classification of fire and applicable extinguishing agents
- correct use of all lifesaving appliances and firefighting appliances

- different classes of fire, their characteristics and strategies and equipment needed for their extinguishment
- elements of fire and explosion (the fire triangle)
- extinguishing media including firefighting foams
- fire and smoke detection and automatic alarm systems
- firefighting tactics, techniques and procedures
- flammable materials, fire hazards and spread of fire
- hazards and threats to life or health during onboard firefighting operations
- lifeline signals
- location of firefighting appliances and emergency escape routes
- maintenance of lifesaving appliances and firefighting appliances
- need for constant vigilance
- onboard Emergency Response Organisation and procedures
- own ability and limits
- portable fire extinguishers
- purpose, function and location of fixed installations/systems
- principles and methods of fire extinguishment
- principles underlying the spread of fire
- relevant Australian Standards
- role and responsibility of self and team members
- safe working practices
- shipboard firefighting organisation
- statutory requirements pertaining to lifesaving appliances and firefighting appliances
- types and sources of ignition
- types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, procedures for their use and problems that can occur
- ventilation procedures
- vessel construction as it relates to fire prevention/protection
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF009 Survive at sea in the event of vessel abandonment

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to survive at sea in the event of vessel abandonment.

This unit applies to people working in the maritime industry requiring a Certificate of Safety Training.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F - Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Respond to emergency

- 1.1 Emergency situation is correctly recognised
- 1.2 Muster and abandon vessel signals are activated according to organisational procedures
- 1.3 Prompt, accurate and clear information is given on raising alarm
- 1.4 Instructions are provided to crew and passengers to maximise

		chances of survival
	1.5	Emergency position indicating radio beacon (EPIRB) is operated to transmit distress signal
	1.6	Distress calls are made using radio equipment on distress call frequency to communicate nature of emergency
<b>2 Launch survival craft and rescue boats</b>	2.1	Preparations for the launch of the survival craft or rescue boat are made according to organisational procedures and manufacturer instructions
	2.2	Appropriate launch strategy is adopted following an assessment of the weather and sea conditions, and the nature of the emergency
	2.3	Launching equipment is operated according to organisational procedures and manufacturer instructions
	2.4	Survival craft or rescue boat is launched smoothly according to organisational procedures and manufacturer instructions
	2.5	Pre-start checks are conducted on the engine of the survival craft or rescue boat
	2.6	Survival craft or rescue boat engine is started according to organisational procedures and manufacturer instructions
<b>3 Operate survival craft and rescue boats</b>	3.1	Orders are given to survivors to board the survival craft or rescue boat using appropriate means
	3.2	Survival craft or rescue boat is cleared of the vessel and operated according to organisational procedures and manufacturer instructions
	3.3	Sea anchors and drogues are used to assist in remaining within the vicinity of the abandoned vessel and to minimise the effects of adverse weather and sea conditions
	3.4	Exposure cover is deployed on an open lifeboat according to manufacturer instructions
<b>4 Operate lifesaving and survival equipment on board survival craft and rescue boats</b>	4.1	Location and accessibility of all lifesaving and survival equipment is established
	4.2	Survival equipment is checked and operated according to manufacturer instructions
	4.3	Lifesaving equipment is correctly donned and used according to manufacturer instructions

- 5 Assume responsibility for survival of crew and passengers**
- 5.1 Survivors are checked for signs of hypothermia or other injuries and first aid is applied where necessary
  - 5.2 Water and food is rationed
  - 5.3 Lookout for vessels and aircraft in the vicinity is maintained and distress signals are released on sighting
  - 5.4 Instructions given by rescue personnel are followed to safely access rescue craft
  - 5.5 Persons are disembarked from survival craft or rescue boat according to organisational procedures
  - 5.6 Survival craft or rescue boat is recovered and checked for signs of damage

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Emergency situations must include:

- collision
- fire
- foundering

Radio equipment includes one or more of the following:

- EPIRB
- Global Maritime Distress and Safety System (GMDSS)
- HF

- search and rescue transponders (SARTs)
- VHF

Survival craft and rescue boats include one or more of the following:

- inflatable life raft
- life boat
- rescue boat

Lifesaving and survival equipment includes one or more of the following:

- EPIRBs
- flares
- life jackets
- immersion suit
- person overboard combination light and smoke float
- SARTs

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF3006A Survive at sea in the event of vessel abandonment.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARF009 Survive at sea in the event of vessel abandonment**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- boarding a survival craft from the ship and water while wearing a life jacket
- determining the type and extent of the emergency
- donning a life jacket
- donning and using an immersion suit
- ensuring initial actions after leaving ship, and procedures and actions in the water minimise threats to survival
- freeing a survival craft of obstructions
- identifying hypothermia and providing appropriate treatment
- keeping afloat without a life jacket
- launching survival craft
- operating location devices, including radio equipment
- operating radio equipment
- operating survival craft equipment
- recognising and interpreting muster signals, and taking action that is appropriate to emergency and complies with established procedures
- righting an inverted life raft
- righting an inverted life raft while wearing a life jacket
- safely jumping from a height into water
- streaming a drogue or sea-anchor
- swimming while wearing a life jacket
- taking initial actions on boarding survival craft to enhance chance of survival
- timing and sequencing individual actions so they are appropriate to prevailing circumstance and conditions, and minimise potential dangers and threats to survival
- using appropriate method to board survival craft that avoids dangers to other survivors.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken in an emergency

- characteristics of survival craft
- emergency muster and abandon vessel signals
- equipment found in survival craft, its function and the procedures for correct operation
- equipment in survival craft
- first aid techniques
- location of personal life-saving appliances
- location of survival equipment on vessel
- principles concerning survival including:
  - value of training and drills
  - personal protective clothing and equipment
  - need to be ready for any emergency
  - actions to be taken when called to survival craft stations
  - actions to be taken when required to abandon ship
  - actions to be taken when in the water
  - actions to be taken when aboard a survival craft
  - main dangers to survivors
- procedures for abandoning vessel
- relevant maritime regulations related to required survival equipment on a vessel
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- standard safety symbols
- steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- survival at sea techniques
- techniques for using survival equipment
- time required to make distress calls safely
- types of emergency situations which may occur such as collision, fire, foundering
- types of life-saving appliances normally carried on ships
- use of distress signals and penalty for misuse.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF010 Work safely in confined spaces on a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to enter and work safely in confined spaces on a vessel.

This unit applies to all maritime employees who could be required to work in, on or around confined spaces on board a vessel.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F - Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Identify confined spaces and their regulatory framework**

- 1.1 Characteristics of a confined space are outlined
- 1.2 Confined spaces in the workplace are identified
- 1.3 Regulations and standards relevant to confined space operations on vessels are identified
- 1.4 Relevant codes of practice and sources of guidance for undertaking confined space work are identified

- |  |     |  |
|--|-----|--|
|  | 1.5 | Potential hazards of confined spaces are identified  |
| <b>2 Assess confined space for entry</b>           | 2.1 | Purpose and need to enter confined space is confirmed  |
|  | 2.2 | Hazards in and around confined space and those associated with work to be performed are identified   |
|  | 2.3 | Risk assessment is conducted and documented according to organisational procedures   |
|  | 2.4 | Risk control measures are identified and documented  |
| <b>3 Obtain permission to enter confined space</b> | 3.1 | Process and documentation required for authorisation to enter confined space are identified  |
|  | 3.2 | Permission to enter and work in confined space is sought from authorised personnel on vessel according to regulatory and organisational requirements |
|  | 3.3 | Permit requirements associated with confined space entry and work to be performed are confirmed and completed  |
| <b>4 Plan and prepare for entry</b>                | 4.1 | Appropriate plan is prepared for completion of work activity in confined space   |
|  | 4.2 | Process is followed to ensure confined space is ready for entry  |
|  | 4.3 | Appropriate personal protective clothing and equipment is selected and used correctly  |
|  | 4.4 | Entry equipment is made ready and used according to manufacturer operating instructions  |
|  | 4.5 | Precautions during entry are identified to protect occupants   |
| <b>5 Apply emergency procedures</b>                | 5.1 | Role and responsibilities of standby person/s are clearly defined  |
|  | 5.2 | Planned emergency procedures appropriate for circumstances are implemented   |
|  | 5.3 | Personal protective equipment and emergency rescue equipment is selected, prepared and used  |
| <b>6 Conclude confined space operations</b>        | 6.1 | Personnel involved and equipment used are accounted for  |
|  | 6.2 | Equipment is cleaned, inspected and/or serviced prior to stowage   |

- 6.3 Confined space entry is secured, isolations are removed and space is returned to normal
- 6.4 Permit is withdrawn and documentation is completed according to regulatory requirements and organisational policy

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Characteristics of a confined space must include:

- those described in the Occupational Health and Safety (Maritime Industry) (National Standards) Regulation and/or Australian Standard (AS/NZS) 2865 Safe working in a confined space

Confined spaces include one or more of the following:

- ballast tanks
- battery lockers
- boilers
- cargo tanks/holds
- chain lockers
- cofferdams
- compressor rooms
- double bottoms
- duct keels
- engine components
- fuel tanks

- furnaces
- inert gas scrubber plants
- pump rooms
- sewage tanks
- storage areas for fixed fire extinguishing media
- trunking and pressure vessels
- void spaces

Regulations, standards and codes of practice must include:

- Code of Safe Working Practice for Australian Seafarers - Section 10 Entering and working in enclosed or confined spaces
- International Safety Management (ISM) Code
- Navigation Act 2012
- Occupational Health and Safety (Maritime Industry) (National Standards) Regulations 2003

Regulations, codes of practice and standards include one or more of the following:

- AS/NZS 2865 Safe working in a confined space
- International Maritime Organization (IMO) Resolution A 1050 (27) Revised Recommendations for Entering Enclosed Spaces Aboard Ships
- International Maritime Solid Bulk Cargoes (IMSBC) Code
- International Safety Guide for Oil Tankers and Terminals (ISGOTT)
- Liquefied Gas Handling Principles on Ships and in Terminals (SIGTTO)
- shipboard confined /enclosed space entry procedures

Vessels include:

- any Australian or international commercial vessel or unit

Hazards include one or more of the following:

- cold pipes and valves (refrigeration and liquefied gases etc.)
- dangerous goods in packaged form
- electricity and wiring systems
- flammable or explosive atmospheres
- free flowing solids
- height
- hot pipes (steam, fuel oil, lubricating oils etc.)
- manual handling
- moving equipment
- noise
- oxygen deficiency or enrichment

- physical obstructions such as transverse frames and floors
- poor visibility
- products or processes in adjacent spaces
- restricted access
- rising liquids
- slippery or uneven surfaces
- temperature extremes
- toxic liquids, solids, gases, vapours and dusts
- vibration

Risks include one or more of the following:

- asphyxiation
- contamination
- engulfment
- falling
- fire or explosion

Risk control measures include one or more of the following:

- atmospheric testing
- barricading
- cleaning
- de-energising
- isolation
- lockout
- purging
- signage
- tag out
- ventilation

Authorised personnel include one or more of the following:

- Master
- Delegated Safety Officer
- Chief Mate
- Chief Engineer
- 1st Engineer

Permit requirements include one or more of the following:

- atmospheric testing results
- cold work permit
- communications
- competent person who has control of the space and the authorising officer's signature
- date and period of validity



- hazards that are likely to be present
- height permit
- hot work permit
- isolation checklist
- locations of the space
- need for respiratory protection
- personal protection clothing required
- personal protective equipment required
- person/s entering
- rescue arrangements and emergency equipment
- risk control measures
- standby person/s

Ready for entry include one or more of the following:

- communications understood and tested
- control measures confirmed and implemented
- development of an appropriate plan to complete works in the space
- emergency plan confirmed as appropriate or modified and equipment in position at the ready
- method of safe entry and exit in place
- permit/s signed by the Responsible Officer and posted
- safe atmosphere confirmed (or relevant measures in place to ensure safe entry into an unsafe atmosphere)
- space is secured
- standby person/s identified and in position

Personal protective clothing and equipment include one or more of the following :

- atmospheric monitoring equipment
- chemically resistant splash suits
- coveralls
- gloves
- harness and restraint equipment
- helmet
- respiratory protection (self rescue devices and self contained breathing apparatus [SCBA])
- safety boots
- safety glasses or goggles

Entry equipment include one or more of the following:

- anchor straps and/or anchor points
- atmospheric testing and monitoring equipment
- confined space harnesses

- fall arrest systems equipment
- intrinsically safe torches/lifting
- lifeline/signalling line
- lockout kit
- retractable lanyard/s
- rope kit/winching
- SCBA
- signage
- tripod
- ventilation fan and ducting

Precautions during entry include one or more of the following:

- atmosphere must be tested prior to entry, before re-entry and at frequent intervals
- atmospheric monitoring must occur during occupancy
- if conducting prolonged work activities or in extreme temperatures, regular breaks should be taken
- if entry to unknown or unsafe atmospheres cannot be avoided the use of suitable breathing apparatus e.g. airline or self-contained should be employed
- occupants must be provided with calibrated and tested multi-gas detectors
- standby person must maintain communications with occupants and relevant personnel
- ventilation must continue while the space is occupied

Role and responsibilities of standby person/s include:

- as defined in Regulation 4.18 Part 4 of the Occupational Health & Safety (Maritime Industry) (National Standards) Regulation

Emergency rescue equipment includes one or more of the following:

- atmospheric monitoring equipment
- emergency escape breathing devices
- first aid kit
- harnesses
- helmets
- lighting
- oxygen resuscitation kit
- rescue ropes
- rope recovery kit
- SCBA
- stretcher

- tripod

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF3007A Work safely in confined spaces on a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF010 Work safely in confined spaces on a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing necessary documentation associated with confined space entry
- continuously monitoring and checking conditions and hazards when working in a confined space on a vessel
- developing effective planning documents
- identifying and implementing control measures to mitigate risk
- recognising defective equipment and taking appropriate action
- recognising hazards and risks when preparing to enter, entering and working in confined spaces
- reading and interpreting regulations, codes of practice, permit requirements, instructions and procedures for entry into a confined space on a vessel
- selecting, inspecting and using safety and emergency equipment according to operating instructions
- taking appropriate action during an emergency
- taking actions promptly to identify, report, and/or rectify hazards and emergency situations when working in a confined space
- using atmospheric detection equipment and interpreting the readings
- using basic verbal and/or defined communication skills and signals when entering and working in confined spaces
- working safely and collaboratively with others when entering and working in a confined space.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- atmospheric testing and monitoring equipment and techniques
- communications systems:
  - air horns
  - alarm/indicator panels
  - face-to-face

- lifeline/signalling line
- two way radios
- communication techniques used when entering and working in confined spaces on a vessel
- criteria that defines a confined space
- emergency entry and exit procedures
- inherent and work related hazards associated with confined spaces
- procedures and permit requirements for confined space entry
- relevant legislative and/or regulatory framework that impacts on confined space entry
- role of standby person/s
- safe operational procedures for the use of self contained breathing apparatus (SCBA)
- ventilation of confined spaces
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF011 Manage firefighting and fire prevention activities on board a vessel

## Modification History

Release 1. New unit of competency.

## Application

his unit involves the skills and knowledge required to manage firefighting and fire prevention activities on board a vessel.

This unit applies to deck and engine officers who are required by Marine Order 3 to be in charge of firefighting activities on board a vessel.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Manage fire prevention activities**

- |     |  |
|-----|--|
| 1.1 | Hazards including dangerous goods on board a vessel are identified and appropriate action is implemented as determined by industry standard documentation                    |
| 1.2 | Legislative requirements and current industry standards relating to the maintenance and operation of fire detection, firefighting equipment and systems on board are met and |

- complied with
- 1.3 Inductions or other educational activities are organised to ensure awareness of causal factors of on-board fires, prevention methods and standard operating procedures when fire alarms are activated
- 2 Plan for fire emergencies**
- 2.1 Vessel fire control plan is consulted to review and develop appropriate response to any fire
- 2.2 Contingencies are anticipated, planned for and practised
- 2.3 Evacuations are prepared for and practised according to regulatory requirements
- 2.4 Roles/functions of command and firefighting team members, as related to fire prevention and suppression, are established and reviewed according to regulatory and organisational requirements
- 2.5 Firefighting training exercises are developed and implemented according to regulatory and organisational requirements
- 2.6 Training exercises are prepared, practised and debriefed according to regulatory and organisational requirements, to ensure readiness for any fire emergency
- 3 Coordinate tactical firefighting activities in response to a fire emergency**
- 3.1 Gathering of full and accurate information on the nature and extent of the fire by the command team is overseen
- 3.2 Order of priority and sequence of actions appropriate to the requirements of the incident is determined and communicated to the responding crew clearly and accurately
- 3.3 Evacuation of personnel, if appropriate, is conducted according to regulatory requirements
- 3.4 Search and rescue operations are conducted using established marine firefighting best practice
- 3.5 Controlled ventilation techniques are correctly applied during fire suppression and rescue operations
- 3.6 Treatment of injured personnel is timely and according to current best casualty management practice
- 3.7 Operational tactics are monitored for their effectiveness and adjusted when required to ensure best outcomes

- |                                      |     |  |
|--------------------------------------|-----|--|
|                                      | 3.8 | Operational tactics are monitored to ensure vessel stability and integrity is maintained                     |
|                                      | 3.9 | All shore-side involvement in an on-board fire emergency is coordinated and monitored effectively            |
| <b>4 Manage post fire activities</b> | 4.1 | Fire watch is coordinated to prevent re-ignition   |
|                                      | 4.2 | Fire affected area is secured prior to investigation according to regulatory and organisational requirements |
|                                      | 4.3 | Equipment is restored to operational condition where applicable  |
|                                      | 4.4 | Cause of the fire is investigated and determined according to regulatory and organisational requirements     |
|                                      | 4.5 | Incident reports are completed according to regulatory and organisational requirements                       |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Hazards must include:

- contents of adjacent spaces
- dangerous goods
- electricity and wiring systems
- flammable or explosive atmospheres
- oxygen deficiency or enrichment



	<ul style="list-style-type: none"><li>• physical obstructions</li><li>• poor visibility</li><li>• restricted access</li><li>• toxic liquids, solids, gases, vapours and dusts</li><li>•</li></ul>
Fire detection, firefighting equipment and systems include one or more of the following:	<ul style="list-style-type: none"><li>• common on board suppression systems</li><li>• hoses and nozzles</li><li>• pumps</li><li>• rescue equipment</li><li>• self contained breathing apparatus (SCBA)</li><li>• thermal and smoke detectors</li></ul>
Fire control plan must include:	<ul style="list-style-type: none"><li>• applications of the BC Code</li><li>• applications of the International Maritime Dangerous Goods (IMDG) Code</li><li>• communication strategy</li><li>• contingency plans for fires involving hazardous materials</li><li>• evacuation plan</li><li>• handling and treatment of injured personnel</li><li>• hazard control strategies</li><li>• search and rescue operations</li><li>• strategies for liaison with shore-based agencies (such as environmental protection agencies, fire services, medical teams, port authorities)</li><li>• strategies for shipboard firefighting management in port</li><li>• tactical methods for fighting fires involving hazardous materials</li><li>• tactical plan of action</li></ul>
Contingencies include one or more of the following:	<ul style="list-style-type: none"><li>• change in fire behaviour or extent</li><li>• equipment failure or unavailability</li><li>• unexpected personnel involvement</li></ul>
Restored must include:	<ul style="list-style-type: none"><li>• after use, maintaining SCBA to industry standards</li><li>• cleaning</li><li>• recharging extinguishers according to Australian Standards</li><li>• re-stowing</li><li>• servicing</li></ul>

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF4001A Manage firefighting and fire prevention activities on board a vessel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF011 Manage firefighting and fire prevention activities on board a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with crew and passengers during fire emergencies
- determining the type and extent of the fire and initiating appropriate, timely, actions
- ensuring order of priority, timing and sequence of actions are appropriate to the overall requirements of the incident and minimise damage and potential damage to the vessel, injuries to personnel, and impairment of the operational effectiveness of the vessel
- evaluating effectiveness of firefighting activities and tactics during fire emergencies
- initiating appropriate action and providing solutions to problems with firefighting equipment and operations during fire emergencies
- liaising with shore-based emergency organisations during fire emergencies
- managing fire prevention and suppression activities on a vessel
- managing on-board firefighting training for shipboard firefighting teams
- managing shipboard firefighting teams and their tactical activities during fire emergencies
- managing the maintenance of firefighting equipment and systems
- providing leadership to shipboard personnel and passengers during fire emergencies
- recognising and interpreting fire alarms and initiating appropriate response
- safeguarding personal safety during fire control activities at all times
- taking actions to control fires based on a full and accurate assessment of the incident, using all available sources of information
- transmitting information promptly, accurately, completely and clearly.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- assessment of cause of incidents involving fire
- chemistry of fire and its relationship to combustible materials typically found on vessels
- communication and coordination during firefighting operations
- composition and allocation of personnel to fire parties
- control of fuel and electrical systems

- different classes of fire and the most appropriate extinguishing agents, application equipment and methods of extinguishment for each
- fire-detection systems: fixed fire-extinguishing systems; portable and mobile fire-extinguishing systems, including appliances, pumps and rescue, salvage, life-support, personal protective and communication equipment
- fire precautions and hazards associated with the storage and handling of materials (paints etc.)
- firefighting procedures at sea and in port, with particular emphasis on organisation, tactics and command
- firefighting process hazards (dry distillation, chemical reactions, boiler uptake fires etc.)
- firefighting involving dangerous goods
- implications of shipboard firefighting management in port and the procedures that must be followed to comply with port and state regulations
- importance of maintenance of fire detection and firefighting equipment on board vessels
- life and health risks associated with fires on vessels
- management and control of injured persons
- maritime communication techniques applicable to the management of fire prevention and firefighting activities on board a vessel
- methods for checking and replacing consumable materials in fire detection, fire-fighting equipment and systems on board vessels
- preparation of contingency plans
- principle of operation of fixed fire suppression systems
- principles underlying the spread of fire and its extinguishment
- problems likely to be encountered during the management of a shipboard fire and related tactics and solutions that can be applied
- procedure for safe activation of fixed firefighting systems
- procedures for coordination of shore-based firefighters
- relevant regulations, codes of practice, policies and procedures relating to the maintenance of fire detection, firefighting equipment and systems on board vessels
- requirements for on-board firefighting training
- requirements for statutory and classification surveys
- safety data sheets/material safety data sheets relevant to the various products and substances carried on vessels
- strategies and tactics for control of fires in various parts of the vessel
- strategies for rapid briefing of shore-based emergency organisations using the vessel fire control plan
- types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, the procedures for their use and remediating problems that can occur during use
- typical actions of passengers in a shipboard fire
- use of water for fire extinguishing, the effect on ship stability, precautions and corrective procedures
- ventilation control, including smoke extraction

- work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF012 Control safe access to and on vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to control safe access to and on a vessel.

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Rig equipment

- 1.1 Preparations for the rigging of access equipment are made according to manufacturer instructions and organisational procedures
- 1.2 Access equipment is deployed according to organisational procedures
- 1.3 Safety checks and precautions are carried out according to

		organisational procedures
	1.4	Defective equipment is identified and reported, repaired or replaced according to organisational procedures
	1.5	Access equipment is unrigged and stowed after use
<b>2</b>	<b>Monitor access of persons to and on vessel</b>	
	2.1	Persons accessing the vessel are advised and instructed on the procedures for using access equipment
	2.2	Access of persons to and on vessel is supervised
	2.3	Any problems with persons accessing the vessel are identified and resolved or reported
<b>3</b>	<b>Monitor safety of personnel working aloft and over side of vessel</b>	
	3.1	Personnel going aloft or over side are instructed on the procedures and safety precautions to be followed
	3.2	Equipment for going aloft or over side is rigged and checked prior to operations commencing
	3.3	Appropriate personal protective equipment for working aloft or over side is made available and instructions are provided on its use
	3.4	Faulty equipment is identified, isolated and reported to enable prompt repair and/or replacement
	3.5	Emergency and rescue procedures are confirmed and agreed before work commences
	3.6	Operations of personnel aloft or over the side are supervised and any problems are identified and resolved or reported
	3.7	Safety incidents arising in the course of work aloft or over side are reported and recorded according to statutory requirements and organisational procedures
<b>4</b>	<b>Monitor safety of personnel working in confined spaces on a vessel</b>	
	4.1	Risk assessment of confined space entry is conducted and documented according to organisational and regulatory requirements
	4.2	Permission to enter and work in a confined space is sought from authorised personnel according to regulatory requirements
	4.3	Permits are completed with conditions of validity and submitted for approval to designated personnel according to regulatory requirements

- 4.4 Appropriate plan is prepared for the completion of the work activity in the confined space
- 4.5 Operations of personnel working in confined spaces are supervised and any problems are identified and resolved or reported
- 4.6 Planned emergency and rescue procedures are followed in the event of an accident or other emergency
- 4.7 Evacuation of confined space is supervised and sign out is completed on entry permit

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Access equipment includes one or more of the following:

- gangways
- gas and oxygen meters
- pilot hoist
- pilot ladder
- staging

Equipment for going aloft or over side includes one or more of the following:

- fall arrest devices
- ladders
- ropes
- safety harness



	<ul style="list-style-type: none"><li>• staging</li></ul>
Personal protective equipment for working aloft or overside includes one or more of the following:	<ul style="list-style-type: none"><li>• hard hats</li><li>• immersion suit</li><li>• life jacket</li><li>• thermal protective aids</li><li>• safety lines</li></ul>
Confined spaces includes one or more of the following:	<ul style="list-style-type: none"><li>• ballast or oil tank</li><li>• cargo hold</li><li>• cargo tank</li><li>• double bottom tank</li><li>• duct keel</li><li>• space entered through a small hatchway or access point</li><li>• void space</li></ul>
Risk assessment includes one or more of the following:	<ul style="list-style-type: none"><li>• atmosphere that contains potentially harmful levels of contaminants</li><li>• atmospheric conditions such as high temperature and humidity that cause fatigue</li><li>• corroded or otherwise damaged ladders and landings</li><li>• engulfment by 'fluid' cargo such as grains</li><li>• external hazards connected to or adjacent to the space</li><li>• harmful non-toxic or non-explosive dusts</li><li>• isolation of electrical equipment</li><li>• operation of radar scanners</li><li>• oxygen deficiency or excess</li><li>• poor visibility and lighting</li><li>• restricted access and movement making escape and rescue difficult</li><li>• slippery conditions that might result in injury from falls</li><li>• toxic liquids, solids, vapours, gases and dusts</li><li>• work processes which may introduce flammable, volatile and/or toxic gasses and vapours</li></ul>
Regulatory requirements includes one or more of the following:	<ul style="list-style-type: none"><li>• Australian Standard (AS/NZS) 2865:2001 Safe working in a confined space</li><li>• vessel and organisation safety management system plans, procedures, checklists and instructions</li></ul>

- Authorised personnel include one or more of the following:
- Chief engineer
  - Master
  - work health and safety (WHS)/occupational health and safety (OHS) representative
- Permits include one or more of the following:
- gas free certificate
  - hot work permit
  - permit to enter
- Appropriate plan includes one or more of the following:
- atmospheric tests
  - communications system
  - emergency and rescue arrangements
  - identification of standby person/s
  - isolation of confined space
  - permits
  - personal protective equipment
  - procedures for entering and exiting a confined space
  - strategy for recovery of injured and unconscious person/s
  - ventilation of space

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF5001A Control safe access to and on vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF012 Control safe access to and on vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively when controlling safe access to and on a vessel
- completing entry permits and other related documentation
- conducting atmospheric assessments with oxygen meter and gas detecting equipment
- identifying and controlling hazards in confined spaces
- interpreting relevant legislative responsibilities in relation to working in confined spaces
- managing safety of personnel aloft and over side of vessel
- reading, interpreting and applying instructions relevant to the rigging of personnel and pilot access ways on a vessel
- recognising routine problems that may occur when controlling safe access to and on a vessel and taking appropriate action
- rigging personnel and pilot access ways
- selecting and using rigging and safety equipment according to standard operating procedures and safety management systems
- supervising persons working in confined spaces
- tying required knots and handling ropes
- using emergency and safety equipment according to operating instructions
- working safely and collaboratively with others working in a confined space
- working safely and collaboratively with others when rigging personnel and pilot access ways to and on a vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable personal protective safety equipment and procedures for its use
- atmospheric hazards and assessment methods
- communication techniques used when entering and working in a confined space
- electrical safety
- emergency entry and exit procedures
- equipment used in confined space entry

- hazard identification procedures
- hazards to health and safety in confined spaces
- maintenance and storage procedures for equipment used when working aloft or over side
- maritime security levels and their impact on security measures and procedures on board ship and in port facilities
- precautions to be taken:
  - when entering enclosed spaces
  - before and during repair and maintenance work
- principle design and safety features and component parts of personnel and pilot access ways typically used on vessels
- safety measures for hot and cold work
- security reporting procedures
- ship/shore safety checklist
- relevant sections of applicable maritime regulations
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- risk management strategies for entry to confined spaces
- role of standby personnel while a person enters and works in a confined space
- routine problems that may occur when controlling safe access to and on a domestic vessel and appropriate action and solutions
- safe systems of work
- special procedures and permit requirements for particular types of work in confined spaces
- standard operating procedures and safety precautions to be followed when working:
  - aloft or over side
  - in confined spaces
- standard operating procedures for rigging personnel and pilot access ways
- types of confined spaces encountered in the maritime industry
- types of knots, bends and hitches required when rigging personnel and pilot access ways, their characteristics, applications and limitations, and methods of tying them using synthetic and fibre rope of varying construction and size
- WHS/OHS requirements for confined space entry.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF013 Provide medical first aid on board a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to provide immediate first aid in the event of accident or illness on board a vessel.

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters; or as Marine Engineer Class 2 on commercial vessels greater than 3000 kW; or as a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare to respond to emergency on board**

- 1.1 Casualty condition is assessed and appropriate response is determined in order to minimise hazards and determine the need for emergency medical assistance
- 1.2 Options for transporting casualty or waiting for medical assistance are evaluated in relation to environmental issues,

- transport availability and casualty condition
- 1.3 Casualty is sheltered from elements according to environmental conditions, if required
- 2 **Provide first aid on board**
    - 2.1 Nature of casualty injury/condition and relevant first aid procedures are determined and explained to the casualty
    - 2.2 Consent is sought from the casualty prior to applying first aid
    - 2.3 First aid is provided to address casualty condition and according to effective first aid principles
    - 2.4 Casualty condition is monitored and ongoing first aid is provided as required
    - 2.5 Casualty is calmly reassured according to effective first aid principles
    - 2.6 Condition of casualty is documented over time to assist in providing ongoing first aid
  - 3 **Work in conjunction with medical and emergency services support**
    - 3.1 Communication links are established with medical services using relevant communication equipment to ensure prompt control action is taken
    - 3.2 Appropriate medical assistance is sought according to the circumstances
    - 3.3 Medication is administered under direction from an authorised health worker as required
    - 3.4 Directions given by emergency services are followed to assist in the evacuation of the casualty, if required
  - 4 **Participate in debriefings**
    - 4.1 Information is provided on the incident and the first aid assistance provided
    - 4.2 Clarifications are provided, where required
    - 4.3 Suggestions are provided to improve future operations

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Emergency includes one or more of the following:

- asphyxia
- burns and scalds and the effects of heat and cold
- cardiac arrest
- drowning
- fractures, dislocations and muscular injuries
- medical care of rescued persons

Options for transporting casualty or waiting for medical assistance include one or more of the following:

- advice given by authorised health worker
- severity of injury
- time required for medical assistance to arrive
- whether movement might cause a deterioration in casualty condition
- whether contact with medical and/or emergency services has been achieved

Documented includes one or more of the following:

- administration of medications including time, date, dose, person administering
- description of injury
- first aid management
- fluid/oral intake/output including fluid loss via blood, vomit, faeces, urine
- location
- time
- vital signs

Communication equipment includes one or

- GMDSS equipment
- VHF radio



more of the following:

Authorised health worker includes one or more of the following:

- general practitioner
- nurse practitioner
- paramedic/ambulance officer

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF5002A Provide medical first aid on board a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF013 Provide medical first aid on board a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accurately listening to, clarifying and applying medical instructions
- administering medication under direct instruction from an authorised health worker
- conducting an initial casualty assessment
- demonstrating adequate infection control procedures
- evaluating available options for transporting or maintaining condition of casualty
- examining casualty or patient
- identifying and preparing an area for safe evacuation
- improvising treatment and associated resources
- minimising the risk of harm to self and others at all times
- planning an appropriate first aid response in line with established first aid principles, policies and procedures
- preparing incident reports
- promptly completing identification of probable cause, nature and extent of injuries according to current first aid practice
- using available communication methods and equipment to access medical assistance.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- body structure and function
- burns, scalds and the effects of heat and cold
- cardiac arrest, drowning and asphyxia
- first aid kit
- fractures, dislocations and muscular injuries
- medical care of rescued persons
- pharmacology
- radio medical advice
- sterilisation

- toxicological hazards on board including use of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) or its national equivalent
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF014 Respond to emergencies

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to deal with maritime emergencies and incidents.

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Raise alarms

- 1.1 Urgency of situation and nature of emergency is identified promptly
- 1.2 Relevant alarms are activated
- 1.3 Distress signals are used to indicate need for assistance, if required

- |  |   |
|--|---|
| <b>2 Control onboard emergency</b>           | <ul style="list-style-type: none"><li>2.1 Initial actions on becoming aware of emergency are undertaken according to contingency plans and are appropriate to urgency of situation and nature of emergency</li><li>2.2 Onboard personnel are given information and instructions clearly and accurately</li><li>2.3 Procedures are implemented to combat emergency and to protect persons on board</li><li>2.4 Communications are established with others to facilitate emergency response process</li><li>2.5 Injured persons are provided with assistance</li><li>2.6 Contact is maintained with others at all times to keep them briefed on emergency response process</li><li>2.7 Preparation for abandoning vessel is undertaken, if required</li><li>2.8 Cessation of emergency is communicated to appropriate personnel</li></ul> |
| <b>3 Respond to a distress signal at sea</b> | <ul style="list-style-type: none"><li>3.1 Distress signals from others are recognised immediately</li><li>3.2 Nature of assistance required is identified</li><li>3.3 Capability to safely assist or relay emergency is determined taking into account own safety and physical proximity to emergency</li><li>3.4 Appropriate response to emergency is prepared for and implemented according to contingency plans and instructions in standing orders</li><li>3.5 Cessation of emergency is communicated to appropriate personnel</li></ul>  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Nature of emergency includes one or more of the following:

- anchoring
- assisting a vessel in distress
- collision
- contaminated fuel
- emergencies which arise in port
- engine breakdown or malfunction
- fire
- flooding
- grounding
- hypothermia
- incidents
- injuries/illness
- lack of fuel
- lost
- person overboard
- rescuing persons from sea
- sinking
- swamping

Relevant alarms include one or more of the following:

- abandon ship signals
- fire and lifeboat muster alarms
- mayday broadcast

Distress signals include one or more of the following:

- emergency position indicating radio beacons (EPIRB)
- flags
- hand signals
- International Code Signal of Distress
- light signals
- pyrotechnic distress signals
- radio
- reflective mirror

- V-sheet

Initial actions include one or more of the following:

- damage assessment and control
- manoeuvring vessel

Others include one or more of the following:

- aircraft
- other vessels
- search and rescue authorities

Nature of assistance includes one or more of the following:

- assisting a ship in distress
- rescuing persons from sea
- responding to emergencies occurring in port

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF5003A Respond to emergencies.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF014 Respond to emergencies

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying first aid
- correctly using lifesaving appliances
- if appropriate, manoeuvring vessel, according to contingency plans
- immediately recognising a distress or emergency signal
- implementing contingency plans and instructions in standing orders when responding to a distress signal at sea
- promptly identifying type and scale of emergency
- working as part of a team.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- common emergency actions
- contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
- initial action to be taken following a collision or grounding
- initial damage assessment and control
- one's surroundings and changes to these surroundings
- precautions for protection and safety of passengers in emergency situations
- procedures to be followed for:
  - rescuing persons from the sea
  - assisting a vessel in distress
  - responding to emergencies that arise in port
- range of lifesaving appliances
- types of maritime emergency incidents and situations
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.



## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF015 Manage provision of medical care on board a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to provide medical care to people who are sick and/or injured while they remain on board a vessel.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited or a Marine Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Manage vessel medical care**

- 1.1 Availability of adequate resources is monitored and maintained to support medical responses
- 1.2 Regular inspections of stock and equipment are conducted to ensure currency and operational readiness, according to organisational requirements
- 1.3 Equipment and resources are stored and maintained according to regulatory requirements and

- manufacturer/supplier instructions
- 1.4 Risks on the vessel are reviewed and organisational policies and procedures related to the provision of medical care are validated
  - 1.5 Planning is conducted for responses to major incidents on board the vessel
- 2 Take charge of a casualty on board**
- 2.1 Safety of injured or ill person, bystanders and self in an accident situation is assessed according to first aid procedures
  - 2.2 Safety requirements associated with providing medical care and vessel environmental requirements are adhered to
  - 2.3 Condition of injured or ill person is assessed according to first aid procedures
  - 2.4 Position of injured or ill person is adjusted to optimise personal comfort for the medical condition or injury
  - 2.5 Injured or ill person is reassured and supported during the wait for medical assistance
  - 2.6 Nature of the illness/injury is explained to injured or ill person
  - 2.7 Significance of changes in person's condition is promptly recognised and appropriate action is taken if there are signs of deterioration in injured or ill person
  - 2.8 Calm, confident and reassuring personal attitude is conveyed
- 3 Provide medical care**
- 3.1 Medical emergencies and injuries are identified and assessed correctly, and appropriate action is taken to prevent further injury
  - 3.2 Symptoms and appropriate treatment are identified based on the concepts of clinical examination and medical history
  - 3.3 Medical emergencies and injuries are diagnosed and managed according to accepted medical practice, and relevant national and international guides
  - 3.4 Manufacturer recommendations and accepted medical practice with regard to dosage and application of drugs and medication are complied with
  - 3.5 Complete and effective methods to protect against infection

and spread of diseases are used

3.6 Resuscitation techniques are performed following safety procedures, if required

3.7 Appropriate techniques for moving injured or ill person are used

3.8 Resources and equipment are recovered and reprocessed, and waste is disposed of safely

#### **4 Seek external assistance**

4.1 Condition of injured or ill person is documented over time to assist with ongoing management

4.2 Communication links are established with external medical services to ensure prompt control action is taken

4.3 Clinical examination procedures are completed and instructions received are complied with

4.4 Assessments of person's condition are relayed to external medical advisors

4.5 Medical procedures are carried out under medical instruction using relevant communication equipment and instructions received are complied with

4.6 Condition of injured or ill person is evaluated to determine transport requirements for additional medical care

4.7 Preparation for the evacuation of injured or ill person by emergency services is provided, if required, according to organisational procedures and welfare of person is maximised

4.8 Resources and equipment are recovered and reprocessed, and waste is disposed of safely

#### **5 Manage first aid records**

5.1 Documentation is completed in accordance with regulatory and organisational requirements

5.2 First aid records are maintained in accordance with regulatory and organisational requirements

5.3 Relevant documents are sent to appropriate bodies in accordance with regulatory and organisational requirements

5.4 Confidentiality of records and information is maintained in accordance with privacy principles and regulatory and organisational requirements

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Resources include one or more of the following:

- backboards
- blood pressure cuff
- cervical collars
- defibrillation units
- dressings
- eyewash
- first aid kits
- injections
- oxygen resuscitation cylinders
- pocket face masks
- pressure bandages
- rubber gloves
- soft bag resuscitator
- spacer device
- stretchers
- thermometers
- thermal blankets

Safety of injured or ill person includes one or more of the following:

- bodily fluids
- environmental risks
- equipment, machinery and substances

- first aid equipment
- risk of further injury
- risks associated with the proximity of crew or passengers

Medical emergencies and injuries include one or more of the following:

- care of casualty involving:
  - head and spinal injuries
  - injuries of ear, nose, throat and eyes
  - external and internal bleeding
  - burns, scalds and frostbite
  - fractures, dislocations and muscular injuries
  - wounds, wound healing and infection
- dealing with a death at sea
- dressing and bandaging
- giving vaccinations
- managing acute abdominal conditions
- providing:
  - dental care
  - gynaecological, pregnancy and childbirth support
  - medical care of rescued persons
  - minor surgical treatment
  - pain relief
- treating:
  - sexually transmitted diseases
  - tropical and infectious diseases
  - alcohol and drug abuse
- using disease prevention techniques including disinfection, de-infestation, de-ratting
- using techniques of sewing and clamping

Medication includes one or more of the following:

- adrenaline
- analgesics
- aspirin
- bronchodilators
- oxygen
- pain relief/paracetamol

Communication links include one or more of the following:

- electronic equipment
- email
- flags

- HF/VHF radio
- satellite phones
- two-way radio
- use of medical codes

Preparation for the evacuation includes one or more of the following

- communicating with helicopter, vessel or ambulance conducting the evacuation
- relevant first aid supplies and resources
- selecting relevant communication equipment

Documentation includes one or more of the following:

- casualty history forms
- day book
- disease notification to quarantine officials
- D-Rat Certificate
- first aid risk assessment
- incident/injury reports
- infection control records
- management records
- medical histories
- medication registers
- stock records
- workcover forms
- workers' compensation

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARF6002A Manage provision of medical care on board a vessel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF015 Manage provision of medical care on board a vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- caring of casualty involving:
  - head and spinal injuries
  - injuries of ear, nose, throat and eyes
  - external and internal bleeding
  - burns, scalds and frostbite
  - fractures, dislocations and muscular injuries
  - wounds, wound healing and infection
- dealing with a death at sea
- dressing and bandaging
- giving vaccinations
- managing acute abdominal conditions
- providing:
  - dental care
  - gynaecological, pregnancy and childbirth support
  - medical care of rescued persons
  - minor surgical treatment
  - pain relief
- treating:
  - alcohol and drug abuse
  - sexually transmitted diseases
  - tropical and infectious diseases
- using disease prevention techniques including disinfection, de-infestation, de-ratting
- using sewing and clamping techniques.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:



- alcohol and drug abuse
- care of:
  - head and spinal injuries
  - injuries of ear, nose, throat and eyes
  - external and internal bleeding
  - burns, scalds and frostbite
  - fractures, dislocations and muscular injuries
  - wounds, wound healing and infection
- death at sea
- dental care
- disease prevention including disinfection, de-infestation, de-ratting
- dressing and bandaging
- general principles of nursing
- gynaecology, pregnancy and childbirth
- hygiene
- international and national maritime medical regulations
- management of acute abdominal conditions
- medical care of rescued persons
- medical care of sick seafarers involving co-operation with port health authorities or out-patient wards in port
- medical conditions and emergencies
- minor surgical treatment
- nursing care
- pain relief
- radio medical advice
- quarantine regulations and required advices such as pratique, notification of disease on board
- sexually transmitted diseases
- techniques of sewing and clamping
- transportation of injured or ill persons including helicopter evacuation
- tropical and infectious diseases
- vaccinations
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF016 Carry out fast rescue craft operations**

## **Modification History**

Release 1. This unit first released with MAR Maritime Training Package Version 2.0.

## **Application**

This unit involves the skills and knowledge required to carry out fast rescue craft operations and includes maintaining fast rescue craft; preparing fast rescue craft and crew for operations; taking charge of a fast rescue craft during and after launch; responding to craft, equipment and crew emergencies or malfunctions; locating and retrieving casualties; recovering and securing fast rescue craft after operations.

Work is performed relatively independently under broad operational requirements and requires the ability to take charge of the rescue boat and its crew, and to take responsibility for self and others in achieving the required outcomes.

Work involves applying established maritime survival principles and practices for launching and operating fast rescue craft and using related survival equipment. Implementing established survival strategies and procedures is also involved.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

F – Operational Quality and Safety

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
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- |   |   |
|---|---|
| <b>1 Maintain fast rescue craft for operations</b>                | <ul style="list-style-type: none"><li>1.1 Fast rescue craft design characteristics and fittings are identified</li><li>1.2 Fast rescue craft capabilities are outlined</li><li>1.3 Fast rescue craft and items of equipment are maintained in accordance with manufacturer specifications and operational requirements</li></ul>  |
| <b>2 Prepare fast rescue craft and crew for operations</b>        | <ul style="list-style-type: none"><li>2.1 Fast rescue craft launching equipment design and operation are outlined</li><li>2.2 Motion compensation system operation and associated fail safe devices are outlined</li><li>2.3 Motion compensation system operation and associated fail safe devices are maintained in accordance with manufacturer instructions</li><li>2.4 Pre-launch checks are conducted in accordance with manufacturer specifications and operational requirements</li><li>2.5 Appropriate specialised emergency equipment is stowed on board fast rescue craft</li><li>2.6 Operational responsibilities and lines of communication are confirmed with relevant personnel</li><li>2.7 Appropriate personal protective and foul weather equipment is worn as required</li><li>2.8 Readiness of fast rescue craft, crew and equipment for launch is confirmed with relevant personnel</li></ul> |
| <b>3 Take charge of fast rescue craft during and after launch</b> | <ul style="list-style-type: none"><li>3.1 Fast rescue craft is launched in a controlled and safe manner according to craft and launch system manufacturer specifications and instructions</li><li>3.2 Hook release system is operated according to manufacturer specifications, and launch vessel and launch equipment are cleared safely</li><li>3.3 Engine power is managed within manufacturer torque range in a way that ensures smooth and efficient movement</li><li>3.4 Damage to engine and accessories is minimised</li><li>3.5 Fast rescue craft is operated within safe operational limits of craft for the prevailing conditions</li></ul>  |

- 3.6 Manoeuvres are performed with due regard to drive system manoeuvring characteristics
- 3.7 Manoeuvres are performed in a way that ensures the safety of personnel on board and in the water
- 3.8 Navigational equipment is used according to manufacturer specifications
- 3.9 Communication and signalling equipment is used according to manufacturer specifications and operational requirements
- 3.10 Communications are established and maintained between craft, other vessels, rig and helicopters as required
- 3.11 Emergency equipment is used according to manufacturer specifications, supervisor instructions and emergency conditions
- 4 Respond to emergencies or malfunctions involving craft, equipment and crew**
  - 4.1 Capsized fast rescue craft is righted using craft righting system, with due concern for crew safety and possible damage to craft and equipment
  - 4.2 Swimming is performed as required in standard personal protective equipment, foul weather clothing or other specialised protective equipment
  - 4.3 Appropriate procedures for reboarding fast rescue craft and for wearing operational clothing and equipment are implemented
  - 4.4 Emergency repairs and maintenance to fast rescue craft and equipment are performed according to manufacturer specifications and emergency conditions
- 5 Locate and retrieve casualties**
  - 5.1 Appropriate search patterns are followed according to search coordinator instructions
  - 5.2 Search patterns and rescue procedures are coordinated with other fast rescue craft where appropriate
  - 5.3 Casualties are approached in a way that ensures casualty and crew safety
  - 5.4 Fast rescue craft is positioned to ensure safe and quick retrieval of casualties
  - 5.5 Casualty condition is determined and appropriate recovery procedures are implemented

- |                                    |     |  |
|------------------------------------|-----|--|
|                                    | 5.6 | Appropriate lifting procedures are adopted to ensure safe retrieval of casualty  |
|                                    | 5.7 | Emergency first aid procedures are applied as appropriate  |
|                                    | 5.8 | Master or medical officer is notified of casualty condition and medical instructions are followed as appropriate   |
|                                    | 5.9 | Casualty is transferred to vessel, rig, helicopter or other place of safety with concern for types of injuries sustained   |
| <b>6 Recover fast rescue craft</b> | 6.1 | Stand-down procedures are followed   |
|                                    | 6.2 | Fast rescue craft is recovered in a controlled and safe manner according to craft, hook release systems and recovery system manufacturer specifications and instructions |
|                                    | 6.3 | Fast rescue craft and equipment are secured on board and prepared for future operations  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Numeracy – required to calculate items of equipment and to conduct pre-launch checks

Literacy – required to read and accurately interpret pre-launch checks and stand down procedures

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| Drive systems and manoeuvres include one or more of the following: | <ul style="list-style-type: none"> <li>• inboard/outboard</li> <li>• jet</li> <li>• jet drives</li> <li>• outboard</li> <li>• rudder</li> <li>• single propeller</li> <li>• twin propeller</li> </ul> |
| Craft righting systems   | <ul style="list-style-type: none"> <li>• inflatable bag supported by stern mounted roll bar that is</li> </ul>  |

include one of the following:

- accessible from outside the craft
- rope mounted on the outside of the craft

Launch systems and recovery systems include one or more of the following:

- deck crane or davit
- four point sling with fixed eye
- rig crane
- solid mounted frame using fixed hook assembly

Manoeuvres include one or more of the following:

- approaching a casualty in the water
- coming alongside and leaving a moving vessel
- coming alongside or leaving a pontoon, jetty or other fixed object
- following search patterns
- high speed approaches
- pacing a vessel or helicopter
- positioning craft for casualty pick-up
- towing or being towed by other craft
- transferring personnel or equipment to or from stationary or moving point
- turning through 180 degrees in a narrow channel requiring forward and reverse movement

Emergencies include one or more of the following:

- capsize
- collision
- crew or equipment overboard
- electrical or mechanical failure
- injury to crew
- leaks or flooding

## Unit Mapping Information

This unit replaces and is equivalent to TDMMF4307B Carry out fast rescue craft (FRC) operations.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF016 Carry out fast rescue craft operations

## Modification History

Release 1. This unit first released with MAR Maritime Training Package Version 2.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- completing vessel logbooks
- conducting pre-launch and ongoing craft and equipment checks in relation to:
  - ancillary equipment required on board
  - battery
  - bowsing line operability
  - communications equipment
  - compass
  - crane operability
  - drive units including oil levels, clearance from obstruction, tilt levels, nozzle operation where applicable
  - electrical equipment
  - engine levels including oil, water and v-belts
  - engine operability
  - fuel lines and pumps
  - hull integrity
  - launch capability
  - lifting sling or hook
  - lines of communication
  - operational procedures and requirements
  - personal protective equipment availability and operability
  - search light
  - specialised emergency equipment
  - steering
  - switches
  - tow rope
- effectively using personal protective equipment and foul weather gear including:
  - eye protection, sunscreen protective footwear, safety helmet and gloves



- immersion suits, inflatable life jacket, overalls, wet weather gear
- implementing appropriate casualty recovery procedures
- implementing emergency first aid procedures including:
  - cardiopulmonary resuscitation
  - care following fuel ingestion
  - care of burns, breaks and fractures
  - control of hypothermia, control of internal or external bleeding, shock
  - determining the extent of head and spine injury and appropriate care
  - expired air resuscitation
  - monitoring of vital signs
- implementing personal survival techniques required of seafarers as referenced in Section A VI/1 of the International Maritime Organization (IMO) Standards of Training and Certification & Watchkeeping (STCW) 95 Code
- launching and operating fast rescue craft and equipment by day or night in both normal and emergency situations under normal and adverse conditions of sea and weather while:
  - anchored or moored
  - hove to
  - under way
- maintaining and undertaking emergency repair of craft and auxiliary equipment
- operating fast rescue craft in prevailing sea and weather conditions including:
  - broken or rough water
  - cross-winds, swell and/or tide
  - wind, swell and/or tide running with the craft
  - wind, swell and/or tide running against the craft
- reading and interpreting IMO safety symbols by night and day
- swimming in personal protective equipment, foul weather gear or specialised protective equipment
- undertaking appropriate search patterns including:
  - creeping line
  - expanding square
  - parallel track search using one, two or three craft
  - sector search
  - ship/aircraft coordinated pattern
- using launch and recovery equipment including:
  - buoyant bailer, ladles, rescue buoyant quoits with 30 metre line, 15 metre painter, 50 metre buoyant towing line
  - compass, whistle, waterproof electric torch and waterproof search light
  - first aid kit
  - sea anchor
  - tool kit
- using signals and communications equipment including:

- flair pack containing handheld orange smoke flairs, handheld red flairs and handheld rocket flairs
- radar reflector
- using specialised emergency equipment including:
  - buoyant safety line
  - safety buoyant clasp knife
  - thermal protective aids
  - fire extinguisher
  - foot pump
  - safety boat hook.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- effects of sea and weather conditions on fast rescue craft operations
- equipment maintenance and emergency repair procedures
- fast rescue craft:
  - hull construction (such as inflatable hulls, rigid hulls, semi-rigid hulls)
  - hull flotation systems (such as foam filled collar, inflatable collar, inflatable pontoons, sealed floor)
- International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code) safety management system plans, procedures, checklists and instructions
- launch and recovery equipment, procedures and safety precautions
- manoeuvring and engine characteristics for fast rescue craft including handling strategies to overcome hazards caused by a head sea, a following sea and a beam sea
- operational features and correct use of the motion compensation system in use
- outfitting of fast rescue craft such as auxiliary equipment, specialised emergency equipment and communications equipment
- personal survival techniques required of all seafarers
- procedures and sequences of action for correctly operating and using fast rescue craft
- relevant sections of:
  - International Aeronautical and Maritime Search and Rescue (IAMSAR) manual
  - relevant Australian Maritime Safety Authority (AMSA) publications such as Survival at Sea : a Training and Instruction Manual
  - IMO STCW 95 Code and AMSA Marine Orders
  - relevant international, Australian and state/territory work health and safety/occupational health and safety (WHS/OHS) legislation, regulations, codes of practice, policies and procedures such as Safety of Life at Sea (SOLAS)

- relevant international and Australian Standards
- search patterns and environmental factors affecting their execution
- signals and communications protocols
- symptoms of hypothermia, its prevention and treatment and the related use of protective covers and garments such as immersion suits and thermal protective aids
- types of fast rescue craft and relevant ancillary equipment, including construction, features and starting and operating characteristics.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- all tools, equipment, materials and personal protective equipment specified in the Performance Evidence in this unit of competency
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals including:
  - section A VI/1 of the International Maritime Organization (IMO) Standards of Training and Certification & Watchkeeping (STCW) 95 Code
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARF017 Follow work health and safety, and emergency procedures during mooring and unmooring activities**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to interpret and follow work health and safety (WHS)/occupational health and safety (OHS) policy and procedures, and emergency procedures during mooring and unmooring activities.

This unit applies to people working in the maritime industry as a Linesperson as part of a mooring and unmooring team.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

F – Operational Quality and Safety

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

#### **ELEMENTS**

Elements describe the essential outcomes.

#### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 
- |  |   |
|--|---|
| <b>1 Follow safety and hazard control procedures</b> | <ul style="list-style-type: none"><li>1.1 Tests and inspections of ropes and equipment are conducted according to regulations and company procedures</li><li>1.2 Hazards are identified and action is taken to eliminate or minimise risk to personnel, port facilities, vessel and the environment</li><li>1.3 Safety precautions and hazard minimisation procedures and regulations are followed at all times during mooring or unmooring operations</li><li>1.4 Safe distance from snapback zones and demarcated area is maintained during tensioning and slackening of lines</li><li>1.5 Action is taken to secure vessel and to maintain safety of vessel and persons involved, in a mooring or unmooring incident</li></ul> |
| <b>2 Use personal protective equipment</b>           | <ul style="list-style-type: none"><li>2.1 Personal protective equipment (PPE) is obtained and checked prior to commencement of operations according to company WHS/OHS policy and procedures</li><li>2.2 PPE is correctly used as required</li><li>2.3 PPE is correctly stored after use according to company procedures</li></ul>  |
| <b>3 Follow safety and emergency procedures</b>      | <ul style="list-style-type: none"><li>3.1 Wharf, port and vessel emergency procedures are accessed and implemented</li><li>3.2 Safety drills are conducted according to company procedures</li><li>3.3 Escape routes, and internal and external communications and alarm systems are correctly used according to regulatory requirements and established port procedures</li><li>3.4 Emergency communications, and alarm signals and systems are used according to port emergency procedures and regulatory requirements</li></ul>  |

#### **4 Report safety incidents and emergencies**

- 4.1 Safety incidents or emergencies that occur during mooring or unmooring operations are correctly and accurately recorded according to regulations and company procedures
- 4.2 Required reports on safety incidents or emergencies that occur during mooring or unmooring operations are prepared and referred to designated personnel according to regulations and company procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Hazards include one or more of the following:

- crane movement
- faulty communications equipment
- inadequate lighting
- ship mooring lines and wires in poor condition
- wharf traffic

Personnel include one or more of the following:

- mooring:
  - launch and crew
  - mooring supervisor
  - wharf mooring personnel (bow) forward
  - wharf mooring personnel (stern) aft

Safety precautions include:

- pilot
- tug crew/s
- vessel crew
- checking:
  - own personal fitness and medical wellbeing
  - whereabouts of edge of wharf
  - whereabouts of other members of mooring/unmooring team
- confirming availability of a personal flotation device on arrival at mooring operation
- keeping work area hazard-free

- Hazard minimisation procedures include:
- obtaining and using required personal protective equipment (such as safety footwear, safety helmet, suitable gloves were appropriate, safety vest and reflective clothing, personal life vest, safety glasses)
  - removing rings from fingers to avoid them being caught on steel wire ropes
  - wearing suitable clothing
  - ensuring ropes and equipment have been tested and are in good condition
  - placing warning signage in appropriate places
  - testing equipment prior to operation
- Mooring or unmooring operations include one or more of the following:
- landing a gangway
  - preparing a berth
  - receiving heaving line from:
    - a launch
    - a vessel
  - returning heaving line to a vessel
  - unmooring and letting go a vessel
  - working:
    - by day or night
    - in normal and emergency situations
    - under any permissible conditions of weather
    - at various shore-side terminals and wharves

## Unit Mapping Information

This unit replaces and is equivalent to MARF1004A Follow work health and safety, and emergency procedures during shore-based mooring operations.

MARF1004A replaces and is equivalent to TDMMF6007A Follow OH&S and emergency procedures during shore-based mooring operations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF017 Follow work health and safety, and emergency procedures during mooring and unmooring activities

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- communicating effectively with other personnel when mooring and unmooring a vessel
- handling rope appropriately and correctly:
  - storing and caring for ropes and lines
  - tying knots such as bowline, reef knot, overhand knot, figure of eight knot, sheet bends, clove hitch, splicing and whipping, round turn two half hitches
  - applying a chain stopper to a wire rope
  - heaving on a line in collaboration with other members of a mooring team
  - applying a stopper to a synthetic fibre rope
  - applying a chain stopper to a natural cordage rope
  - attaching a line to a bollard or bitt with all lines in correct order such as up through the eye (dipping)
  - flaking down a rope
  - forming a bight
- identifying and correctly using:
  - personal protective equipment (PPE)
  - various types of ropes, steel wires and mooring equipment
- interpreting and following work health and safety (WHS)/occupational health and safety (OHS), and safety management procedures for mooring and unmooring operations, including safety instructions and precautions
- recognising dangers and hazards before and during mooring and unmooring operations, and taking appropriate action to report and rectify them
- recognising safety-related problems that may occur during mooring and unmooring operations, and taking appropriate action to report and resolve these problems
- recording and reporting safety incidents and emergencies
- reporting and/or rectifying hazards, safety incidents or emergencies promptly
- responding to individual differences and applying acceptable behaviour when working with others



- working safely as a member of a mooring and unmooring team
- working systematically with required attention to detail and safety requirements.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- dangers associated with mooring and unmooring duties:
  - being hit by a line being thrown down from a vessel
  - stepping inside the bight of a line
  - being struck by a parting line
  - mixing rings and wire rope
  - falling off the edge of the wharf into the water
  - back strain from carrying a line, heaving on a line
  - ‘snap back’ in the event of a line breaking
  - trip hazards such as crane lines
- hazards and safety-related problems that may occur during mooring and unmooring operations, and appropriate preventative and remedial action and solutions
- individual differences and acceptable behaviour when working with others
- legal rights and responsibilities of management, crew and others
- methods for safely mooring and unmooring ocean-going vessels
- procedures for calculating stresses on lifting gear used in cargo handling operations
- relevant documentation and records:
  - mooring and unmooring plans, procedures, checklists and instructions
  - relevant sections of maritime regulations concerning mooring and unmooring operations
  - rope and equipment manufacturer instructions and procedures
  - safety instructions and procedures
  - instructions of relevant maritime authorities
  - reports and records of safety incidents or emergencies
- relevant port and vessel safety and security requirements and regulations
- relevant WHS/OHS legislation, codes of practice, policies and procedures
- reporting requirements for safety incidents or emergencies that occur during mooring or unmooring operations
- safety drills and equipment used for lines launches
- safety instructions for using ropes and other equipment during mooring and unmooring operations
- safety management procedures for mooring and unmooring ocean-going vessels
- use, type and application of PPE required when undertaking mooring and unmooring

activities.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions.

Resources for assessment include access to:

- a range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment currently used in industry including:
  - VHF radios
  - ropes and heaving lines provided by shore
  - shackles
  - wires
- PPE including:
  - personal life vest
  - reflective clothing
  - safety footwear
  - helmet
  - vest
  - suitable gloves
  - protective safety glasses.

Practical assessment should be combined with targeted questioning to assess required knowledge. Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF018 Assist in an emergency response

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to assist in responding to an emergency or incident and to apply control procedures on a vessel.

This unit applies to an Integrated Rating or Able Seafarer-Engine/Deck responding to an emergency individually, or as a member of an emergency response team.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Raise alarms

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Emergency or incident is correctly identified according to organisational procedures

- 1.2 Emergency response plan is accessed, reviewed and clarified with appropriate personnel and/or emergency response team members
- 1.3 Duties allocated to minimise risk are carried out
- 1.4 Distress signals are activated according to manufacturer instructions and organisational procedures
- 2 Act in an emergency**
  - 2.1 Immediate action required is identified and taken, according to emergency procedures
  - 2.2 Safety and security procedures are complied with in all actions
  - 2.3 Personal protective equipment is selected and used according to requirements of the situation, work health and safety (WHS)/occupational health and safety (OHS), and emergency procedures
  - 2.4 Emergency equipment is selected and used appropriate to the emergency or incident
  - 2.5 Orders are acknowledged and followed
  - 2.6 Allocated duties for emergency situations are performed according to organisational procedures
  - 2.7 Communications are maintained with others to facilitate emergency response process
- 3 Assist others in distress**
  - 3.1 Distress signals from others are recognised and acknowledged
  - 3.2 Nature of assistance required is established
  - 3.3 Capability to safely assist or relay emergency is determined taking into account own safety and physical proximity to emergency or incident
  - 3.4 Appropriate response to emergency or incident is prepared for and implemented
  - 3.5 Communications are maintained with others to facilitate emergency response process
- 4 Monitor environment and**
  - 4.1 Factors that may create or increase risk of injury or damage are constantly assessed and reported to the Master

<b>incident</b>	4.2	Measures taken to relieve an emergency situation are monitored to ensure continued effectiveness
	4.3	Changes in conditions and behaviour are identified and reported
<b>5 Assist with recovery from emergency or incident</b>	5.1	Evidence relating to cause of emergency or incident is preserved and recorded
	5.2	Appropriate assistance is provided according to emergency procedures
	5.3	Emergency equipment is returned to a state of readiness as soon as is reasonably possible
	5.4	Debriefings are attended and participated in as required

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

Emergency or incident includes one or more of the following:	•	anchoring
	•	capsize
	•	contaminated fuel
	•	engine breakdown or malfunction
	•	fire
	•	flooding
	•	fouled propeller
	•	fuel supply system failure
	•	grounding
	•	hypothermia
	•	injuries/illness
	•	person overboard
	•	person retrieval from water

Distress signals include one or more of the following:

- sinking
- swamping
- dye markers
- flags
- hand signals
- internal public address system
- light signals
- mobile phone (which may be limited in effectiveness)
- pyrotechnic distress signals
- radio
- reflective mirror
- satellite emergency position indicating radio beacons (EPIRBs)
- search and rescue transponders (SARTs)
- ship's whistle
- sound signal including voice
- V-sheet
- enhanced lookout activities
- fire watch
- measurement of water ingress
- monitoring distress frequencies
- monitoring patient recovery

Measures taken to relieve an emergency situation include one or more of the following:

## Unit Mapping Information

This unit replaces and is equivalent to MARF3001A Assist in an emergency response.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF018 Assist in an emergency response

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely in an emergency or incident
- identifying, isolating and reporting faulty or non-operational emergency equipment and distress signals
- reading and following emergency procedures
- reading and interpreting basic instructions and standard operating procedures for emergencies
- recognising routine problems that may occur when operating emergency equipment and distress signals
- selecting and using appropriate emergency equipment and distress signals
- working effectively with team members when responding to an emergency or incident.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable sections of relevant maritime regulations dealing with emergency equipment and procedures
- duties and responsibilities of shipboard personnel during emergencies
- emergency duties and alarm signals applied and used on the vessel
- functions and purpose of pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs)
- International Convention for the Safety of Life at Sea (SOLAS) and related regulations
- location and purpose of pyrotechnic expiry dates
- location of escape routes on the vessel



- location of firefighting equipment on the vessel
- procedures for:
  - activation of maritime emergency alarms
  - emergency response on board a vessel
  - testing EPIRBs and SARTs
- range of emergency/safety equipment available on the vessel
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- role and responsibility of self and other crew members
- techniques for avoiding false distress alerts and action to be taken in an accidental activation
- types of emergency incidents and measures taken to address them.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations when assisting in responding to an emergency or incident. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials that replicate and are currently used in industry
- personal protective equipment including:
  - foot protection /boots
  - hand protection/gloves
  - head protection/helmet
  - radiant heat protection/coat
- emergency equipment including:
  - battery systems
  - emergency fire pump
  - emergency generator
  - EPIRBs

- firefighting systems
- life jackets
- lifebuoys, lines and lights
- SARTs.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF019 Operate emergency equipment and apply emergency procedures

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to participate in monitoring emergency prevention and applying control procedures in an emergency on a vessel.

This unit applies to individuals working as an Integrated Rating or Able Seafarer-Engine/Deck on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Apply emergency procedures

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Emergencies are correctly identified according to organisational procedures

- 1.2 On becoming aware of an emergency or abnormal situation, organisational procedures for initial action are confirmed with the officer of the watch
  - 1.3 Emergency and distress alerting systems are activated according to manufacturer instructions and organisational procedures
  - 1.4 False distress alerts are avoided and appropriate action is taken in an accidental activation of a distress alert according to organisational procedures
  - 1.5 Orders are acknowledged and followed
  - 1.6 Allocated duties for emergency situations are performed according to organisational procedures
  - 1.7 Communications are maintained with others to facilitate the emergency response process
- 2 Maintain integrity of emergency and distress alerting systems**
  - 2.1 Emergency and distress alerting systems maintenance requirements are specified and managed
  - 2.2 Systems maintenance is checked for compliance
  - 2.3 Systems are assessed for useability and accessibility, and are reported according to organisational procedures
  - 2.4 Procedures are followed to correct systems defects and deficiencies
- 3 Report and record emergency and distress alerting systems faults**
  - 3.1 Schedule for verifying and reporting faults is developed and implemented
  - 3.2 Details and nature of faults are recorded and rectified according to manufacturer instructions and organisational procedures
  - 3.3 Reports on faults are provided and recommendations are made for improvements according to organisational procedures
  - 3.4 Frequency of occurrence of faults is monitored and reported according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |  |   |
|--|---|
| Emergencies include one or both of the following:                      | <ul style="list-style-type: none"><li>• any situation leading to abandonment of a vessel</li><li>• responding to distress alerts from other vessels</li></ul>   |
| Systems defects and deficiencies include one or more of the following: | <ul style="list-style-type: none"><li>• emergency position indicating radio beacon (EPIRB) function test failure</li><li>• out-of-date pyrotechnics distress signals</li><li>• search and rescue transponder (SART) not operating</li></ul> |

## Unit Mapping Information

This unit replaces and is equivalent to MARF3003A Operate emergency equipment and apply emergency procedures.

MARF3003A replaces and is equivalent to TDMMF2307B Operate emergency equipment and apply emergency procedures.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF019 Operate emergency equipment and apply emergency procedures

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely in an emergency or abnormal situation
- identifying, isolating and reporting faulty or non-operational emergency and distress alerting systems
- reading and following emergency procedures
- reading and interpreting basic instructions and standard operating procedures for emergency and distress alerting systems
- recognising routine problems that may occur when operating emergency and distress alerting systems
- selecting and using emergency and distress alerting systems including:
  - internal public address system
  - pyrotechnic distress signals
  - search and rescue transponders (SARTs)
  - satellite emergency position indicating radio beacons (EPIRBs)
  - ship's whistle.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable sections of relevant maritime regulations dealing with emergency equipment and procedures
- duties and responsibilities of shipboard personnel during emergencies
- emergency duties and alarm signals commonly used on a vessel

- escape routes from machinery spaces on a vessel
- functions and purpose of pyrotechnic distress signals, satellite EPIRBs and SARTs
- identification of pyrotechnic expiry dates
- International Convention for the Safety of Life at Sea (SOLAS) and related regulations
- procedures for:
  - activating maritime emergency alarms
  - emergency response on board a vessel
  - testing EPIRBs and SARTs
- relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- techniques for avoiding false distress alerts and action to be taken in an accidental activation.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Operating emergency equipment and applying emergency procedures must be assessed in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment that replicate and are currently used in industry
- emergency equipment including:
  - EPIRBs
  - SARTs
  - internal public address system
  - pyrotechnic distress signals
  - ship's whistle.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARF020 Coordinate search and rescue operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to assist in planning and coordinating search and rescue operations at sea.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Activate search and rescue support plan**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Distress and emergency signals, and communications are recognised and evaluated

1.2 Type of emergency, and level and nature of assistance required is assessed and its practicability is considered

- 1.3 Communications are established, where possible, with the parties in distress, other vessels and relevant authorities/agencies
- 1.4 Search and rescue parameters are identified based on available information
- 1.5 Search and rescue strategy is developed based on all available information and after consultation with others in the established chain of command
- 1.6 Required resources are identified according to the strategy
- 1.7 Strategy is evaluated and reviewed as determined by the input of all information and review of available resources
- 1.8 Organisation and command chain with other stations involved in the search and rescue is established in collaboration with search and rescue authorities

## **2 Coordinate crew in search and rescue operations**

- 2.1 Crew members are informed of the scenario and strategy
- 2.2 Crew members are briefed on their roles and responsibilities and the way the crew will operate, and are deployed to the required stations
- 2.3 Tasks are allocated to crew members according to their roles in the crew and level of competence
- 2.4 Confirmation is gained from crew members of their understanding of the scenario, their role and the roles of other crew members
- 2.5 Performance of crew members is monitored and reviewed as the scenario unfolds, to determine ongoing requirements
- 2.6 Directions are given to others involved in the search and rescue operation according to agreed plan and established chain of command
- 2.7 Manoeuvres of vessel are made according to agreed plan and with due regard to limits of the vessel and the environment
- 2.8 Feedback from crew members and others involved in the search and rescue operation is received and relayed to others according to agreed plan and established chain of command

**3 Liaise with internal and external authorities/agencies**

- 3.1 Radio communication is established and maintained with all parties involved in the search and rescue operations
- 3.2 Briefings are provided to appropriate people according to operational procedures
- 3.3 Search and rescue progress is monitored and information is provided to internal and external authorities/agencies
- 3.4 Issues are negotiated with internal and external authorities/agencies
- 3.5 Resources are monitored and reviewed to meet changing requirements according to operational procedures
- 3.6 Search and rescue problems/potential problems are identified and solutions are developed in liaison with internal and external authorities/agencies
- 3.7 Guidance and support are provided and sought from internal and external authorities/agencies according to requirements

**4 Manage communications systems**

- 4.1 Communications systems are identified as appropriate to the situation and the strategy
- 4.2 Communications systems are selected according to agreed plan and established chain of command
- 4.3 Communications systems are managed to provide optimum capability

**5 Conclude search and rescue support**

- 5.1 Duration of the search and rescue operation is determined by the level of emergency
- 5.2 Instructions from internal and external authorities/agencies about the duration of the search and rescue are complied with
- 5.3 All information is collected and preserved
- 5.4 Debrief is conducted with relevant people involved
- 5.5 Items for improvement are identified and action is taken to have improvements built into support plans

**6 Manage search and rescue records**

- 6.1 Records of the search and rescue are made in the vessel log

6.2 Other documentation is completed as required by regulatory requirements

6.3 Reports are completed and disseminated according to organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Type of emergency includes one or more of the following:

- ditched aircraft
- person/s in distress in sea
- person/s in distress in survival craft
- vessel/s in distress

Information includes one or more of the following:

- agents and operators both private and commercial
- government departments
- members of the public
- search and rescue authorities
- specialist search and rescue information systems
- vessel/aircraft owners
- volunteer organisations

Resources include one or more of the following:

- accommodation
- aircraft
- Australian Defence Force/Police assets
- communications systems
- electronic aids
- equipment
- facilities
- fuel
- instructions
- manuals
- maps/charts
- people
- vessels

Limits of the vessel and the environment include one or more of the following:

- fuel range
- limits of propulsion
- prevailing weather
- sea conditions
- steering
- vessel stability

External authorities/agencies include one or more of the following:

- aircraft
- other vessels
- search and rescue authorities
- other parties involved in the rescue

Reports include one or more of the following:

- board reports and briefings
- briefings to government
- covering reports
- initial advice forms
- media releases
- messaging systems
- search and rescue logs

## Unit Mapping Information

This unit replaces and is equivalent to MARF6001A Coordinate search and rescue operations.

MARF6001A replaces and is equivalent to TDMMF107B Assist in search and rescue operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF020 Coordinate search and rescue operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying procedures from the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
- attending to appropriate level of detail in recordkeeping
- liaising effectively with internal and external authorities/agencies
- establishing radio communications and following correct communications procedures at all stages of search and rescue operations
- identifying and solving problems that may arise during search and rescue operations, reporting problems and issues, and taking appropriate action based on available information
- modifying activities according to vessel contingencies, risk situations and environments
- monitoring and anticipating hazards and risks that may arise during search and rescue operations and taking appropriate action
- planning to coordinate search and rescue operations according to international guidelines and standards
- providing high quality reports
- taking appropriate initiative for search and rescue operations
- using relevant publications, charts, meteorological data, particulars of vessels involved, radio communications equipment and other available facilities.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- chain of command and organisational requirements used in search and rescue operations
- IAMSAR Manual
- maritime communications techniques applicable to search and rescue operations
- principles involved in determining the duration and scope of a search
- responsibilities when participating in search and rescue operations
- search and rescue techniques and procedures
- sequence of actions to be taken after sighting or receiving a distress signal or call for assistance
- types of distress and emergency signals, and types of response required in each case
- types of search patterns and their application
- typical search and rescue problems and appropriate action and solutions
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site where coordinating search and rescue operations can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry and necessary for coordinating a search and rescue operation.

Performance should be demonstrated consistently over time and in a suitable range of contexts.



## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF021 Manage safety and security of vessel crew and passengers

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to develop emergency and damage control plans, and to handle emergency situations to maintain the safety and security of vessel crew and passengers.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Develop emergency and damage control plans

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Potential emergencies and damage scenarios are identified

1.2 Plans of action are developed for responding to

potential emergencies and damage scenarios according to regulatory and organisational requirements

1.3 Procedures, checklists and instructions for dealing with emergencies and damage scenarios are documented according to regulatory and organisational requirements

1.4 Resources are organised in readiness for potential implementation of emergency and damage control plans

1.5 Information on emergency and damage control plans is distributed and made available to crew

1.6 Appropriate instruction is organised for crew about their roles and responsibilities during various emergencies and damage control scenarios

## **2 Develop security risk management plans**

2.1 Security risk management plans are prepared according to regulatory and organisational requirements

2.2 Explanatory information on the importance of security and the organisation's security objectives is contained in plans

2.3 Threat assessments undertaken, current exposure and current protective security arrangements are summarised in plans

2.4 Security strategies for implementing, monitoring and evaluating countermeasures are outlined in plans

2.5 Appropriate instruction is organised for crew about their roles and responsibilities in a security threat

## **3 Maintain the operational condition of firefighting, lifesaving and safety systems**

3.1 Safety management system (SMS) processes and outcomes for maintaining the operational condition of firefighting, lifesaving and safety systems are identified

3.2 Procedures and supporting documentation for the routine maintenance of firefighting, lifesaving and safety systems are developed

3.3 Personnel roles and responsibilities are allocated and communicated

3.4 Checks are conducted according to SMS requirements

3.5 Non-compliances are identified and analysed

3.6 Appropriate responses to non-compliances are initiated

according to SMS requirements

3.7 Outcomes are recorded and reported according to regulatory and organisational requirements

#### **4 Organise fire and abandon vessel drills**

4.1 Fire and abandon vessel drills are planned and conducted according to regulatory requirements and organisational procedures

4.2 Instruction is provided to others on organisational procedures and the correct use of firefighting and lifesaving equipment

4.3 Musters and drills are reviewed against objectives

4.4 Records are completed according to regulatory requirements and organisational procedures

#### **5 Manage emergencies**

5.1 Initial actions on becoming aware of emergency are undertaken according to contingency plans, urgency of the situation and nature of the emergency

5.2 On-board personnel are given information and instructions clearly and accurately

5.3 Procedures are implemented to combat emergency and to protect persons on board

5.4 Communications are established with others to facilitate the emergency response process

5.5 Assistance is coordinated and provided by appropriate personnel

5.6 Contact is maintained with others at all times to keep them briefed on the emergency response process

5.7 Preparation for abandoning vessel is undertaken, if required

5.8 Cessation of emergency is communicated to appropriate personnel

#### **6 Maintain operational safety**

6.1 Environmental factors are continually monitored, assessed and reviewed to identify distinctive features and any change in characteristics that might indicate unusual or suspicious behaviour

6.2 Personal safety checks are made on a systematic and routine basis according to organisational procedures

6.3 Resources and equipment are organised in readiness for potential security risk situations

## **7 Respond to security risks**

7.1 Security risk situations are accurately identified and assessed for degree of risk to self, others and vessel

7.2 Response to security risk is formulated and carried out according to security risk management plan

7.3 Safety and security of self, others and vessel is maximised through response initiative

7.4 Changing circumstances are monitored and responses are adjusted as required to maintain security

7.5 Relevant documentation is completed and securely maintained according to confidentiality requirements and organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Potential emergencies include one or more of the following:

- accidents
- bomb threat
- collision
- fire or explosion
- flooding
- grounding
- loss of main engine or power
- loss of steering
- person overboard
- rescue and evacuation of injured persons
- scenes of crime

- Information includes one or more of the following:
- documented instructions
  - drills
  - meetings
  - notice boards
  - pamphlets
  - training sessions
- Threat assessments include one or more of the following:
- determining the potential of a threat to actually cause harm
  - evaluating and discussing the likelihood of a threat being realised
  - providing information about people and events that may pose a threat to the crew, passengers and/or the vessel
- Exposure includes:
- measure of how open the vessel is to harm
  - potential of the vessel to attract harm
- Firefighting, lifesaving and safety systems include one or more of the following:
- fire and smoke detectors and alarms
  - fire and watertight doors
  - fire hoses and extinguishers
  - fire smothering systems
  - flares and smoke floats
  - lifeboats and life rafts
  - life jackets and other flotation devices
- Non-compliances include one or more of the following:
- damaged components
  - damaged equipment
  - failure to conduct drills
  - faulty components
  - faulty equipment
  - lapsed expiry dates
  - levels of consumable materials
  - quality of consumable materials
- Initial actions include one or more of the following:
- broadcasting appropriate distress or warning signals
  - calling crew and passengers to muster stations
  - investigating the source of fire or smoke alarms
  - mustering appropriate resources

Environmental factors include one or more of the following:

- access to assistance and resources
- availability of opportunities for escape
- degrees of illumination in affected areas
- presence of sources of threat
- time of day
- weather

Resources and equipment include one or more of the following:

- access to emergency services and specialist personnel
- back-up personnel
- communication equipment
- firefighting equipment
- first aid kit
- personal protection equipment
- security equipment including electronic screening equipment, video cameras and monitors, alarms and signals

Security risk situations include one or more of the following:

- breaches of law including criminal damage, offences against people, public order, misuse of drugs and alcohol
- emergencies
- hazards including physical, chemical, electrical, psychological, biological
- threats including bombs, sabotage, assassination

Responses to security risk include one or more of the following:

- abandoning the vessel
- checking identification
- defusing the situation
- isolating area of potential risk
- isolating risk
- issuing verbal warnings
- notifying relevant emergency services organisations
- offering assistance
- providing first aid
- requesting support and assistance
- restraint of person
- tactical withdrawal
- using basic defensive techniques
- using negotiation techniques

## Unit Mapping Information

This unit replaces and is equivalent to MARF6003A Manage safety and security of vessel crew and passengers.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARF021 Manage safety and security of vessel crew and passengers

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying all relevant work health and safety (WHS)/occupational health and safety (OHS) and work practices
- applying procedures for monitoring fire detection and safety systems to ensure all alarms are detected promptly and acted upon according to established emergency procedures
- communicating using appropriate channels and communication codes and signals
- completing documentation and reporting requirements on matters related to the development of emergency and damage control plans
- determining response appropriate to security risk situations
- developing emergency procedures according to established plans for emergency situations
- developing effective planning documents
- identifying and complying with security incident response procedures
- identifying security risk factors and conducting risk assessments
- instructing personnel on procedures to be taken during emergency situations on board a vessel
- interpreting and applying security and safety practices and regulations
- maintaining the operational condition of lifesaving, firefighting and other safety systems
- managing the handling of emergency situations on board a vessel
- minimising hazards and risks to the safety of self and others
- organising fire drills and abandon ship drills
- preparing contingency plans for response to emergencies
- providing the required amount of detail in reports
- reporting emergency situations on board a vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- actions to be taken to protect and safeguard all persons on board in emergencies
- actions to limit damage and save the vessel following fire, collision or grounding
- bomb threat and counter-terrorism procedures
- concept of reserve buoyancy and its relevance to damage control in vessels
- faults that can occur with fire detection, firefighting, lifesaving and safety equipment, and systems and appropriate remedial action and solutions
- functions and use of lifesaving appliances
- general principles of damage control and the manner in which the watertight integrity of the hull is maintained on a vessel
- importance of maintaining fire detection, firefighting, lifesaving and safety equipment and systems, and potential consequences if the equipment or systems are not operational during an emergency
- lifesaving appliance regulations (International Convention for the Safety of Life at Sea)
- methods and aids for fire prevention, detection and extinction
- methods for checking and replacing consumable materials in fire detection, firefighting, lifesaving and safety equipment and systems
- regulations related to security risk management
- regulatory requirements for emergency response plans
- regulatory requirements related to maintaining fire detection, firefighting, lifesaving and safety equipment and systems
- relevant Australian Maritime Safety Authority (AMSA) Marine Orders and Notices, International Ship and Port Facility Security Code (ISPS Code), and other relevant International Maritime Organization (IMO) Conventions and Codes
- safety management system (SMS) plans, procedures, checklists and instructions
- ship construction including damage control measures
- statutory requirements pertaining to damage control in vessels
- types of fire detection, firefighting, lifesaving and safety equipment and systems on board vessels and the procedures for their use
- ways of controlling damage during a flooding emergency
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site where a range of damage scenarios can be demonstrated including:

- collision damage
- damage caused by cargo shift
- integrity of vessel hull.

Resources for assessment include access to:

- relevant documentation including workplace procedures, activity logs, incident reports, request for assistance forms, records of conversations, regulations, codes of practice and operation manuals
- tools, equipment, material and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF022 Apply maritime resource management principles

## Modification History

Release 1. New unit of competency. Not applicable.

## Application

This unit involves the skills and knowledge required to establish and maintain maritime resource management procedures in accordance with Australian and international regulations and guidelines.

The unit applies to personnel responsible for controlling the operation of the ship and for the care of persons on board.

The unit reflects the requirements of the International Maritime Organization (IMO) International Convention on Standards of Training, Certification and Watchkeeping Manila Convention (STCW) including the Tables A-II/1, A-III/1, A-II/2 and A-III/2.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Establish working systems and

1.1 Principles of resource management are interpreted to establish the functions and responsibilities of the crew

- procedures**
- 1.2 Principles of resource management are interpreted to establish arrangements and procedures
  - 1.3 Operations are planned, and arrangements and procedures applied according to regulatory requirements and company procedures
  - 1.4 Working systems are documented as required and communicated to relevant personnel
  - 1.5 Schedules are developed with due consideration to crew's experience
- 2 Assign resources and allocate duties**
- 2.1 Current competency of crew is evaluated and appropriate measures are taken to ensure all personnel have the required level of competency
  - 2.2 Clear and unambiguous roles and responsibilities of crew are determined
  - 2.3 Crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned
  - 2.4 Resources are allocated and assigned as needed in correct priority to perform necessary tasks to obtain and maintain situational awareness
- 3 Manage personnel**
- 3.1 Crew are informed of current and predicted vessel and operational status and external environment
  - 3.2 Operations are undertaken in accordance with established functions and responsibilities
  - 3.3 Effective communication is maintained with crew on matters relevant to safety and integrity of vessel
  - 3.4 Questionable decisions and/or actions are dealt with using an appropriate challenge and response
  - 3.5 Fatigue management strategies are applied
  - 3.6 Operations are monitored and appropriate action is taken if found to be in breach of established arrangements, regulations and procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Applicable procedures and codes must include:	<ul style="list-style-type: none"><li>• International Regulations for Preventing Collisions at Sea</li><li>• ISM Code</li><li>• relevant international, commonwealth, state and territory work health and safety/occupational health and safety (WHS/OHS) legislation</li><li>• relevant sections of AMSA Marine Orders</li><li>• relevant sections of the IMO STCW including the Manila Amendments</li></ul>
Documentation/records include one or more of the following:	<ul style="list-style-type: none"><li>• AMSA Marine Orders</li><li>• company procedures</li><li>• ICS Bridge Procedures Guide</li><li>• IMO STCW including the Manila Amendments</li><li>• International Safety Management (ISM) Code safety management system plans, procedures, checklists and instructions</li><li>• navigational charts</li><li>• operational orders</li><li>• vessel log</li></ul>
Factors to be taken into account when establishing watchkeeping arrangements include one or more of the following:	<ul style="list-style-type: none"><li>• attention necessary when navigating in or near traffic separation schemes or other routeing measures</li><li>• bridge or engine room must never be left unattended</li><li>• operational status of bridge/engine room instrumentation, controls and alarms</li><li>• professional competency and experience of vessel officers and crew and their familiarity with the vessel's equipment, procedures and manoeuvring capability</li><li>• provision of unmanned machinery space (UMS) controls, alarms and indicators</li><li>• proximity of navigational hazards</li><li>• size of the vessel and the field of vision available from the conning position</li><li>• traffic density and other activities occurring in the area in which the vessel is navigating</li></ul>

Fatigue management strategies include one or more of the following:

- unusual demands on the watch arising from operational conditions
- use and operational condition of navigational aids
- weather and sea conditions, visibility and whether there is daylight or darkness
- whether the vessel is fitted with an automatic steering system
- whether there are radio duties to be performed
- appropriate dietary habits
- arranging to take a break when symptoms of fatigue are identified
- avoiding excessive consumption of alcohol prior to watchkeeping duties
- maintaining personal fitness and health
- recognition of symptoms of fatigue

Watchkeeping principles (as described in AMSA Marine Orders) must include:

- all necessary precautions must be taken to avoid polluting the marine environment
- assistance must be available to be summoned to the bridge or engine room if required by a change in the vessel's situation
- duties of look-out and/or helmsman must be kept separate
- look-out must give full attention to keeping a proper look-out and must not be given other duties which could interfere with the task
- proper look-out must be maintained at all times

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF022 Apply maritime resource management principles**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying principles of resource management
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing competency and experience of vessel officers and crew, and their suitability for specific roles
- assisting team members to develop and maintain the required level of competency
- communicating effectively with others on issues, arrangements and requirements
- demonstrating effective leadership and management skills
- developing and implementing operating procedures
- establishing and maintaining appropriate internal and external communication systems
- establishing and managing operations on an operational commercial vessel in an appropriate range of contexts
- identifying and evaluating problems and determining appropriate courses of action
- investigating and arbitrating shipboard conflicts
- monitoring arrangements and taking appropriate action where there is an identified breach of established arrangements, regulations or procedures
- planning and coordinating timelines, tasks, prioritisation and workload
- reading, interpreting and applying instructions, procedures and information relevant to procedures and responsibilities
- recognising and interpreting signs of fatigue among crew and initiating appropriate action.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- cultural differences and how to deal with them
- effective decision-making techniques
- fatigue management principles and techniques
- functions and responsibilities of shipboard personnel management and training
- importance of situation awareness to decision making
- related international maritime conventions, recommendations, and national legislation
- resource management principles including:
  - allocation, assignment and prioritisation of resources
  - effective communication onboard and ashore
  - assertiveness and leadership, including motivation
  - obtaining and maintaining situational awareness
  - consideration of team experience, including decisions that reflect team experiences
- ways of assessing the current competency of vessel officers and crew, and their familiarity with the vessel's equipment, procedures, and manoeuvring capability
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations that reflect workplace conditions.

Resources for assessment must include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, material, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARF023 Apply safe work practices in a marina

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to apply safe work practices according to the organisation's work health and safety (WHS)/occupational health and safety (OHS) policies and procedures, within the context of a small work team.

This unit applies to individuals working in a marina who have a key role in monitoring and maintaining workplace safety.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

F – Operational Quality and Safety

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Identify WHS/OHS policy and procedures

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Relevant WHS/OHS legislation, policy and workplace procedures are accessed, reviewed and clarified as necessary
- 1.2 WHS/OHS responsibilities and duties are identified and accountability processes are outlined

- |  |  |
|--|--|
|  | 1.3 Records are accurately completed and maintained according to workplace procedures and WHS/OHS legislative requirements             |
| <b>2 Identify hazards in the workplace</b> | 2.1 Actual and potential hazards are identified and steps to minimise associated risks using hierarchy of controls are applied         |
|  | 2.2 Inadequacies in existing risk control measures are reported according to workplace policy and procedures                           |
| <b>3 Follow safe work practices</b>        | 3.1 Resources and equipment required in emergency operations are identified, selected and made ready according to workplace procedures |
|  | 3.2 Personal protective clothing and/or equipment is identified, used, maintained and stored according to workplace procedures         |
|  | 3.4 Safety checks on all equipment and machinery are undertaken before operation   |
|  | 3.5 Hazardous materials and substances are identified and handled according to workplace procedures                                    |
|  | 3.6 Safety signs/symbols are identified and followed according to instruction  |
|  | 3.7 Safe manual handling techniques are used and all work is carried out safely, according to workplace policy and procedures          |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Hazards include one or more of the following:

- accidents
- adverse weather
- bomb scares and violent incidents

- chemical or fuel spills
- fires and explosions
- paint thinners in a boatyard
- rubbish on docks

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF023 Apply safe work practices in a marina

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices
- communicating with people from a range of backgrounds and with a range of abilities
- completing required WHS/OHS documentation
- identifying hazards in the marina and steps required to minimise risks using hierarchy of controls
- identifying inadequacies and making recommendations to address these inadequacies
- liaising with relevant personnel to monitor the impact of policies and procedures on safe work practices
- monitoring incidents and hazards
- reading and analysing WHS/OHS legislation and organisational policies and procedures.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- importance of WHS/OHS in the workplace
- hazards and steps to minimise associated risks using hierarchy of controls
- organisational policies and workplace procedures relating to WHS/OHS, hazard management, emergencies, evacuation, incident investigation and reporting
- persons responsible for WHS/OHS in the workplace
- principles and practices of effective WHS/OHS management to enable effective implementation of organisational policies and procedures
- procedures for dealing with hazards
  - accident or incident reporting and investigation

- containment of spills
- evacuation
- first aid
- reporting procedures for unsafe situations, fire hazards, broken or damaged equipment or fittings, sickness and accidents
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions where safe work practices can be applied.

Resources for assessment include:

- dedicated tools and equipment, materials and parts currently used in industry
- protective clothing and equipment including:
  - foot protection/boots
  - personal safety devices
  - head protection/helmet
  - hand protection/gloves
  - radiant heat protection/coat
- information and documentation including:
  - relevant organisational policies and workplace procedures, relevant Acts, regulations, codes of practice, licensing requirements and standards.
  -

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF024 Classify marina infrastructure, vessels and staffing structure

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to classify marina infrastructure and vessels and provide an overview of marina staffing structure and skill. It includes identifying types, features and characteristics of a marina.

This unit applies to individuals who provide assistance under supervision in the operational management of the marina.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Classify marinas and identify marina

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1.1 Various marina types are identified and their features and characteristic are outlined



**infrastructure**

- 1.2 Marina ownership types are identified and advantages and disadvantages of each are outlined
- 1.3 Different types of boat storage and dock systems are identified and outlined
- 1.4 Equipment and objects found in a marina are identified and their function is explained
- 1.5 Different business models for marina operations are outlined and the advantages and disadvantages of each are outlined and documented

**2 Classify different marine vessels types commonly seen on a marina**

- 2.1 Hull form and superstructure features are outlined and hull designs are matched to normal vessel application
- 2.2 Vessel construction materials are identified and their relevance to the marina is explained
- 2.3 Various parts of a vessel are identified and the function of the part is explained
- 2.4 Systems used for vessel propulsion, steering, navigation and communication are identified and their functions are explained
- 2.5 Vessel identification systems, registration tags, engine number and model designation are located, recorded and used to confirm vessel year of manufacture, refurbishment and/or registration

**3 Provide an overview of the marina staffing structure**

- 3.1 Organisational structure of a commercial and club marina is outlined and their differences are explained
- 3.2 Role and performance outcomes of key marina personnel are documented and job descriptions are prepared
- 3.3 Skills and experience of key marina personnel are established and duties are allocated according to relevant job description

**Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Types of marinas include one or more of the following:

- club
- combination
- destination
- dry stack storage
- traditional
- transient
- working

Ownership types include one or more of the following:

- government owned
- not-for-profit club
- public/private marina
- private club
- private yacht berth

Types of boat storage include one or more of the following:

- dry stack
- dry stand
- hard stand
- mooring
- wet berth

Types of dock systems include one or more of the following:

- fixed
- floating

Business models for marina operations include one or more of the following:

- contractor
- in-house
- tenant

Vessels found in a marina include one or more of the following:

- motor boat or power boat
- motor yacht
- multihull (e.g. catamaran)
- sailing yacht
- superyacht

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF024 Classify marina infrastructure, vessels and staffing structure**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- communicating and interpreting information
- communicating with people from a range of backgrounds and with a range of abilities
- reading, interpreting and recording instructions, procedures and information
- working collaboratively with others.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic provisions of relevant legislation that affects business operations, such as:
  - anti-discrimination legislation
  - consumer and corporations laws including appropriate state/territory legislation
  - ethical principles
  - privacy laws
- differences in hull shapes and types, construction materials, propulsion
- features and functions of trailers
- organisational structure, policies and procedures
- roles, responsibility and duties undertaken by marina staff
- types of marinas, use, characteristics and features
- various business models
- vessel types, construction, size and capacity
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

- typical sail and mast arrangements for sailing craft
- typical superstructure configurations and general deck layouts
- types of internal combustion engines used for inboard and outboard propulsion systems.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, and operation manuals
- dedicated equipment and materials currently used in industry.
- 

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF025 Respond to marina emergencies

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to recognise and safely deal with emergencies and incidents, and includes using safety equipment and providing assistance to others in distress.

The unit applies to individuals implementing workplace policies and procedures when responding to marina emergencies or incidents.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Apply workplace emergency procedures

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Emergency response plan is accessed, reviewed and clarified as necessary

1.2 Nature, location and type of emergency is established and recorded

- 1.3 Emergency is reported to relevant personnel according to emergency response plan
- 1.4 All personnel are informed of actions required to deal with the emergency
- 2 Respond to an emergency**
  - 2.1 Hazards and risks are identified, monitored and controlled according to emergency response plan
  - 2.2 Suitable resources, emergency equipment and protective clothing are identified and selected
  - 2.3 Emergency equipment is used according to manufacturer specifications and in a manner appropriate to the emergency or incident
  - 2.4 Strategies for group control and assisting casualties are identified and implemented
  - 2.5 Clear instructions are provided to personnel involved in the emergency response
  - 2.6 Assistance is provided to distressed and injured persons, according to duty of care and workplace procedures
- 3 Conclude emergency response**
  - 3.1 All persons are accounted for and outcomes are reported to relevant personnel
  - 3.3 Equipment is cleaned and stored according to h workplace procedures
  - 3.4 Site is secured and all documentation and reports are completed according to workplace policies and procedures
  - 3.5 Emergency response training plan is developed and/or reviewed

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Emergencies include one or more of the following:

- adverse weather conditions
- capsised or sinking vessel
- collisions
- explosions
- fire
- flooding
- fuel or chemical spillage
- groundings
- hazardous materials incidents
- injuries/illness
- medical conditions
- person overboard
- person retrieval from water
- rescue
- structural failure/damage
- swamping

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARF025 Respond to marina emergencies

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying evacuation procedures
- applying precautions and required action to minimise, control or eliminate hazards that may exist when responding to an emergency or incident
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices
- communicating effectively with others when responding to an emergency or incident
- completing documentation related to an emergency or incident response
- operating safety equipment correctly and adapting to any differences
- reporting and/or rectifying identified problems, faults or malfunctions promptly, according to with workplace policies and procedures
- reading, interpreting and recording instructions, procedures and information
- reporting an emergency accurately and according to operating procedures
- selecting and using required personal protective equipment
- working collaboratively with others when responding to an emergency or incident.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- duty of care
- emergency procedures manual and evacuation plan
- emergency response plan, its contents and purpose
- firefighting techniques and systems
- relevant regulatory requirements applicable to emergency or incident
- role and responsibility of a marina fire warden and first aid officer safety considerations
- site layout and building construction
- types of emergencies
- typical problems that can occur during an emergency or incident and action that can be taken
- vessel types and construction relevant to marina emergencies
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in a fully operational marina or, where this is not available, in simulated workplace operational situations that reflect workplace conditions where responding to an emergency and/or incident can be demonstrated.

Resources for assessment include:

- applicable documentation including workplace procedures, regulations and operation manuals
- relevant and appropriate materials, tools, equipment, and personal protective equipment currently used in industry including:
  - masks or respirators
  - goggles/face shields
  - gloves and appropriate clothing
  - life jacket
  - safety harness and lines.
  -

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF026 Follow port and terminal security procedures

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to recognise and report security threats. This includes being aware of and assessing situations involving threats to the security and safety of a vessel or port facility, and reporting threats or suspicious situations.

This unit applies to individuals applying security procedures when responding to security threats. No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

F – Operational Quality and Safety

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Maintain basic awareness of**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1.1 Legislative and organisational requirements and procedures about maintaining security are identified and followed**

<b>potential security threats and incidents</b>	1.2	Own role and responsibilities are recognised and duty of care requirements are ascertained and complied with
	1.3	Need for and methods of maintaining security awareness and vigilance are identified
	1.4	Role of designated personnel for security response is ascertained
	1.5	Team members and others are encouraged to contribute to workplace security and safety
	1.6	Work health and safety (WHS)/occupational health and safety (OHS) requirements are recognised and complied with
<b>2 Recognise potential security threats</b>	2.1	Potential security threats are promptly identified, assessed and response is prioritised
	2.2	Emergency and evacuation procedures are accessed and implemented
	2.3	Factors with increased security risk are identified
	2.4	Appropriate actions for maintaining security and safety of self, others, port facilities and vessel are identified and followed
<b>3 Respond to security threat</b>	3.1	Relevant personnel are alerted to security threat or situation in an effective and efficient manner
	3.2	Potential security threat or situation is responded to according to organisational security procedures
<b>4 Report security threat</b>	4.1	Organisational procedures for reporting security threats and incidents are accessed and followed
	4.2	Reports of security incidents or threats are completed
	4.3	Communications are maintained with relevant personnel, security operations are reviewed and outcomes are documented

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |   |
|---|---|
| Legislative requirements include one or more of the following:                  | <ul style="list-style-type: none"><li>• applicable crime Acts and codes of practice</li><li>• award and enterprise agreements</li><li>• general duty of care responsibilities</li><li>• maritime industry codes of practice</li><li>• maritime transport Acts and regulations</li></ul> |
| Procedures for reporting security threats include one or more of the following: | <ul style="list-style-type: none"><li>• completing documentation such as logs and activity reports</li><li>• completing police reports</li><li>• contacting designated personnel</li><li>• requesting security assistance</li></ul>   |
| Alert modes include one or more of the following:                               | <ul style="list-style-type: none"><li>• alarms</li><li>• call codes and signs</li><li>• hand signals</li><li>• megaphone</li><li>• mobile phone</li><li>• public address system</li><li>• telephone</li><li>• two-way radio</li><li>• verbal communication</li></ul>                    |

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF026 Follow port and terminal security procedures**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying security procedures and basic security legislative requirements
- being aware of one's surroundings and changes to these surroundings
- identifying a range of security threats and risks relevant to vessel and port security
- monitoring and anticipating security problems and risks and taking appropriate action
- observing chain of command and communication channels
- operating security equipment
- reading and interpreting relevant instructions, procedures and other information
- reporting security threats and risks relevant to vessel and port security and providing appropriate level of detail in these reports
- working as a team with others on matters relevant to maintaining vessel and port security.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- communication chain of command
- communication modes, and security equipment and systems relevant to the maritime environment
- dangerous substances and devices, and awareness of the damage they can cause
- duty of care requirements of self and others
- general procedures for emergency, evacuation and first aid response
- handling security related information and security related communications
- international marine security policy and responsibilities of governments, organisations and individuals
- maritime security levels, and their impact on security measures and procedures aboard ship

and in port facilities

- maritime security terms and definitions including elements relating to piracy and armed robbery
- potential security threats including elements related to piracy and armed robbery
- procedures and legislation relevant to the maritime environment and own work role
- procedures for reporting incidents
- security related contingency plans
- techniques used to circumvent security measures
- training, drill and exercise requirements under relevant conventions, codes and International Maritime Organization (IMO) circulars including those relevant for anti-piracy and anti-armed robbery
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations, where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry, including:
  - alarms
  - locked and secure areas
  - mirrors
  - surveillance equipment
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operation manuals.



## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF027 Apply basic survival skills in the event of vessel abandonment**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to apply basic survival skills in the event of vessel abandonment. This unit applies to people working in the maritime industry in a deck and or engine room capacity on vessels up to 80 m and with propulsion power <3000 kW within the exclusive economic zone (EEZ). They could be working independently or as part of a vessel crew.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand NC, Coxswain Grade 2 NC, Coxswain Grade 1 NC, Marine Engine Driver Grade 3 NC, Master (Inland waters), Master <24 m NC, Marine Engine Driver Grade 2 NC, Mate <80m NC, Master < 35 m NC and Marine Engine Driver Grade 1 NC, as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012 or relevant skills and experience.

## **Pre-requisite Unit**

Not Applicable

## **Competency Field**

F – Operational Quality and Safety

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Prepare to abandon vessel</b>                 | <b>1.1</b> Nature of emergency is determined to minimise potential dangers and threats<br><br><b>1.2</b> Muster and abandon vessel signals are responded to according to vessel safety procedures<br><br><b>1.3</b> Survival equipment is organised to maximise chances of survival<br><br><b>1.4</b> Emergency position indicating radio beacon (EPIRB) is operated to transmit distress signal<br><br><b>1.5</b> Distress calls are made using radio equipment on distress call frequency, if time allows, to communicate the nature of the emergency<br><br><b>1.6</b> Others are assisted to maximise their chances of survival |
| <b>2 Determine operational safety requirements</b> | <b>2.1</b> Relevant maritime legislation is identified and implemented<br><br><b>2.2</b> Safety requirements for a range of near coastal vessels are identified, accessed and reviewed<br><br><b>2.3</b> Lifesaving and survival equipment required on board a near coastal vessel are accurately identified<br><br><b>2.4</b> Lifesaving equipment on board is checked and confirmed as serviceable<br><br><b>2.5</b> Lifesaving and survival equipment certificates and documentation are checked for validity<br><br><b>2.6</b> Vessel safety management systems (SMS) and plans are located, interpreted and applied            |
| <b>3 Practise survival techniques</b>              | <b>3.1</b> Typical emergency alarms and types of alarm systems are accurately identified  |

- 3.2** Need to abandon vessel is determined according to established safety practice and procedures
  - 3.3** In-water survival techniques are implemented according to established safety practice and procedures
  - 3.4** Threats to survival are identified and treatment options are outlined
- 4 Apply survival techniques**
  - 4.1** Lookout for vessels and aircraft is maintained and distress signals are released on sighting
  - 4.2** During an emergency, work is carried out collaboratively with other shipboard personnel and passengers as required
  - 4.3** During emergency and survival situations, appropriate communication skills and techniques are implemented
  - 4.4** Instructions given by rescue personnel to safely access rescue craft are followed
- 5 Operate lifesaving and survival equipment**
  - 5.1** Range of pyrotechnic and distress signals are operated according to established safety practice and procedures
  - 5.2** Survival equipment is operated according to instructions and accepted survival practice
  - 5.3** Survival radio equipment is operated according to manufacturer instructions and regulatory protocols
  - 5.4** Lifejackets and other lifesaving equipment are operated and used according to instructions
- 6 Participate in abandon vessel drills**
  - 6.1** Regulatory requirements and company procedures for musters and drills are identified and implemented
  - 6.2** Actions required for a range of muster signals are correctly identified
  - 6.3** Action is taken promptly to address problems that may arise when following vessel abandonment procedures
  - 6.4** Hazards are identified that may occur when abandoning vessel risks are minimised according to SMS, and established safety practice and procedures
  - 6.5** Information relevant to use of lifesaving equipment is accessed and applied

## **6.6** Range of emergencies that may lead to vessel abandonment are outlined

### **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

### **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

### **Unit Mapping Information**

This unit replaces and is equivalent to MARF001 Apply basic survival skills in the event of vessel abandonment.

### **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **Assessment Requirements for MARF027 Apply basic survival skills in the event of vessel abandonment**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- collecting, managing and interpreting information on the use of lifesaving equipment and procedures to be followed when order to abandon vessel is given
- communicating effectively with other personnel and passengers during simulated and/or actual abandon vessel musters and emergencies
- determining type and extent of emergency and appropriate survival action to be taken
- donning a lifejacket in water and:
  - assisting a survivor to don a lifejacket
  - holding heat escape lessening posture for at least 5 minutes
  - maintaining a group huddle for at least 10 minutes
  - swimming in a group conga line for a minimum of 50 metres
  - swimming in a lifejacket for a minimum of 50 metres
  - towing with a life jacket for a minimum of 25 metres
- ensuring behaviour reflects statutory requirements pertaining to lifesaving appliances
- operating radio equipment, including very high frequency (VHF) or high frequency (HF) radios
- operating and using lifesaving and survival equipment, including:
  - orange smoke flares or red handheld flares
  - life buoys
  - life jacket or personal floatation devices
- planning timing and sequence of individual survival actions to be appropriate to prevailing circumstances and conditions of emergency, and minimising potential dangers and threats to other survivors
- reading and interpreting instructions on emergency procedures, safety management systems (SMS) and plans
- recognising and interpreting alarms and muster signals appropriately
- remaining afloat without a lifejacket for at least 5 minutes.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate techniques for:
  - first aid
  - maritime communication
  - survival with a swamped, semi-submerged tender or dingy
  - using survival equipment
- action to be taken in an emergency situation
- certificates and documentation, including:
  - instructions for use of lifesaving equipment
  - lifesaving and survival equipment certificates
  - pyrotechnic expiry dates
  - record of inspection of equipment
- crew and passenger safety briefing
- construction, outfit and particular characteristics of various types of applicable survival equipment
- distress signals, their use and penalty for misuse
- emergency muster and abandon vessel signals
- emergencies that may lead to vessel abandonment
- established safety practice and procedures
- hazards, including:
  - expired pyrotechnics
  - inaccessible lifejackets
  - no defined abandon ship procedures established
  - poorly maintained equipment
- importance of being ready for any shipboard emergency, including initial actions for survival on vessel; abandonment
- location of:
  - lifesaving appliances on a vessel
  - survival equipment on vessel
- maintenance of lifesaving appliances
- person overboard combination light and smoke float
- purpose and use of relevant personal protective equipment (PPE)
- procedures for:
  - abandoning vessel
  - correctly operating and using lifesaving appliances on board vessels and survival craft, specifically donning a lifejacket, using a lifejacket light and whistle and using handheld pyrotechnics
  - emergency response on board vessels, including abandoning vessel

- regulatory requirements and company procedures for musters and drills
- relevant manufacturer guidelines relating to operating and using survival equipment, including instructions on equipment capability and limitations
- relevant maritime regulations related to required survival equipment on a vessel
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies, including SMS, plans, processes and techniques
- signs of hypothermia and appropriate treatment
- search and rescue transponders (SARTs)
- standard safety symbols
- steps taken after collision, grounding or other marine casualty and resulting hull damage
- symptoms of hypothermia, its prevention and treatment and related use of protective covers and garments
- threats to survival after abandoning vessel, including dehydration and ingestion of seawater and:
  - appropriate strategies for countering these threats
  - how to minimise dangers
- using survival equipment, including:
  - emergency position indicating radio beacons (EPIRBs)
  - immersion suits
  - SARTs
- value of training and emergency drills for enhancing chances of survival at sea
- ways of maximising detectability using pyrotechnic distress signals, portable high frequency (HF) radios and EPIRBs.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management systems, workplace procedures and operational manuals, including:
  - abandon vessel procedures
  - emergency procedures



- information on the use of lifesaving equipment
- instructions for the use of lifesaving and survival equipment
- lifesaving and survival equipment certificates
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARF028 Follow procedures to minimise and fight fires on board a vessel**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to apply defined policies and procedures when carrying out fire minimisation procedures and fighting a fire on board a vessel. This unit applies to people working in the maritime industry in a deck and or engine room capacity on vessels up to 80 m and with propulsion power <3000 kW within the exclusive economic zone (EEZ). They could be working independently or as part of a vessel crew.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand NC, Coxswain Grade 2 NC, Coxswain Grade 1 NC, Marine Engine Driver Grade 3 NC, Master (Inland waters), Master <24 m NC, Marine Engine Driver Grade 2 NC, Mate <80 m NC, Master <35 m NC and Marine Engine Driver Grade 1 NC, as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012 or relevant skills and experience.

## **Pre-requisite Unit**

Not Applicable

## **Competency Field**

F – Operational Quality and Safety

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Carry out fire minimisation procedures**

**1.1** Fire hazards and risks on board vessel are identified and reported to designated personnel according to workplace procedures

**1.2** Workplace procedures and work instructions for controlling fire risks are followed

**1.3** Firefighting equipment is regularly checked and appropriate action is taken to ensure it is operational

**1.4** Participation in fire drills and musters is undertaken to ensure readiness for fire emergencies

#### **2 Follow instructions during response to a fire emergency**

**2.1** Location and class of fire are identified and alarm is raised and or responded to according to workplace procedures

**2.2** Appropriate personal protective equipment (PPE) requirements are made ready

**2.3** Instructions to contain the spread of fire and smoke are acted upon

**2.4** Fire is attacked using appropriate method, firefighting equipment and extinguishing media or agent according to instructions

**2.5** Collaboration and communication is maintained with others to support the safety and efficiency of the firefighting operation

#### **3 Support post-fire operations**

**3.1** Fire watch is carried out as instructed to prevent further outbreak

**3.2** Equipment is restored to operational condition according to workplace instructions

**3.3** Assistance is provided to preserve fire scene prior to

investigation, as required

### **3.4** Information relevant for fire incident debrief is provided

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARF002 Follow procedures to minimise and fight fires on board a vessel.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF028 Follow procedures to minimise and fight fires on board a vessel**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying extinguishing media to a fire, including:
  - water
  - dry chemical powder
- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating and working collaboratively as a member of a team in a firefighting operation
- correctly using vessel closure and shutdown systems
- conducting effective boundary cooling
- identifying fire hazards and risks
- using fire hose lines (jet spray to fog stream)
- using a fire blanket to extinguish a fire.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- chemistry of fire and its relationship to flash point, vapour density, auto ignition temperature and spontaneous combustion
- classes of fire applicable to Australian and New Zealand Standards, including:
  - A – Carbonaceous solids
  - B – Flammable liquids
  - C – Flammable gases
  - E – Electrically energised equipment
  - F – Cooking fats or oils
- detection and suppression systems, including fixed firefighting systems
- extinguishing media, and their use, including:

- extinguishing powders
- firefighting foams
- gaseous extinguishing agents
- water
- fire alarms and signals during on-board fire emergency
- firefighting tactics, techniques and procedures, including team dynamics
- fire hazards and risks, including:
  - cargo
  - clothing
  - cooking oils
  - cordage
  - electrical arcing
  - fuels and lubricants
  - furnishings
  - paints
  - poor housekeeping
  - poor work practices
  - smoking
  - spontaneous combustion
- hazards and threats to life or health during on-board firefighting operations
- international shore connections
- methods of heat transfer
- on-board fire emergency response organisation and procedures
- portable fire extinguishers – colour codes and suitability for class of fire
- principles underlying spread of fire on a vessel
- principles and methods of extinguishment of each class of fire
- fire pumps
- procedure for restoring equipment to operational condition, including:
  - cleaning
  - re-stowing
- types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, procedures for their use and problems that can occur
- using a fire bucket
- ventilation procedures
- vessel construction as it relates to fire prevention or protection
- WHS/OHS requirements and safe work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a

minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) that are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARF029 Meet work health and safety requirements

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to follow defined work health and safety (WHS)/occupational health and safety (OHS) policies and procedures to ensure the safety of self, others on board and the vessel. This unit applies to people working in the maritime industry in a deck and or engine room capacity on vessels up to 80 m and with propulsion power <3000 kW in waters to the outer limits of the exclusive economic zone (EEZ). They could be working independently or as part of a vessel crew.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand NC, Coxswain Grade 2 NC, Coxswain Grade 1 NC, Marine Engine Driver Grade 3 NC, Master Inland Waters, Master <24 m NC, Marine Engine Driver Grade 2 NC, Master <35 m NC and Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

F – Operational Quality and Safety



## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Recognise safety management system requirements**

**1.1** WHS/OHS responsibilities and duties are identified and accountability processes are outlined

**1.2** WHS/OHS policies and procedures are accessed and reviewed, and clarification is sought where necessary

**1.3** Implications of changes to the safety management system (SMS) are identified and addressed

**1.4** Records are accurately completed

#### **2 Work safely**

**2.1** Established safety procedures are followed when conducting work

**2.2** Work for which personal protective equipment (PPE) is required is identified

**2.3** PPE is used, maintained and stored according to workplace procedures

**2.4** Safety checks on all equipment and machinery are undertaken before operation according to workplace procedures

**2.5** Hazardous chemicals are identified and handled according to workplace procedures

**2.6** Safe manual handling techniques are used when conducting work

**2.7** Worker or employee responsibilities prescribed in WHS/OHS legislation are recognised and carried out

#### **3 Follow workplace procedures for hazard identification, risk assessment and risk**

**3.1** Hazards in the workplace are recognised and reported to designated personnel according to workplace procedures

**control**

- |  |            |   |
|--|------------|---|
|  | <b>3.2</b> | Assessment of risks associated with identified hazards is made according to workplace procedures        |
|  | <b>3.3</b> | Workplace procedures and work instructions for controlling risks are followed                           |
|  | <b>3.4</b> | Risks to fellow workers and other people are recognised and action is taken to eliminate or reduce them |
| <b>4 Participate effectively in WHS/OHS consultation processes</b> | <b>4.1</b> | WHS/OHS issues are raised with designated personnel according to workplace procedures                   |
|  | <b>4.2</b> | Contributions are made to workplace meetings, inspections and other WHS/OHS activities                  |
|  | <b>4.3</b> | Ideas are provided to control the level of risk associated with work tasks                              |
| <b>5 Follow emergency procedures</b>                               | <b>5.1</b> | Emergency incidents are identified and reported   |
|  | <b>5.2</b> | Emergency procedures are followed in responding to emergency incidents                                  |
|  | <b>5.3</b> | Emergency equipment is used in responding to emergency incidents  |
|  | <b>5.4</b> | Appropriate personnel are notified according to workplace procedures                                    |

**Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

**Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

**Unit Mapping Information**

This unit replaces and is equivalent to MARF004 Meet work health and safety requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARF029 Meet work health and safety requirements**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing workplace information on work health and safety (WHS)/occupational health and safety (OHS) policies and procedures
- accessing workplace information on safety management systems (SMS)
- applying problem solving skills to investigate and identify causes of WHS/OHS incidents
- applying safe manual handling techniques
- cooperating with employer or supervisor on any action taken to comply with WHS/OHS legislation
- demonstrating safe work practices
- identifying and responding to typical emergency situations
- identifying isolation points for equipment and following workplace procedures for lock out or tag out of equipment as required
- identifying WHS/OHS hazards related to work responsibilities and taking required action to remove or control hazards
- maintaining housekeeping standards in work area
- reporting WHS/OHS information according to workplace procedures
- selecting, fitting and using appropriate personal protective equipment (PPE)
- taking reasonable care for own health and safety
- using consultation processes to consult others on WHS/OHS issues.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken in the event of emergencies, including:
  - chemical spills
  - collisions
  - disabled vessel
  - electrocution

- falling or being dragged overboard
- fire
- grounding
- hull damage
- injuries associated with dangerous organisms (such as bites, stings and poisoning)
- injuries associated with machines, vehicles, vessels and diving
- loss of rudder
- lost or fouled propeller
- rescue activities
- rough weather and heavy seas
- vessel capsize
- water ingress
- application of concepts relating to hazard identification, risk assessment and control options
- communication systems and consultation arrangements
- designated personnel and their role, including:
  - master of the vessel
  - supervisors, managers and team leaders
  - workplace WHS/OHS personnel
  - other persons authorised or nominated by the workplace to perform, approve, inspect or direct specified work
- difference between hazards (source of potential harm) and risks (chance of something occurring that will result in injury or damage)
- disposition of persons on board to ensure satisfactory stability and trim
- emergency and evacuation procedures
- emergency incidents, including:
  - general safety duties relating to domestic vessels under the Marine Safety (Domestic Commercial Vessel) National Law Act 2012
- hazardous chemicals, including:
  - battery acid
  - cleaning fluids
  - fuel
  - gas
  - oils and lubricants
  - paint
  - thinners
- identifying confined spaces and procedures and legislative requirements for working in confined spaces
- impact of housekeeping on safety
- location of advice on WHS/OHS issues, including documents such as procedures and safety data sheets (SDS)/material safety data sheets (MSDS)
- obligations and safety duties towards all persons on board domestic commercial vessels

- procedures and responsibilities for investigating WHS/OHS incidents and assessing risk
- purpose and procedure for collecting and reporting WHS/OHS information
- safe work procedures relating to work responsibilities, including:
  - accident and incident reporting
  - electrical safety
  - emergency procedures
  - health and hygiene
  - isolation
  - manual handling
  - noise and vibration
  - fatigue management
  - permits to work
  - plant and equipment
  - rescue procedures
  - use and storage of hazardous substances
  - SDS/MSDS
  - vessel housekeeping
  - work in rough weather
  - working with the elements
- SMS
- steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- storage requirements for hazardous goods used in work area
- typical hazards related to work responsibilities, including:
  - contact with chemicals and hazardous substances
  - contact with electricity
  - contact with plant and marine life
  - dangerous organisms
  - equipment operation and maintenance
  - exposure to heat, cold and water
  - falls, trips and slips
  - fatigue
  - hitting or being hit by stationary or moving objects
  - immersion in water without a personal flotation device (PFD)
  - ladders
  - manual handling
  - noise
  - poor housekeeping and lack of deck space
  - repetitive movements and awkward postures
  - unventilated holds

- weather and water conditions
- working in confined spaces
- working with inappropriate clothing
- working with knives
- use, care and storage of PPE
- use of distress signals and penalty for misuse
- WHS/OHS legislation, regulations, codes of practice and organisational policies and procedures associated with work responsibilities.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- a vessel  $\geq 5.0$  metres in length
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARF030 Survive at sea using survival craft**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Application**

This unit involves the skills and knowledge required to survive at sea using survival craft. This unit applies to people working in the maritime industry in a deck and or engine room capacity on vessels up to 80 m and with propulsion power <3000 kW within the exclusive economic zone (EEZ). They could be working independently or as part of a vessel crew.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a General Purpose Hand NC, Coxswain Grade 1 NC, Marine Engine Driver Grade 3 NC, Master <24 m NC, Marine Engine Driver Grade 2 NC, Mate <80 m NC, Master < 35 m NC and Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012 or relevant skills and experience.

### **Pre-requisite Unit**

Not Applicable

### **Competency Field**

F – Operational Quality and Safety



## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Prepare to abandon vessel</b>                 | <p><b>1.1</b> Nature of emergency is determined to minimise potential dangers and threats</p> <p><b>1.2</b> Muster and abandon vessel signals are responded to according to vessel safety procedures</p> <p><b>1.3</b> Survival equipment is organised to maximise chances of survival</p> <p><b>1.4</b> Emergency position indicating radio beacon (EPIRB) is operated to transmit distress signal</p> <p><b>1.5</b> Distress calls are made using radio equipment</p> <p><b>1.6</b> Others are assisted to maximise their chances of survival</p> <p><b>1.7</b> Prevailing circumstances and emergency conditions are used as the basis for timing and sequencing individual survival actions, and potential dangers and threats to other survivors are minimised</p> |
| <b>2 Operate lifesaving and survival equipment</b> | <p><b>2.1</b> Location and accessibility of lifesaving and survival equipment is established</p> <p><b>2.2</b> Survival craft is launched in a timely and effective manner</p> <p><b>2.3</b> Survival equipment is operated according to instructions and accepted survival practice</p> <p><b>2.4</b> Survival radio equipment is operated according to manufacturer instructions and regulatory protocols</p> <p><b>2.5</b> Lifejacket and other lifesaving equipment are correctly used according to instructions</p>  |
| <b>3 Abandon vessel safely</b>                     | <p><b>3.1</b> Need to abandon vessel is established according to safety management system (SMS) or plan</p>   |

- 3.2 Survival craft is launched according to instructions
  - 3.3 Survival craft is checked to ensure it is safe to board
  - 3.4 Survival craft is boarded observing safety of other survivors
  - 3.5 Survival craft is released from abandoned vessel
  - 3.6 Exposure cover is deployed on survival craft according to accepted survival practice and manufacturer instructions
- 4 Apply survival techniques**
- 4.1 Survival craft is checked for seaworthiness
  - 4.2 Sea anchors and drogues are deployed according to accepted nautical practice
  - 4.3 Occupants are checked for signs of hypothermia or other injuries and first aid is applied as required
  - 4.4 Water and food is rationed
  - 4.5 Lookout for vessels and aircraft in vicinity is maintained and distress signals are released on sighting
  - 4.6 Instructions given by rescue personnel are followed to safely access rescue craft

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARF005 Survive at sea using survival craft.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARF030 Survive at sea using survival craft

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying appropriate handling strategies to manoeuvre survival craft in rough weather and sea conditions
- boarding a life raft unassisted while wearing a lifejacket and assisting others to board
- collecting, managing and interpreting information on the use of lifesaving equipment
- communicating with other crew members
- determining type and extent of emergency
- jumping safely from a height into the water while wearing a lifejacket and according to established survival practice
- operating radio equipment
- participating in training, musters and emergency drills
- reading and interpreting instructions for emergency procedures and for use of lifesaving and survival equipment
- recognising and interpreting muster signals
- righting an inverted life raft unassisted while wearing a lifejacket according to established survival practice
- swimming while wearing a lifejacket and floating without a lifejacket according to established survival practice
- using a rescue quoit to assist a person to the life raft
- using paddles to manoeuvre survival craft
- using survival equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken in emergency situations
- calculations required to ration food and water
- technique used to deploy a sea anchor or drogue from the survival craft

- emergency muster and abandon vessel signals
- equipment found in survival craft, its function and procedures for correct operation
- established survival practice
- first aid techniques
- how to launch survival craft
- importance of being ready for shipboard emergencies
- International Convention for the Safety of Life at Sea (SOLAS) regulations
- location of survival equipment on vessel
- maintenance of lifesaving appliances
- means of activating gas release line to inflate life raft
- procedures for abandoning vessel including use of:
  - inflatable life raft
  - life buoys
  - life jackets
- relevant maritime regulations relating to required survival equipment on a vessel
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- search and rescue transponders (SARTs)
- steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- survival at sea techniques
- survival craft:
  - characteristics of different types of survival craft
  - construction
- techniques for using survival equipment
- time required to make distress calls safely
- threats to survival on vessel abandonment and appropriate strategies for countering these threats
- use and purpose of personal protective equipment (PPE)
- use of distress signals, including flares and penalty for misuse.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe,

impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures, instructions for use of lifesaving and survival equipment, emergency procedures and operational manuals
- survival craft
- tools, equipment, machinery, materials and relevant PPE currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARG001 Work effectively as part of a crew on a vessel up to 80 metres

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to work effectively as a general purpose hand on a vessel up to 80 metres.

This unit applies to general purpose hands working in the maritime industry on vessels up to 80 metres as part of a vessel crew.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

G – Teamwork

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Perform routine workplace duties following simple written instructions**

- 1.1 Routine work instructions and procedures are read and interpreted correctly
- 1.2 Appropriate lines of communication with supervisors and colleagues are identified and used
- 1.3 Routine work instructions and procedures are followed in sequence

- |  |     |   |
|--|-----|---|
|  | 1.4 | Clarification is sought from workplace supervisor when any instruction or procedure is not understood                         |
| <b>2 Follow simple spoken instructions</b>   | 2.1 | Spoken instructions are interpreted correctly   |
|  | 2.2 | Instructions are responded to promptly  |
|  | 2.3 | Clarification is sought from workplace supervisor when any instruction is not understood                                      |
| <b>3 Communicate with other crew members</b> | 3.1 | Constructive feedback is encouraged and acted upon  |
|  | 3.2 | All crew members are treated with respect, courtesy and sensitivity   |
|  | 3.3 | Cultural differences are considered and appropriate language is used in all verbal and non-verbal communication               |
|  | 3.4 | Communication is used to develop and maintain positive relationships, mutual trust and confidence                             |
| <b>4 Complete workplace forms</b>            | 4.1 | Workplace forms are completed clearly and concisely within designated timeframes  |
|  | 4.2 | Assistance is sought to complete workplace forms when necessary   |
| <b>5 Complete work tasks</b>                 | 5.1 | Tasks are completed within designated timeframes according to instructions  |
|  | 5.2 | Effective questioning is used to seek assistance from other crew members when difficulties arise in achieving allocated tasks |
|  | 5.3 | Factors affecting work requirements are identified and appropriate action is taken  |
|  | 5.4 | Progress with task is communicated to supervisor as required  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of



competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Routine work instructions and procedures include one or more of the following:

- instruction manuals
- labels
- personnel information, notes, rosters
- signs and symbols
- weather information
- work health and safety (WHS)/occupational health and safety (OHS) policies, procedures and alerts

Workplace forms include one or more of the following:

- hazard/incident/accident report forms
- personnel forms
- safety reports
- telephone messages

Factors affecting work requirements include one or more of the following:

- changes to procedures
- competing work demands
- environmental factors such as weather
- equipment/technology breakdowns
- other work demands
- resource issues

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARG1001A Work effectively as part of a crew on a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARG001 Work effectively as part of a crew on a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- being aware of own specific role and responsibilities
- communicating effectively in the workplace relevant to own work responsibilities
- communicating using maritime vocabulary
- completing relevant workplace documentation
- identifying work requirements
- planning work tasks
- processing basic workplace forms
- relating to people from diverse backgrounds using culturally appropriate language
- requesting advice, receiving feedback and working with others
- working as part of a team.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic spelling, grammar and punctuation to complete basic workplace forms
- communication procedures relevant to the organisation and own work responsibilities
- standard marine communication phrases (SMCPs)
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## **Assessment Conditions**

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARG002 Manage a small crew

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to lead and develop small crews.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Induct and train crew**

- 1.1 Crew member is introduced to key personnel and areas on vessel
- 1.2 Performance requirements and responsibilities of the position are explained
- 1.3 Legislative requirements and organisational policies and procedures are explained
- 1.4 Initial training in relevant safety management systems,

- equipment and work practices is arranged and conducted
- 1.5 Training opportunities for development of the individual's job role are identified
  - 1.6 Relevant documentation is completed and submitted to appropriate personnel
- 2 Allocate crew workload**
- 2.1 Current workload of crew is assessed
  - 2.2 Workload is scheduled effectively to facilitate operational efficiency of vessel
  - 2.3 Duties, rosters and responsibilities are assessed against and matched to crew capabilities according to legislative and organisational requirements
  - 2.4 Crew are allocated a workload priority
  - 2.5 Workload of crew is continuously assessed according to agreed objectives and timelines
- 3 Monitor crew performance**
- 3.1 Performance expectations are communicated clearly to crew and individual crew members
  - 3.2 Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned workloads
  - 3.3 Performance expectations are assessed objectively against workloads and crew and individual capabilities
  - 3.4 Strategies are developed to ensure crew and individuals are actively encouraged and supported in assessing their own competence and identifying their learning needs
- 4 Address performance related issues**
- 4.1 Systems are established to ensure efforts of crew are monitored, and formal and informal feedback is provided in a constructive manner
  - 4.2 Performance above expectations is identified and reinforced through recognition and continuous feedback
  - 4.3 Performance below expectations is identified and development plan for improved performance is negotiated, agreed on and documented according to organisational requirements
  - 4.4 Action plans for improving performance are established and monitored according to organisational requirements

- |  |   |
|--|---|
| <b>5 Address issues and problems of crew and individual crew members</b> | <div style="margin-left: 20px;">5.1 Potential and current issues and problems arising within crew and/or individuals are identified and acted on according to organisational and legislative requirements</div> <div style="margin-left: 20px;">5.2 Advice, support and expertise is sought from appropriate personnel as required, to resolve issues and problems</div> <div style="margin-left: 20px;">5.3 Issues and problems that impact on individual crew members are followed through and resolved with concerned individuals</div>  |
| <b>6 Build support and commitment within crew</b>                        | <div style="margin-left: 20px;">6.1 Organisational requirements are met through personal performance, behaviour and leadership, which serves as a positive role model for other crew members</div> <div style="margin-left: 20px;">6.2 Own performance is monitored and adjusted to ensure it aligns with key performance indicators and organisational goals</div> <div style="margin-left: 20px;">6.3 Crew members are treated in a fair and equal manner and individual differences are identified and accommodated</div> <div style="margin-left: 20px;">6.4 Effective communication is developed and maintained with crew and management</div> |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |  |
|--|--|
| Organisational policies and procedures include | <ul style="list-style-type: none"><li>• anti-discrimination</li><li>• complaint and grievance procedures</li></ul> |
|--|--|

one or more of the following:

- culturally appropriate entitlements
- employment conditions
- equal opportunity
- induction and training
- performance measures
- professional development
- recruitment and selection
- work health and safety (WHS)/occupational health and safety (OHS)

Relevant documentation include one or more of the following:

- employee records
- job/position descriptions
- records of taxation and superannuation payments
- WHS/OHS records

Performance expectations include one or more of the following:

- documented key performance indicators (KPIs) for:
  - individuals
  - individuals and crew
- informal KPIs developed by Master for:
  - individuals
  - individuals and crew

Strategies include one or more of the following:

- coaching
- counselling
- disciplinary procedures
- discussions and meetings to resolve performance issues
- making adjustments to KPIs
- mentoring
- referral to more senior management/human resources support services
- shadowing
- training

Development plan includes one or more of the following:

- capacity for inserting ongoing evaluation, review and input
- codes of conduct
- crew competencies
- crew roles and responsibilities
- KPIs
- learning opportunities



- negotiated agreements with individual
- performance standards
- WHS/OHS requirements
- work allocation
- work outputs and processes

Potential and current, issues and problems include one or more of the following:

- appeals against formal decisions such as assessments
- bullying
- discrimination and harassment
- dispute between individuals or parties
- grievances
- injury rehabilitation
- perceived or actual relating to:
  - work roles, job design and allocation of duties
  - work performance of self and others
- prejudice or racial vilification
- promotions
- stress or personal problems

Appropriate personnel include one or more of the following:

- human resources manager and personnel
- management
- other crew members
- other Masters in the organisation
- union/employee representatives or groups

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARG4001A Manage a small crew.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARG002 Manage a small crew

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- building and motivating teams
- coaching and mentoring others
- communicating and negotiating effectively
- communicating effectively with others as required
- counselling others and providing feedback as required
- developing and maintaining crew performance to enhance business operations
- developing effective planning documents
- leading others
- managing personnel effectively
- monitoring and reviewing activities, processes, performance and plans
- planning and organising work and activities
- producing accurate and reliable documentation
- relating to people from a range of social, cultural and ethnic backgrounds
- resolving conflict
- training others.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- consultation and communication techniques and strategies
- key result areas of crew and organisation
- organisational policies and procedures
- principles and techniques involved in:
  - performance management systems
  - leadership and mentoring
- processes for monitoring team and own performance
- relevant industry awards and enterprise agreements
- relevant international maritime conventions

- relevant legislation especially in relation to work health and safety (WHS)/occupational health and safety (OHS), environmental issues, equal opportunity, industrial relations, unfair dismissal and anti-discrimination
- safety management systems
- staff counselling, grievance and disciplinary procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARG003 Manage an engine room and small engineering team

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to lead and develop a small engineering team.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Organise engine room for departure**

- 1.1 Fuels, lubricating oil, liquefied petroleum gas (LPG) and refrigeration gas required for proposed voyage are obtained
- 1.2 Flammable and explosive materials are stowed and managed according to regulatory and organisational requirements
- 1.3 Planned maintenance tasks to be completed during proposed voyage are verified

- |  |     |   |
|--|-----|---|
|  | 1.4 | Spares and consumables required for proposed voyage are acquired  |
|  | 1.5 | Work health and safety (WHS)/occupational health and safety (OHS) hazards in engine room are identified, risks are assessed and corrective actions are taken and recorded according to organisational practices |
| <b>2 Manage daily engine room routine</b>      | 2.1 | Engine room routine is organised and duties for engineering team are defined  |
|  | 2.2 | WHS/OHS roles and responsibilities of engineering team are defined  |
|  | 2.3 | WHS/OHS procedures are communicated to engine room crew   |
|  | 2.4 | WHS/OHS issues raised are acknowledged and resolved promptly  |
|  | 2.5 | Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements   |
|  | 2.6 | Engineering team members are allocated daily maintenance tasks according to planned maintenance system or breakdown maintenance   |
|  | 2.7 | Procedures for collecting and sorting engine room waste from cleaning and maintenance tasks are defined and communicated to engineering team  |
| <b>3 Manage engineering team</b>               | 3.1 | Performance expectations are communicated clearly to engineering team   |
|  | 3.2 | Performance expectations are assessed objectively against workloads and engineering team capabilities to ensure satisfactory completion of assigned tasks   |
|  | 3.3 | Potential and current issues and problems arising within crew and/or individuals are identified and acted on according to organisational and legislative requirements   |
|  | 3.4 | Effective communication is developed and maintained with team and management  |
| <b>4 Manage engineering procedures in port</b> | 4.1 | Planned and breakdown maintenance activities to be conducted in port are arranged to facilitate operational efficiency of vessel  |

- 4.2 Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements
  - 4.3 Sound business relationships with contractors are established and maintained to ensure effective communication and early identification of potential service delivery problems
  - 4.4 Contractual disputes with contractors that arise are managed according to contractual requirements, using established mediation mechanisms
  - 4.5 Removal of sludge, sewage and engine room waste is arranged
  - 4.6 Procedures for removal of sludge, sewage and engine room waste are followed according to regulatory requirements and organisational procedures
- 5 Manage engineering emergencies**
- 5.1 Information is received regarding scope and severity of emergency
  - 5.2 Information is analysed to determine appropriate response
  - 5.3 WHS/OHS risks are identified and action is taken according to organisational procedures
  - 5.4 Actions are taken to reduce effect of incident according to organisational procedures
  - 5.5 Incident is monitored for any changes and appropriate responses are taken according to organisational procedures
  - 5.6 Communications are established with support services and relevant stakeholders, where appropriate
  - 5.7 Reports and debriefings are completed according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work Environment.

Flammable and explosive materials include one or more of the following:

- fuels
- LPG
- lubricating oils
- refrigeration gas

Engine room routine include one or more of the following:

- completing log book entries
- monitoring of equipment in engine room
- regular inspection of engine room
- responding to alarms
- watchkeeping arrangements

Performance expectations include one or more of the following:

- compliance with duty statements
- personal appraisal reports

Potential and current issues and problems include one or more of the following:

- bullying
- discrimination and harassment
- disputes between individuals or parties
- grievances
- injury rehabilitation
- perceived or actual issues and problems relating to:
  - work roles, job design and allocation of duties
  - work performance of self and others
- prejudice or racial vilification
- stress or personal problems

Emergencies include one

- accidental release of refrigeration gas in confined space
- explosion

or more of the following:

- fire
- flooding
- loss of electrical supply
- major failure of propulsion engine

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARG4002A Manage an engine room and small engineering team.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARG003 Manage an engine room and small engineering team**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with people from a range of social, cultural and ethnic backgrounds
- counselling team members and providing feedback
- developing effective planning documents
- displaying sound personnel management
- leading team members
- monitoring and reviewing activity
- negotiating effectively
- planning and organising activity
- providing high quality reports
- reading and interpreting maritime regulations, rules and instructions
- reading, interpreting and applying manufacturer instructions including all work health and safety (WHS)/occupational health and safety (OHS) requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
- resolving conflict
- writing reports.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- consultation and communication techniques and strategies
- hazards associated with flammable/explosive materials
- hazards of refrigeration gases including accidental release in a confined space
- key result areas of the crew and the organisation
- organisational policies and procedures
- principles and techniques involved in:
  - performance management systems
  - leadership and mentoring
- processes for monitoring crew and own performance

- relevant legislation especially in regard to WHS/OHS, environmental issues, equal opportunity, industrial relations, unfair dismissal and anti-discrimination
- regulations for stowing and managing flammable/explosive materials including:
  - diesel
  - petrol
  - liquefied petroleum gas (LPG)
  - refrigerant gases
  - lubricants
- requirements for confined space entry and hot work permits
- safety management systems
- testing of LPG detectors.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARG004 Provide leadership to crew

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to apply leadership and team working skills.

This unit applies to a Watchkeeper Deck, Master up to 500 gross tonnage and Master up to 80 metres.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Allocate duties

- 1.1 Workload is scheduled effectively to facilitate vessel operational efficiency
- 1.2 Duties, rosters and responsibilities are assessed against and matched to crew capabilities and according to legislative and organisational requirements
- 1.3 Crew are allocated workload priority and performance expectations are communicated clearly

- 1.4 Workload of crew is continuously assessed according to agreed objectives and timelines
  - 1.5 Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned workloads
  - 1.6 Performance above expectations is identified and reinforced through recognition and continuous feedback
  - 1.7 Performance below expectations is identified and development plan for improved performance is negotiated, agreed on and documented according to organisational requirements
  - 1.8 Potential and current issues and problems arising within the crew and/or individuals are identified and acted on according to organisational and legislative requirements
- 2 Provide learning and development activities**
- 2.1 Action plan to meet individual and group learning and development needs is prepared
  - 2.2 Individuals are supported to identify their specific learning and development needs
  - 2.3 Crew members are encouraged and supported to take advantage of learning and development opportunities according to their needs and organisational requirements
  - 2.4 On-the-job learning opportunities are provided according to individual needs and to the required standard
  - 2.5 Crew members are encouraged and supported in applying new skills and knowledge in the workplace
- 3 Communicate effectively with crew and stakeholders**
- 3.1 Interpersonal skills and communication techniques are used to facilitate open communication within crew, ensure understanding and encourage accurate exchange of information
  - 3.2 Meetings and briefings are conducted to maintain understanding and support with crew and stakeholders
  - 3.3 Barriers to effective cross-cultural communication are identified and addressed to maintain effective relationships
  - 3.4 Positive involvement and contributions are encouraged from all crew members

- 3.5 Communications are clear and accurate to ensure that information can be easily understood and acted upon
- 3.6 Strategies for resolving differences are used to negotiate issues and problems
- 3.7 Communication is used to develop and maintain positive relationships, mutual trust and confidence
- 4 Provide leadership within the crew**
  - 4.1 Crew members are provided with the support, leadership and advice necessary to perform work safely and effectively
  - 4.2 Assistance is provided to crew members to accomplish teamwork and achieve organisational goals
  - 4.3 Conflict situations in crew are identified and conflict resolution strategies applied
  - 4.4 Leadership and guidance strategies are varied to meet changing priorities and situations, taking into account the differing needs and skills of individuals and the requirements of the tasks
- 5 Make effective decisions**
  - 5.1 Information is gathered and analysed to generate a range of options
  - 5.2 Decisions made are the most effective for the situation based on sufficient, valid and reliable information
  - 5.3 Decisions made are consistent with personal and professional values, ethics and regulatory obligations
  - 5.4 Consultative and participative decision making is used in implementing and reviewing the work of the crew and the distribution of responsibilities
  - 5.5 Needs and expectations of crew and the organisation are taken into account through decision making
  - 5.6 Decision making is undertaken according to risk management plans and within appropriate timeframes
  - 5.7 Effectiveness of decisions is evaluated to improve future decision making

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| Performance expectations include one or more of the following:       | <ul style="list-style-type: none"><li>• documented key performance indicators (KPIs) for:<ul style="list-style-type: none"><li>• individuals</li><li>• individuals and crew</li></ul></li><li>• informal KPIs developed by the Master for:<ul style="list-style-type: none"><li>• individuals</li><li>• individuals and crew</li></ul></li></ul>  |
| Development plan includes one or more of the following:              | <ul style="list-style-type: none"><li>• capacity for inserting ongoing evaluation, review and input</li><li>• codes of conduct</li><li>• crew competencies</li><li>• crew roles and responsibilities</li><li>• KPIs</li><li>• learning opportunities</li><li>• negotiated agreement with individual</li><li>• performance standards</li><li>• work allocation</li><li>• work health and safety (WHS)/occupational health and safety (OHS) requirements</li><li>• work outputs and processes</li></ul> |
| Potential and current issues and problems include one or more of the | <ul style="list-style-type: none"><li>• appeals against formal decisions such as assessments</li><li>• bullying</li><li>• discrimination and harassment</li></ul>   |

following:

- dispute between individuals or parties
- grievances
- injury rehabilitation
- perceived or actual relating to work:
  - roles, job design and allocation of duties
  - performance of self and others
- prejudice or racial vilification
- promotions
- stress or personal problems

Learning and development opportunities include one or more of the following:

- career pathways
- coaching
- conference and seminar attendance
- external study
- formal course participation
- induction
- in-house training programs
- job rotation
- mentoring
- on-the-job training
- secondment

Interpersonal skills and communication techniques include one or more of the following:

- active listening
- constructive feedback
- control of voice and body language
- flexibility and willingness to negotiate
- non-verbal communication
- presenting options and consequences
- paraphrasing
- reflecting and summarising
- speaking clearly and concisely
- seeking feedback to check understanding
- showing awareness of cultural and social differences
- using language sensitively
- using positive, confident and cooperative language

Stakeholders include one or more of the following :

- coast stations
- Master
- other ships
- vessel traffic service (VTS) centres

Barriers to effective cross-cultural communication include one or more of the following:

- assumptions
- cultural
- first or preferred language
- level of skill and knowledge
- power imbalance
- racist and prejudiced attitudes
- socioeconomic
- stereotypes and generalisations
- structural

Teamwork includes one or more of the following:

- advantages and disadvantages
- individual and group behaviour
- team building
- team problem solving
- types of groups

Organisational goals include one or more of the following:

- client service standards
- environmental management
- organisational service standards
- WHS/OHS

Leadership and guidance strategies include one or more of the following:

- delegation
- empowerment
- job design
- motivation
- process theories

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARG5001A Provide leadership to crew.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARG004 Provide leadership to crew

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- allocating, assigning and prioritising resources
- applying:
  - decision-making techniques
  - assertiveness and leadership
- communicating:
  - effectively on board and ashore
  - with other ships, coast stations and VTS centres
  - to perform officer duties, which may include communicating with a multilingual crew
- demonstrating effective leadership behaviour and teamwork techniques
- developing effective planning documents
- ensuring that communications are clear and understood
- sharing an accurate understanding of current and predicted vessel status, operational status and external environment with necessary crew members
- using and understanding the International Maritime Organization Standard Marine Communication Phrases (IMO SMCP).

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- allocation, assignment and prioritisation of resources
- assertiveness and leadership including motivation
- communication techniques and strategies
- decision-making techniques
- effective communication on board and ashore
- English language to:
  - communicate with other ships, coast stations and VTS centres
  - perform officer's duties, which may include communicating with a multilingual crew
- principles and techniques involved in:

- performance management systems
- assertiveness, leadership, motivation
- teamwork
- risk management as the process of identifying potential negative events and developing plans to mitigate or minimise the likelihood of the negative event occurring and/or the consequences, if it does occur.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARG005 Supervise a crew

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to provide leadership and guidance to a vessel crew to optimise vessel performance.

This unit applies to an individual working on a range of vessels as a Chief Integrated Rating.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### **1 Plan and implement work schedules**

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Tasks and/or jobs are identified and prioritised according to work schedules
- 1.2 Timelines, personnel and equipment are identified for each

- job and task
- 1.3 Work schedules are clearly communicated to crew and individuals
  - 1.4 Changes to work schedules are implemented through reorganisation of priorities, and reasons are clearly conveyed to crew and individuals
  - 1.5 Priority of tasks is communicated to crew and individuals
  - 1.6 Tasks and/or jobs are discussed with crew and individuals, and work schedules are adjusted as required
  - 1.7 Risks are identified and analysed according to with organisational policies and procedures
  - 1.8 Risks are monitored and reviewed and appropriate treatment is applied to eliminate or minimise risk
- 2 Monitor performance of tasks**
- 2.1 Required standard is effectively communicated to crew and individuals to ensure understanding of allotted task
  - 2.2 Instruction or technical support to achieve required standard is provided as required
  - 2.3 Standard of performance is monitored to ensure achievement of outcomes
  - 2.4 Feedback on performance is discussed with crew and individuals
  - 2.5 Completion times of tasks/jobs are monitored and scheduling is adjusted as appropriate
- 3 Support development of crew or individuals**
- 3.1 Workload is discussed with crew and individuals on a regular basis
  - 3.2 Support mechanisms are explored and implemented to address issues
  - 3.3 Crew and individuals are supported to identify and resolve work-related issues
  - 3.4 Crew and individuals are supported to establish and maintain effective relationships with colleagues according to the requirements of their work role
  - 3.5 Areas of tension or conflict in relationships are identified and steps are taken to address contributing factors and issues

- |  |     |   |
|--|-----|---|
|  | 3.6 | Mentoring, training and assessment is provided as required, to develop and enhance crew and individual skills and knowledge according to work role requirements |
|  | 3.7 | Trainee crew are supported to complete relevant training record books   |
| <b>4 Provide leadership to crew</b>                        | 4.1 | Crew is assisted to identify and work towards goals and objectives according to organisational values and directions  |
|  | 4.2 | Support and encouragement is provided to crew and steps are taken to maintain or improve cooperation and cohesiveness   |
|  | 4.3 | Barriers to crew effectiveness are identified and potential causes or factors contributing to these barriers are investigated                                   |
|  | 4.4 | Strategies are put in place to enhance team effectiveness by addressing identified barriers   |
| <b>5 Monitor application of WHS/OHS</b>                    | 5.1 | Implementing work health and safety/occupational health and safety (WHS/OHS) standards is monitored to ensure safety requirements are met                       |
|  | 5.2 | Strategies for prevention or correction of problems are determined from monitoring process  |
|  | 5.3 | Recommendations for prevention or correction of problems are made to achieve established standards  |
| <b>6 Communicate with management, crew and individuals</b> | 6.1 | Information affecting work is explained logically and clearly to crew and individuals verbally and/or in writing, as required                                   |
|  | 6.2 | Effective and appropriate information provision is carried out with management  |
|  | 6.3 | Concise reports are written that conform to organisational procedures   |
| <b>7 Control entry to confined spaces</b>                  | 7.1 | Requirement for confined space entry is identified  |
|  | 7.2 | Confined space entry permit and any limitations are identified according to organisational procedures   |
|  | 7.3 | Roles and responsibilities of crew members are confirmed according to organisational procedures   |
|  | 7.4 | WHS/OHS requirements are applied throughout control of  |

the operation

- 7.5 Entry and egress of confined space are monitored and recorded according to work permit conditions and organisational procedures
- 7.6 Communication and consultation with confined space entry team is maintained according to work permit conditions and organisational procedures
- 7.7 Documentation and reports are completed according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

Work schedules include one or more of the following:

- organisational standards relating to service delivery or outcomes specific to work role
- resources required
- specific plans for implementing identified work arrangements
- timeframe for achieving outcomes
- training plans to develop required skills and knowledge

Monitoring performance may include one or more of the following:

- discussions with crew member/s
- identifying training and development needs
- mentoring training and assessment of crew members
- reviewing and discussing factors that have affected individual work schedules
- reviewing individual's work schedule

Organisational values and directions include one or more of the following:

- duty of care
- first aid
- grievance management
- harassment
- person-centred approach

- Strategies must include:
- service delivery standards
  - specific values, standards and approaches relevant to work role
  - WHS/OHS
  - workplace behaviours
  - review of:
    - policies and procedures
    - roster arrangements or associated work conditions
    - systems, equipment or work practices
- Confined spaces include one or more of the following:
- any compartment or area with limited opening for access, no escape route, and with limited natural ventilation and the capability of accumulating a toxic, flammable or explosive atmosphere, or of being flooded such as:
    - pump rooms
    - cargo holds
    - ballast, fresh water and other tanks
- Limitations include one or more of the following:
- emergency situation requirements
  - equipment and/or clothing, and personal protective equipment requirements
  - maximum/minimum numbers in teams entering confined space
  - medical constraints on personnel entering confined space
  - monitoring/testing requirements
  - time limitations for working within confined space or before returning to confined space

## Unit Mapping Information

This unit replaces and is equivalent to MARG4003A Supervise a crew.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARG005 Supervise a crew

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information about tasks and abilities of crew to effectively schedule tasks
- addressing legal, legislative and industrial requirements
- adjusting scheduling to meet contingencies
- analysing relevant workplace data to identify hazards, assess risks, and design and implement appropriate work health and safety (WHS)/occupational health and safety (OHS) control measures
- applying relevant WHS/OHS requirements and work practices
- assessing resources needed to maintain systematic approach to required tasks
- calculating job times and manipulating scheduling to make the most efficient use of personnel and equipment
- communicating ideas and information effectively to crew
- determining job priorities
- identifying, interpreting and analysing risks relevant to work being performed
- enhancing individual performance
- establishing procedures that enable feedback from crew and encourage suggestions that might enhance performance
- monitoring performance of crew members
- monitoring performance of tasks and adjusting scheduling
- operating any equipment pertinent to controlling confined space entry
- providing instruction to achieve the required standard
- providing the required amount of detail in reports
- supporting effective team processes and work functions
- using appropriate information technology and software.



## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- appropriate emergency response procedures
- appropriate signage, symbols, labels and barriers
- effective communication techniques required to communicate with a crew on board a vessel
- entry permit procedures
- incident and accident investigation
- individual behaviour and differences
- key principles of team dynamics, team leadership and management
- legislation, organisational policies and procedures relevant to confined spaces
- organisational human resource management policies
- relevant WHS/OHS requirements, work practices
- reporting procedures for WHS/OHS matters
- risk management principles and appropriate treatments
- techniques for supporting a team to develop mutual concern and camaraderie
- techniques used to resolve conflict within a team
- techniques/methods used to identify and/or analyse risk
- work scheduling procedures
- workforce development, the importance of determining the skill level of workers and ways of improving these skills
- workplace employment awards or agreements and work conditions.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and

operation manuals including:

- entry/egress reports/logs
  - reports to WHS/OHS officer
  - work permit completion after exit
  - written reports required by organisation
- tools, equipment, material and personal protective equipment that replicate and are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARG006 Manage a vessel and its crew

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to lead and manage the operations of a vessel and its crew.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

G – Teamwork

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Take command

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Command is exercised according to organisational authority and guidelines

1.2 Command structure is established appropriate to vessel

- 1.3 Command structure is communicated to crew and external authorities who have a regulatory interest in vessel
- 1.4 Command information management system is implemented
- 1.5 Communication mechanisms and procedures are implemented between levels of command according to organisational procedures
- 1.6 Liaison is established and maintained to meet control and command requirements

## **2 Manage operations**

- 2.1 Operational plan is developed in consultation with relevant personnel
- 2.2 Key performance indicators (KPIs) are developed, detailed and included in operational plan
- 2.3 Contingency plans are developed and implemented at appropriate stages of operational planning
- 2.4 Resource acquisition is planned and managed according to organisational procedures
- 2.5 Standard operating procedures are developed in an appropriate format
- 2.6 Performance systems and processes to assess progress in achieving profit and productivity plans and targets are developed, monitored and reviewed
- 2.7 Areas of under-performance are identified and prompt action is taken to rectify the situation
- 2.8 Recommendations for variations to operational plans are negotiated according to organisational procedures
- 2.9 Systems to ensure procedures and records associated with documenting performance are managed according to organisational procedures

## **3 Apply task and workload management**

- 3.1 Workload of crew members is planned taking into account time and resource constraints
- 3.2 Crew are assigned workload priority and performance expectations are communicated clearly
- 3.3 Workload of crew is coordinated according to agreed objectives and timelines

- 3.4 Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned tasks and workloads
- 3.5 Potential and current issues and problems arising in relation to task and workload management are identified and acted on according to organisational and legislative requirements
- 4 Support and participate in development activities**
  - 4.1 Training needs of crew and individuals are identified and assessed on a regular basis according to organisational procedures
  - 4.2 Action plan to meet crew and individual training and development needs is developed, agreed and implemented
  - 4.3 On-the-job training is provided to meet crew needs according to the required organisational standard
  - 4.4 Crew members are encouraged and supported to attend training and to undertake development opportunities
  - 4.5 Coaching and mentoring are utilised as developmental tools
- 5 Communicate objectives and required standards**
  - 5.1 Crew members are provided with up-to-date information concerning organisational objectives and standards
  - 5.2 Crew member understanding of objectives and standards is checked
  - 5.3 Organisational standards and values are modelled and promoted to crew members
- 6 Provide leadership to crew and individuals**
  - 6.1 Link between function of crew and organisational goals is articulated and communicated to crew
  - 6.2 Participative decision making is used to develop, implement and review work of crew and to allocate responsibilities
  - 6.3 Opportunities are given to crew and individuals to develop new and innovative work practices and strategies
  - 6.4 Appropriate delegation to crew and individuals is made, according to crew objectives and goals, and organisational policy and procedures
  - 6.5 Tasks are allocated within the competence of crew members and this allocation is supported with appropriate authority, autonomy and training

- 6.6 Procedures for emergency responses are developed and communicated to crew members
- 7 Make effective decisions**
- 7.1 Team-building strategies are applied to achieve strengthened crew and individual commitment to organisational vision and goals
- 7.2 Range of consultative methods are used to involve crew in decisions and vessel risk assessment
- 7.3 Use of problem-solving strategies and techniques to identify and generate options is promoted
- 7.4 Decisions and actions are evaluated for their effectiveness and positive outcomes
- 7.5 Decisions and actions are documented and reported according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Information management system includes one or more of the following:

- data receipt
- procedures and protocols
- recording
- recording and documenting incidents
- security and authority assignment
- storage and despatch modes
- types of technology – electronic data exchange devices

Relevant personnel includes one or more of the following:	<ul style="list-style-type: none"><li>• crew supervisors</li><li>• masters of other vessels</li><li>• senior crew members</li><li>• senior management</li><li>• union or employee representatives</li><li>• work health and safety (WHS)/occupational health and safety (OHS) committee/s and other people with specialist responsibilities</li></ul>
Contingency plans include one or more of the following:	<ul style="list-style-type: none"><li>• allocating functions or tasks</li><li>• recycling and re-using materials</li><li>• risk identification, assessment and management processes</li><li>• strategies for reducing costs, wastage, stock or consumables</li></ul>
Resource acquisition includes one or more of the following:	<ul style="list-style-type: none"><li>• current and projected human, physical and financial resources</li><li>• goods and services to be purchased and ordered</li><li>• stock requirements and requisitions</li></ul>
Performance expectations include one or more of the following:	<ul style="list-style-type: none"><li>• documented KPIs developed by Master for: individuals individuals and crew</li><li>• informal KPIs developed by Master for: individuals individuals and crew</li></ul>
Potential and current issues and problems include one or more of the following:	<ul style="list-style-type: none"><li>• appeals against formal decisions such as assessments</li><li>• bullying</li><li>• discrimination and harassment</li><li>• disputes between individuals or parties</li><li>• grievances</li><li>• injury rehabilitation</li><li>• perceived or actual issues relating to work:<ul style="list-style-type: none"><li>• roles, job design and allocation of duties</li><li>• performance of self and others</li></ul></li><li>• prejudice or racial vilification</li><li>• promotions</li><li>• stress or personal problems</li></ul>

Development opportunities include one or more of the following:

- career pathways
- coaching
- external study
- formal course participation
- induction
- in-house training programs
- job rotation
- mentoring
- on-the-job training

Team-building strategies include:

- clarifying ground rules and behavioural expectations
- defining and clarifying objectives and work area plans
- ensuring input into the review of the safety management system (SMS) is encouraged
- fostering creativity
- offering constructive feedback
- recognising achievements
- strengthening communications processes

Consultative methods include one or more of the following:

- email/intranet communications, newsletters or other processes and devices that ensure all employees have the opportunity to contribute to team and individual operational plans
- mechanisms used to provide feedback to work team in relation to outcomes of consultation
- meetings, interviews, brainstorming sessions

## Unit Mapping Information

This unit replaces and is equivalent to MARG6001A Manage a vessel and its crew.

MARG6001A replaces and is equivalent to TDMML407A Manage administration of the vessel and its personnel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARG006 Manage a vessel and its crew

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying decision-making techniques including situation and risk assessment, identifying and generating options, selecting a course of action and evaluating outcome effectiveness
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- applying effective resource management including allocation, assignment and prioritisation of resources; effective communication on board and ashore; decisions reflecting consideration of team experiences; assertiveness and leadership; obtaining and maintaining situational awareness
- applying task and workload management including planning and coordination, personnel assignment, time and resource constraints, and prioritisation
- assessing current competence, capabilities and operational requirements to determine training objectives and activities
- developing, implementing and overseeing standard operating procedures
- giving and receiving communication clearly and unambiguously
- informing crew of expected standards of work and behaviour in a manner appropriate to the individual concerned.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- decision-making techniques
- key performance indicators (KPIs) as measures for monitoring or evaluating the efficiency or effectiveness of a system, which may be used to demonstrate accountability and to identify areas for improvements
- organisational safety management system requirements

- relevant international maritime conventions and recommendations, and national legislation
- shipboard personnel management and training
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including newsletters, operational plans, workplace procedures, regulations and codes of practice
- equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARH006 Forecast weather and oceanographic conditions

### Modification History

Not applicable.

### Application

This unit involves the skills and knowledge required to forecast weather and oceanographic conditions during a near coastal voyage and to take appropriate actions based on predictions.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

H – Navigation

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Interpret weather and oceanographic information**

- 1.1 Ocean and weather conditions are observed and interpreted
- 1.2 Measurements of current local, meteorological and oceanographic parameters are made and recorded using appropriate shipboard instruments
- 1.3 Weather charts and satellite images are acquired and interpreted

- |  |     |   |
|--|-----|---|
|  | 1.4 | Weather reports are obtained and interpreted  |
| <b>2 Use information to predict local weather and oceanographic conditions</b>   | 2.1 | Forecasts of local weather and oceanographic conditions are correctly made using available information  |
|  | 2.2 | Wave height and swell forecast is made using available information  |
|  | 2.3 | Effects of local topographical features on wind flow and weather conditions are estimated using available information                         |
|  | 2.4 | Potentially dangerous conditions are identified and appropriate action is taken to secure vessel  |
| <b>3 Maintain records of weather and oceanographic information and forecasts</b> | 3.1 | Weather and oceanographic information and forecasts are recorded and filed according to organisational procedures                             |
|  | 3.2 | Action on vessel operations initiated as a result of weather and oceanographic forecasts is documented according to organisational procedures |
|  | 3.3 | Meteorological charts, publications and related documentation are updated and stored according to organisational procedures                   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Ocean and weather

- air masses and fronts

conditions must include:

- cloud classifications
- cyclones, storms and gales
- ocean currents
- pressure systems and cold fronts
- sea state
- tide prediction

Shipboard instruments  
include one or more of the  
following:

- barograph
- barometers
- equipment for receiving weather maps and forecasts
- wet and dry bulb thermometers

Appropriate action  
includes one or more of  
the following:

- avoiding storm centres and dangerous quadrants by adjusting course and speed
- ensuring all vessel equipment is properly secured
- taking action to avoid extreme adverse weather conditions

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARH4001A Forecast weather and oceanographic conditions.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH006 Forecast weather and oceanographic conditions**

## **Modification History**

Not applicable.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- ensuring currency of relevant reference material
- observing, interpreting and forecasting weather and oceanographic conditions
- reading, interpreting and applying weather and oceanographic information
- recognising problems that may occur when interpreting weather and oceanographic information
- selecting and using shipboard instruments to assist in forecasting weather and oceanographic conditions
- supporting reasons for intended action with statistical data and observations of actual conditions
- using tide tables to calculate height of tide.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles for making meteorological and oceanographic measurements
- effects on navigation and vessel handling of wind, currents and bottom topography
- heat exchange process
- principles and procedures of weather forecasting using information obtained from observations, charts, satellite images, reports and instruments
- procedures for filing and maintaining weather and oceanographic information
- procedures to be followed during gale conditions and tropical revolving storms
- sources of weather and oceanographic information, and methods for their interpretation
- topographical effects on wind flow
- typical problems in forecasting weather and oceanographic conditions
- vertical division of the atmosphere
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARH007 Apply command navigation procedures on vessels limited by tonnage or near coastal operations**

### **Modification History**

Not applicable.

### **Application**

This unit involves the skills and knowledge required to manage safe navigational watchkeeping on a commercial ocean-going vessel in compliance with Australian and international regulations and guidelines, protection of the marine environment and the safety of vessel and persons on board.

This unit applies to people who work in the maritime industry as Master or Chief Mate on a vessel of up to 500 gross tonnage (GT) or as a Watchkeeper on a vessel up to 3000 GT or as Master or Chief Mate on vessels up to 3000 GT operating in near coastal waters.

The unit is consistent with the relevant sections of STCW 95 and Marine Orders under the Australian Navigation Act 2012.

This unit has links to legislative and certification requirements.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

H – Navigation

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.



- |  |  |
|--|--|
| <b>1 Establish safe watchkeeping procedures on vessels, potentially with limited qualified personnel</b> | <p>1.1 Set of Master standing orders is developed to supplement vessel safety management system (SMS) noting number of watchkeeping personnel</p> <p>1.2 Accepted principles, vessel safety management procedures and Master standing orders are conformed with in conduct, handover and relief of watch</p> <p>1.3 Appropriate bridge team is established according to vessel SMS and bridge personnel are confirmed as fit for duty</p> <p>1.4 Duties are assigned to members of bridge team and their performance of those duties is monitored</p> <p>1.5 Members of bridge team are correctly briefed on their duties</p> <p>1.6 Action is taken to ensure vessel is navigated safely using appropriate position fixing techniques to check location the vessel and to maintain movement of vessel within planned limitations</p> <p>1.7 Action is taken to ensure progress of vessel with respect to passage plan is analysed and vessel navigation is managed appropriately to maintain a required estimated time of arrival at a point in the plan</p> <p>1.8 Accepted principles and procedures are conformed with in relation to frequency and extent of monitoring of traffic, vessel and environment</p> <p>1.9 Responsibility for safety of navigation is defined according to vessel SMS</p> <p>1.10 Safe navigational practice is achieved by implementing accepted bridge resource management principles and procedures</p> <p>1.11 Action is taken to ensure fatigue management strategies are correctly applied by bridge management team</p> |
| <b>2 Respond to potential collision and emergency situations</b>   | <p>2.1 Leadership of bridge team is taken when called to bridge in response to navigational situation</p> <p>2.2 Circumstances when assistance is required when Master is performing watchkeeping duties are identified</p> <p>2.3 Potential collision situations are analyse and appropriate action is taken to avoid collision in ample time and in compliance with international collision regulations, resulting</p>   |

- in a safe passing distance and following practices of good seamanship
- 2.4 SMS procedures and compliance with standard watchkeeping principles are correctly implemented when taking over bridge watch from officer of the watch
- 2.5 Appropriate action is taken to initiate search and rescue procedures on receipt of a distress signal
- 2.6 Appropriate advice is given to watchkeepers and correct actions are implemented regarding a response to navigational or operational emergency situations
- 3 Maintain watchkeeping records**
- 3.1 Relevant information is documented in required records
- 3.2 Action is taken to ensure deck log book and other required records are maintained in an appropriate manner
- 3.3 Required records are filed and stored according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Principles include one or more of the following:
- ensuring proper watch is maintained at all times, including correct response to avoiding collision and maintaining safe navigation of vessel passage
  - making appropriate assistance available to be summoned to

	<ul style="list-style-type: none"> <li>bridge if required by change in vessel situation</li> <li>taking all necessary precautions to avoid pollution of marine environment</li> </ul>
Responsibility for safety of navigation must include:	<ul style="list-style-type: none"> <li>periods under pilotage</li> <li>periods when Master is on bridge</li> </ul>
Fatigue management strategies include one or more of the following:	<ul style="list-style-type: none"> <li>arranging assistance for watchkeepers when symptoms of fatigue are identified</li> <li>ensuring avoidance of excessive consumption of alcohol prior to watchkeeping duties</li> <li>following appropriate dietary habits</li> <li>maintaining personal fitness and health</li> <li>planning appropriate actions when un-fatigued personnel are not available</li> <li>recognising symptoms of fatigue</li> </ul>
Emergency situations include one or more of the following:	<ul style="list-style-type: none"> <li>cargo shift</li> <li>distress signal</li> <li>dragging anchor</li> <li>entry into confined spaces</li> <li>failure of bridge equipment, steering equipment, navigational lights</li> <li>fire</li> <li>fog and restricted visibility</li> <li>fouled hawse</li> <li>heavy weather</li> <li>intoxicated persons on board vessel</li> <li>loss of: <ul style="list-style-type: none"> <li>main engines</li> <li>mooring lines or winches when berthing</li> <li>watertight integrity</li> </ul> </li> <li>person overboard</li> <li>personnel working aloft or overside</li> <li>possible collision</li> <li>retrieval of survivors from water</li> <li>stranding</li> <li>sudden list or loll</li> <li>synchronous rolling</li> </ul>

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARH5001A Apply command navigation procedures on vessels limited by tonnage or near coastal operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH007 Apply command navigation procedures on vessels limited by tonnage or near coastal operations**

## **Modification History**

Not applicable.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing:
  - circumstances requiring Master to call for assistance from a second qualified watchkeeper
  - necessary action when called to bridge by officer of watch
- briefing officers of watch on passage plan and their watchkeeping duties
- communicating effectively with other personnel when managing safe navigational watchkeeping activities
- complying with mandatory rules, regulations and International Maritime Organization (IMO) Conventions and Codes, including relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders and ensuring codes, guidelines and standards recommended by IMO, classification societies and maritime industry organisations are taken into account
- conducting emergency procedures
- determining:
  - actions to take with respect to executing passage plan
  - most important watchkeeping task at any given time
- ensuring established passage plan is correctly carried out
- exchanging information with pilot about pilotage plan and conduct of bridge team
- managing watchkeeping arrangements while underway, when berthed or moored, when slipped or in dry dock, during routine or unplanned events.
- performing pilotage duties, where permitted
- providing leadership to bridge team
- recognising and adapting appropriately to cultural differences in the workplace, including modes of behaviour, and interactions and communication with others
- recognising situations warranting alterations to bridge team, including situations where vessel is under pilotage
- solving problems that may arise when managing bridge team
- taking prompt action to report and/or rectify watchkeeping incidents according to established procedures

- using available technology when managing navigational watchkeeping activities.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- applicable legislation, regulations and codes of practice
- bridge watch handover procedures
- causes of groundings, collisions and casualties when on board vessel
- documentation and records, including:
  - operational orders
  - Master standing and night orders
  - established passage plan
  - navigational charts
  - relevant maritime regulations as they relate to watchkeeping functions and operations during a coastal voyage
  - vessel log
  - company safety management system (SMS)
  - instructions of relevant maritime authorities
- range of factors that can affect watchkeeping functions on vessels under 500 GT and their implications, including:
  - maintaining proper lookout by all available means at all times
  - need to adhere to established passage plan
  - never leaving the bridge unattended
  - weather and sea conditions, visibility and whether there is daylight or darkness
  - proximity of navigational hazards
  - use and operational condition of navigational aids
  - operational status of bridge instrumentation, controls and alarms
  - provision on bridge of unmanned machinery space (UMS) controls, alarms and indicators
  - unusual demands on navigational watch arising from operational conditions
  - traffic density and other activities occurring in area in which vessel is navigating
  - size of vessel and field of vision available from conning position
  - attention necessary when navigating in or near traffic separation schemes or other routing measures
  - rudder and propeller control and vessel manoeuvring characteristics
- fatigue management principles and techniques
- navigational aids including:
  - compass and azimuth mirror
  - electronic navigation systems
  - radar

- electronic charts
- navigational hazards during voyage and implications for watchkeeping
- precautions necessary when navigating in or near traffic separation schemes or other routing measures
- principles for maintaining a safe navigational watch on vessels with potentially limited qualified personnel
- principles of bridge team management
- International Regulations for Preventing Collisions at Sea
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARH008 Plan and conduct a passage

### Modification History

Not applicable.

### Application

This unit involves the skills and knowledge required to plan and conduct a passage and to determine position on a vessel using a range of bridge equipment, and to evaluate meteorological information to inform passage planning.

This unit applies to a Watchkeeper Deck, a Master up to 500 gross tonnage or a Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

H – Navigation

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Plan passage**

- 1.1 Navigational charts, nautical publications and related documentation are selected for the area of navigation and corrected according to the latest information available
- 1.2 Information from charts and publications is interpreted and applied to accurately identify potential navigational hazards relevant to the proposed voyage



- 1.3 State of the tide at specified locations is determined and findings are applied to the passage plan
- 1.4 Route for voyage is determined and critical points along the proposed route of voyage are identified and plotted
- 1.5 Accurate calculations and measurements of navigational information are made
- 1.6 Meteorological information is obtained and interpreted, and weather and sea condition hazards relevant to the proposed voyage are identified prior to departure
- 1.7 Route is modified as required to take into account weather and sea condition hazards
- 1.8 Planned route for voyage is recorded according to organisational and regulatory requirements
- 2 Conduct passage**
  - 2.1 Mode of steering is selected appropriate for the prevailing weather, sea and traffic conditions and intended manoeuvres
  - 2.2 Measurements and observations of sea and weather conditions are used to determine vessel speed and direction
  - 2.3 Information from bridge equipment is interpreted to identify navigational hazards and fix vessel position
  - 2.4 Alterations to vessel course or speed are made to meet prevailing circumstances and changing conditions
  - 2.5 Navigational manoeuvres are conducted within safe operational limits of vessel
  - 2.6 Details of passage are recorded in vessel log according to regulations
  - 2.7 Variations to planned route are documented prior to archiving on completion of the voyage
- 3 Fix vessel position**
  - 3.1 Primary position fixing method is selected according to prevailing circumstances and conditions
  - 3.2 Position is fixed using selected method and information derived from relevant wheelhouse equipment
  - 3.3 Position is determined within limits of acceptable instrument/system errors

- |  |     |   |
|--|-----|---|
|  | 3.4 | Position is recorded on a navigational chart according to regulatory requirements   |
|  | 3.5 | Fixes are taken at time intervals appropriate for prevailing navigational conditions  |
|  | 3.6 | Reliability of information obtained from primary method of position fixing is checked at appropriate intervals  |
|  | 3.7 | Performance checks of position fixing instruments and wheelhouse equipment are carried out according to organisational procedures and manufacturer instructions |
| <b>4 Determine appropriate action to take with respect to plotted position</b> | 4.1 | Assessment of the set, drift and leeway being experienced by the vessel is made   |
|  | 4.2 | Course is adjusted to maintain or resume planned route where the position indicates a deviation has occurred  |
|  | 4.3 | Dead reckoning (DR) and/or estimated position (EP) is projected along planned route according to the course made good between previously observed positions     |
| <b>5 Analyse navigational system performance</b>                               | 5.1 | Theoretical performance of navigational system is determined  |
|  | 5.2 | Measurement equipment is selected, and checks and tests are conducted   |
|  | 5.3 | Data is analysed and theoretical performance is checked with actual performance   |
|  | 5.4 | Significance of variation between theoretical and actual performance is determined  |
|  | 5.5 | Appropriate action is taken to bring performance to acceptable instrument/system errors   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Navigational charts, nautical publications and related documentation include one or more of the following:	<ul style="list-style-type: none"><li>• electronic chart display systems</li><li>• Nautical Almanac</li><li>• nautical tables</li><li>• Notices to Mariners</li><li>• paper charts</li><li>• radio navigational warnings</li><li>• sailing directions</li><li>• temporary warning notices</li><li>• tide tables</li><li>• vessel routing information</li><li>• weather reports and warnings</li></ul>
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Navigational hazards include one or more of the following:	<ul style="list-style-type: none"><li>• restricted visibility</li><li>• shallow ground</li><li>• traffic</li><li>• unlit beacons</li></ul>
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Mode of steering includes one or more of the following:	<ul style="list-style-type: none"><li>• automatic pilot</li><li>• electric systems</li><li>• hydraulic systems</li></ul>
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Conditions include one or more of the following:	<ul style="list-style-type: none"><li>• buoyage</li><li>• overall passage plan requirements</li><li>• prevailing weather and sea conditions</li><li>• proximity and course of other vessels</li><li>• relevant navigational hazards</li><li>• signage</li></ul>
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Primary position fixing	<ul style="list-style-type: none"><li>• celestial observations</li></ul>
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method includes one or more of the following:

- radar ranges or bearings
- radio navigation aids
- running fix
- simultaneous bearings or transits of coastal features
- soundings to determine position
- terrestrial observations

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARH5002A Plan and conduct a passage.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARH008 Plan and conduct a passage

## Modification History

Not applicable.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accurately measuring and observing weather conditions
- accurately preparing calculations and measurements of navigational information
- adjusting steering controls for optimum performance
- calculating courses using plane, mercator and great circle sailing methods
- changing over from manual to automatic control and vice versa
- checking reliability of information obtained from primary method of position fixing at appropriate intervals
- correctly interpreting and applying meteorological information
- determining errors in magnetic and gyro compasses, and correctly applying to courses and bearings
- determining errors of magnetic and gyro compasses using celestial and terrestrial means, and allowing for such errors
- determining vessel position by use of:
  - landmarks
  - aids to navigation including lighthouses, beacons and buoys
  - rising and dipping distances of lights and the use of horizontal angles
  - dead reckoning, taking into account winds, tides, currents and estimated speed
  - electronic navigational aids
- determining vessel position within the limits of acceptable instrument/system errors
- estimating position using dead reckoning
- interpreting nautical charts and publications
- maintaining charts and publications by applying up-to-date corrections to both paper and electronic charts and publications
- operating echo-sounders and applying the information correctly
- producing accurate and reliable information
- reading the aneroid barometer and interpreting the information obtained
- selecting mode of steering most suitable for prevailing weather, sea and traffic conditions and intended manoeuvres
- selecting most appropriate primary method of fixing vessel position for the prevailing circumstances and conditions

- using and interpreting information obtained from shipborne meteorological instruments
- using celestial bodies to determine vessel position
- using chart catalogues, charts, nautical publications, radio navigation warnings, sextant, azimuth mirror, electronic navigation equipment, echo-sounding equipment, compass
- using nautical charts and publications
- using meteorological information available.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic meteorological terms
- characteristics of the various weather systems, reporting procedures and recording systems
- charted information including that in the Title Block, Zones of Confidence Diagrams and Datums
- compass error from transit bearings or by bearings taken from a known position
- determining the times and heights of high and low water from Australian or local tide tables for any port and the relevance of chart datum
- effects of current and of leeway on the course and speed of the vessel (without calculations)
- finding the variation from the chart
- fixing vessel position by:
  - simultaneous bearings, transits of coastal features, and by running fix
  - radar ranges and bearings
- information given on a chart or plan
- interpreting the set and drift of the current from information available on the chart
- measuring distance on a chart
- meteorological instruments and their use
- nautical charts and publications
- plane, Mercator and great circle sailing concepts
- principles of magnetic and gyro compasses
- recognising the presence of either or both factors
- relating coastal features to a chart
- relationship between compass, magnetic, true and gyro courses and bearings
- relative bearings
- selection of suitable points for bearings
- sources of weather forecasts and the interpretation of that information
- steering control systems
- steering control systems operating procedures
- tropical revolving storms and weather associated with such storms
- use and limitations on the use of electronic position fixing equipment found on small vessels
- use of a deviation card without mathematical interpolation

- using a single position line to assist in clearing dangers
- using modern electronic navigational aids to determine vessel position
- using soundings in determining position
- using terrestrial observations to determine vessel position individually or in combination with other methods
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARH009 Use an electronic chart display and information system to navigate safely**

### **Modification History**

Not applicable.

### **Application**

This unit involves the skills and knowledge required to maintain safe navigation of a commercial vessel greater than 500 gross tonnage (GT) using an electronic chart display and information system (ECDIS).

This unit applies to a Watchkeeper Deck, a Master up to 500 GT, a Master up to 80 metres Near Coastal or a Master Unlimited.

This unit has links to legislative and certification requirements.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

H – Navigation

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                          |  |
|--------------------------|--|
| <b>1 Set up an ECDIS</b> | <b>1.1</b> ECDIS is initialised and programmed with own vessel data                                |
|                          | <b>1.2</b> Operational performance and accuracy of ECDIS is confirmed                              |
|                          | <b>1.3</b> Settings and values are adjusted to suit conditions for passage planning and navigation |



- |   |     |   |
|---|-----|---|
|   | 1.4 | Means of providing additional information is correctly interfaced with ECDIS  |
| <b>2 Use an ECDIS for passage planning and navigation</b> | 2.1 | ECDIS is used to assist in passage planning and the conduct of navigation   |
|   | 2.2 | Information on ECDIS is monitored to ensure safe navigation   |
|   | 2.3 | Information obtained from ECDIS is interpreted and analysed taking into account limitations of equipment, all connected sensors and prevailing circumstances and conditions |
|   | 2.4 | Position of vessel is confirmed by alternative means  |
|   | 2.5 | Safety of navigation is maintained through adjustments made to vessel course and speed  |
|   | 2.6 | System and position alarms are responded to, to maintain safety of navigation   |
|   | 2.7 | Situational awareness is maintained while using ECDIS   |
| <b>3 Maintain data</b>                                    | 3.1 | Data produced by ECDIS that should be retained to conform with organisational procedures and regulatory requirements is identified  |
|   | 3.2 | Data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements  |
|   | 3.3 | Security and access requirements for data are adhered to in accordance with organisational procedures   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential

operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

ECDIS must include:

- adequate and up-to-date back-up paper charts
- adequate and up-to-date electronic charts
- back-up systems
- electronic position fixing system
- gyro and log
- raster charts
- uninterruptable power supply
- vector electronic chart systems

Settings include one or more of the following:

- alarm parameters for anti-grounding
- back-up arrangements
- chart update status
- completeness of chart data
- proximity to contacts and special areas

Additional information must include:

- automatic identification system (AIS) input
- radar/automatic radar plotting aid (ARPA) input

Information includes one or more of the following:

- chart data displayed
- contacts
- mode and orientation
- own position
- radar overlay functions
- radar tracking
- route monitoring
- sea area display
- user-created information layers

System and position alarms must include:

- approach to waypoint, critical point, navigation danger and other ships
- chart alarms
- depth and contour alarms
- mode losses

- primary failure

Situational awareness includes one or more of the following:

- chart data and scale selection
- contact detection and management
- integrity of sensors
- safe water and proximity of hazards
- set and drift
- suitability of route

Data includes one or more of the following:

- chart correction information
- electronic navigational chart (ENC) source, date and edition
- vessel voyage details

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARH5003A Use an electronic chart display and information system to navigate safely.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH009 Use an electronic chart display and information system to navigate safely**

## **Modification History**

Not applicable.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adjusting settings and values to suit present conditions
- conducting tests for malfunctions including functional self testing and interpreting the test results
- confirming vessel position by alternative means
- ensuring integrity of back-up systems
- ensuring integrity of data
- maintaining situational awareness while using electronic chart display and information system (ECDIS)
- operating ECDIS when interfaced with automatic identification system (AIS) and interpreting AIS data
- operating, interpreting and analysing information:
  - when radar and automatic radar plotting aid (ARPA) is connected to ECDIS
  - obtained from ECDIS
- operating, interpreting and analysing information
- planning a passage on a display using ECDIS
- safely monitoring and adjusting information
- setting up initial display and maintaining display
- using functions that are integrated with other navigation systems in various installations
- using settings efficiently to ensure conformance to operational procedures.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- correcting and updating charts by manual, semi automatic and automatic systems
- dangers of over-reliance
- differences between vector and raster charts
- differences between ECDIS, ECS and raster chart display system (RCDS)
- functions of ECDIS required by performance standards in force
- principles, capability and limitations of ECDIS operations

- requirements for voyage recording
- significance of chart alarms and indicator warnings
- use of ECDIS in emergency situations
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARH010 Use bridge equipment to determine vessel position

## Modification History

Not applicable.

## Application

This unit involves the skills and knowledge required to maintain safe navigation of a vessel through the use of radar and other bridge equipment to determine vessel position.

This unit applies to a Watchkeeper Deck, a Master up to 500 gross tonnage (GT), a Master up to 80 metres Near Coastal or a Master Unlimited.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

H – Navigation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Set up bridge equipment

- 1.1 Bridge equipment is initialised and displays are set up and maintained
- 1.2 Operational performance and accuracy of bridge equipment is confirmed and appropriate action is taken when performance is out of limits
- 1.3 Any false echoes and misrepresentations are detected, identified and rejected

- |  |   |
|--|---|
| <b>2 Use radar to safely navigate</b>            | <ul style="list-style-type: none"><li>2.1 Radar is operated according to manufacturer instructions to produce data on position of vessel, other vessels and fixed objects</li><li>2.2 Radar plot is constructed on radar plotting sheet and automatic plotting devices are initialised</li><li>2.3 Systematic radar observations of vessels in the vicinity are made and risk of collision is determined</li><li>2.4 Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers</li><li>2.5 Radar bearings are corrected for vessel heading and compass error as appropriate</li><li>2.6 Adjustments are made to vessel course and speed to maintain safety of navigation</li><li>2.7 Manoeuvring signals are made at appropriate time according to regulations</li></ul> |
| <b>3 Use bridge equipment to safely navigate</b> | <ul style="list-style-type: none"><li>3.1 Bridge equipment is safely and efficiently used to conduct navigation of vessel</li><li>3.2 Position of vessel is monitored during voyage to ensure planned passage is followed</li><li>3.3 Movements of vessels in the vicinity are monitored to ensure collision situations do not occur</li><li>3.4 Adjustments are made to vessel course and speed to maintain safety of navigation</li><li>3.5 Manoeuvring signals are made at appropriate time according to regulations</li><li>3.6 Bridge equipment is maintained according to manufacturer requirements and organisational procedures</li></ul>   |
| <b>4 Maintain navigational records</b>           | <ul style="list-style-type: none"><li>4.1 Navigational data produced by bridge equipment that should be retained to conform with organisational procedures and regulatory requirements is identified</li><li>4.2 Navigational data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements</li><li>4.3 Security and access requirements for data are adhered to</li></ul>   |

according to organisational procedures

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Bridge equipment includes one or more of the following:
- automatic identification systems
  - automatic pilot
  - automatic radar plotting aid (ARPAs)
  - azimuth mirrors and other bearing measurement devices
  - bridge alarm systems
  - chronometer
  - electronic chart display and information system (ECDIS)
  - echo sounder
  - differential satellite navigation systems
  - doppler and electro-magnetic speed logs
  - integrated navigation systems
  - Loran C navigation systems
  - magnetic and gyro compasses including rate of turn gyro
  - navigation light systems
  - radar
  - satellite navigation systems
  - sextant
  - signalling devices
  - voyage data recorders



Misrepresentations

includes one or more of the following:

- compass errors
- false echoes
- incorrect radar settings for heading marker and range marker
- incorrect setting up of electronic chart system (ECS) or ECDIS
- incorrect setting up of satellite navigation systems
- satellite and differential satellite navigation system errors
- sea and rain clutter returns

Navigational data includes one or more of the following:

- navigation safety warning
- recording of courses steered
- weather and oceanographic reports

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARH5004A Use bridge equipment to determine vessel position.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH010 Use bridge equipment to determine vessel position**

## **Modification History**

Not applicable.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- clearly and concisely communicating at all times in a seamanlike manner
- correctly interpreting and analysing information obtained from radar and automatic radar plotting aids (ARPAs) taking into account the limitations of equipment and prevailing circumstances and conditions
- correctly interpreting information received from other bridge equipment and applying appropriate corrections
- determining latitude by meridian altitude
- making adjustments to vessel course and speed to maintain safety of navigation
- making decisions to amend course or speed in a timely manner according to accepted navigation practice
- making manoeuvring signals at the appropriate time according to International Regulations for Preventing Collisions at Sea
- planning and conducting celestial observations using a sextant and plotting a position
- taking action to avoid close encounter or collision according to International Regulations for Preventing Collisions at Sea.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- ARPA system performance and accuracy, tracking capabilities, limitations and processing delays
- course and speed of other vessels
- critical echoes, exclusion areas and trial manoeuvres
- detecting course and speed changes of other vessels
- detection of misrepresentation of information, false echoes, sea and rain clutter etc., racons and search and rescue transponders (SARTs)
- effect of changes in own vessel course and speed or both
- factors affecting performance and accuracy of radar and other navigational equipment
- fundamentals of radar and ARPAs

- ground and sea stabilisation and their effects on ARPA data
- identification of critical echoes
- International Regulations for Preventing Collisions at Sea
- meeting overtaking vessels
- methods of position fixing using celestial observations with a sextant
- methods of target acquisition and their limitations
- parallel indexing
- plotting techniques and relative- and true-motion concepts
- principal types of ARPAs, their display characteristics, performance standards and the consequences of over reliance on ARPAs
- range and bearing by radar
- sea and ground stabilisation and their effect on ARPA data
- setting up and maintaining displays on radar
- time, distance and bearing of closest point of approach of a closing vessel
- true and relative vectors, graphic representation of target information and danger areas
- use of operational warnings and system tests
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARH011 Forecast weather and oceanographic conditions to plan a safe passage

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to forecast weather and oceanographic conditions to plan a safe passage.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

H – Navigation

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Forecast area weather

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Synoptic chart is interpreted and recorded

1.2 Information received by weather fax is interpreted and recorded

- 1.3 Weather reports are obtained, interpreted and recorded
- 1.4 Observations of weather and cloud formations are made, interpreted and recorded
- 1.5 Statistical data and observations are used to predict likely weather conditions for a determined period
- 2 Use information to predict oceanographic conditions**
  - 2.1 Information on ocean current systems is interpreted and recorded
  - 2.2 Nautical publications on tides and currents are used to calculate tidal conditions
  - 2.3 Wave height and swell forecast is made using available information
  - 2.4 Potentially dangerous oceanographic conditions are identified and appropriate action is taken to maintain safety of navigation and to minimise risk to safety of vessel
- 3 Maintain records of weather and oceanographic information and forecasts**
  - 3.1 Statistical data and observations are recorded and filed according to organisational procedures
  - 3.2 Actions taken to maintain safety of navigation and to minimise risk to safety of vessel as a result of weather and oceanographic forecasts, are documented according to organisational procedures
  - 3.3 Meteorological and nautical publications are updated and stored according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Weather conditions include one or more of the following:

- air masses and fronts
- cloud classifications
- cyclones, storms and gales
- heat exchange process
- ocean currents
- pressure systems and cold fronts
- sea state
- synoptic chart analysis
- tide prediction
- tropical revolving storms
- use of tide tables
- vertical division of the atmosphere
- weather data provided by shipboard instruments

Dangerous oceanographic conditions include one or more of the following:

- excessively high sea state and swells
- ice formations
- tornados, tropical revolving storms, hurricanes and gales

Appropriate action includes one or more of the following:

- avoiding storm centres and dangerous quadrants by adjusting course and speed
- ensuring all crew and passengers are informed
- ensuring all vessel equipment is properly secured
- securing cargo and stores
- taking action to avoid extreme adverse weather conditions

## Unit Mapping Information

This unit replaces and is equivalent to MARH6001A Forecast weather and oceanographic conditions to plan a safe passage.

MARH6001A replaces and is equivalent to TDMMH907B Forecast weather and oceanographic conditions.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH011 Forecast weather and oceanographic conditions to plan a safe passage**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- calculating tidal conditions
- ensuring currency of relevant reference material
- observing, interpreting and forecasting weather and oceanographic conditions
- reading, interpreting and applying weather and oceanographic information
- selecting and using shipboard instruments to assist in forecasting weather and oceanographic conditions
- supporting reasons for intended action with statistical data and observations of actual conditions
- using appropriate nautical publications on tides and currents
- using tide tables to calculate height of tide.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- air masses and fronts
- basic principles for making meteorological and oceanographic measurements
- characteristics of various weather systems including tropical revolving storms, and avoidance of storm centres and dangerous quadrants
- cloud classifications
- cyclones, storms and gales
- effects on navigation and vessel handling of wind, currents and bottom topography
- heat exchange process
- ocean currents
- pressure systems and cold fronts
- principles and procedures of weather forecasting using information obtained from observations, charts, satellite images, reports and instruments
- procedures for filing and maintaining weather and oceanographic information
- procedures to be followed during gale conditions and tropical revolving storms
- sea state
- sources of weather and oceanographic information, and methods for their interpretation
- synoptic chart analysis
- tide prediction
- tropical revolving storms
- typical problems in forecasting weather and oceanographic conditions
- use of tide tables
- vertical division of the atmosphere
- weather data provided by shipboard instruments
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including synoptic chart, weather reports, workplace procedures, regulations, codes of practice, operation manuals, meteorological and nautical publications
- shipboard instruments, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARH012 Manage the navigation of a vessel 500 gross tonnage or more**

### **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### **Application**

This unit involves the skills and knowledge required to manage the planning of a voyage and the navigation of a vessel of 500 gross tonnage or more.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

H – Navigation

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

#### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Oversee development of passage plan**

#### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Requirements of passage are established

1.2 Reasons for planned route are supported by facts and statistical data obtained from relevant sources and

publications

1.3 Positions, courses, distances and time calculations are checked for correctness within accepted accuracy standards for navigational equipment

1.4 Potential navigational hazards are accurately identified

## **2 Develop and implement watchkeeping arrangements and procedures**

2.1 Watchkeeping arrangements and procedures are developed according to bridge resource management principles, and organisational and regulatory requirements

2.2 Bridge resource management principles are appropriately applied in establishing watchkeeping arrangements and procedures and in developing an effective bridge working system

2.3 Communications strategies are developed to link watchkeeping procedures with all aspects of vessel operations

2.4 Fatigue management strategies are developed according to organisational and regulatory requirements

2.5 Corrective action procedures are developed and monitored

2.6 Procedures for reporting, recording and responding to emergencies and non-compliance are established

## **3 Monitor bridge team in implementing passage plan**

3.1 Work schedule for bridge team is detailed according to bridge resource management principles

3.2 Risk control measures are evaluated against passage plan

3.3 Navigation requirements are communicated to bridge team

3.4 Individuals are fully briefed and responsibilities are coordinated

3.5 Navigation tasks are carried out according to passage plan

3.6 Ongoing checks and position determination are conducted according to organisational procedures

3.7 Non-routine problems related to navigation of vessel are

solved

3.8 Navigational data is signed off according to organisational procedures

3.9 Work schedule for bridge team is detailed according to bridge resource management principles

#### **4 Interpret and evaluate information from electronic navigational system**

4.1 Data from radar plotting sheet is interpreted and analysed to anticipate potential collisions

4.2 Data produced by other electronic navigational aids is interpreted and used to assist navigational command decisions, taking into account known limitations and errors associated with each type of aid

4.3 Information obtained through a single vessel or multiple vessel analysis of radar plots or other electronic navigational data is used to make command decisions on action needed to avoid collisions

4.4 Radar data is used to obtain position fix for vessel using electronic bearing lines and variable range markers

#### **5 Navigate in complex situations**

5.1 Measurements and observations of sea and weather conditions are used to determine vessel speed and direction in complex situations

5.2 Information from bridge equipment is interpreted to identify navigational hazards and to fix vessel position

5.3 Nautical publications on tides and currents are used to calculate tidal conditions

5.3 Alterations to vessel course or speed are made to meet prevailing circumstances and changing conditions

5.4 Navigational manoeuvres are conducted within safe operational limits of vessel

5.5 Details of passage are recorded in vessel log according to regulations

5.6 Variations to planned route are documented prior to archiving, on completion of voyage

#### **6 Manage emergencies**

6.1 Bridge team is taken charge of when called to bridge in response to an emergency

6.2 Safety management system (SMS) procedures are

implemented when taking over bridge watch from officer of the watch

6.3 Appropriate action is taken to initiate search and rescue procedures on receipt of distress signal

6.4 Advice is provided to watchkeeper regarding response to emergency situations

## **7 Maintain navigational equipment**

7.1 Navigational charts, nautical publications and related documentation are stored and maintained according to organisational procedures

7.2 Inventory of navigational charts, nautical publications and related documentation is established and kept according to organisational procedures

7.3 Navigational charts, nautical publications and related documentation are ordered and updated from relevant sources to ensure available data needed for voyage planning is current

7.4 Performance checks and tests of navigation position fixing instruments and systems are carried out according to organisational procedures and manufacturer instructions

## **8 Prepare reports and documentation relevant to passage**

8.1 Passage information is recorded and reported in required format, style, structure and timeframe

8.2 All information is recorded and reported according to legislative requirements

8.3 Technology is used to store and retrieve information

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Sources and publications include one or more of the following:

- Australian Maritime Safety Authority (AMSA) Marine Orders
- annual and weekly notices to mariners
- nautical almanac
- navigational chart availability
- radio signals, light lists, sailing directions, tide tables and chart catalogues
- ship reporting systems and requirements
- ship's routing information
- SMS procedures

Watchkeeping arrangements include:

- clear instruction to watchkeeping officers in the Standing Orders from the Master
- establishing a proper lookout separate from the helmsman
- fatigue management strategies
- hours of work schedule established to ensure correct rest periods are maintained
- watch handover procedures

Emergencies include:

- engine failure
- failure of navigational equipment
- potential close quarter situations

Position determination includes one or more of the following:

- azimuth mirrors
- chronometer
- doppler and electronic logs
- echo sounders
- electronic chart system (ECS) and electronic chart display and information system (ECDIS) systems
- integrated navigation systems
- magnetic and gyro compasses and repeaters
- paper navigational charts
- radar and other electronic navigation devices
- sextant

Non-routine problems include one or more of the following:

- equipment failure
- lack of appropriate resources
- potential collision and emergency situations
- weather conditions precluding the establishment of vessel position

Complex situations include one or more of the following:

- adverse weather
- areas of extensive tidal effects
- ice
- restricted visibility

- restricted waters
- traffic separation schemes
- vessel traffic service (VTS) areas
- when summonsed to the bridge by the duty officer

## Unit Mapping Information

This unit replaces and is equivalent to MARH6002A Manage the navigation of a vessel 500 gross tonnage or more.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARH012 Manage the navigation of a vessel 500 gross tonnage or more

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- assessing accuracy of fix properly
- calculating positions, courses, distances and time correctly, within accepted accuracy standards for navigational equipment
- calculating tidal conditions to determine under keel clearances and air drafts
- choosing the most appropriate primary method for fixing vessel position given the prevailing circumstances and conditions
- conducting performance checks of navigation position fixing instruments and systems
- determining and allowing for errors of magnetic and gyro-compass
- determining position in all conditions by celestial observations and terrestrial observations, and using modern navigational aids within accepted accuracy levels
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring currency of relevant reference material
- enumerating the equipment, charts and nautical publications required for the voyage and appropriate to the safe conduct of the voyage
- establishing and maintaining watchkeeping arrangements in compliance with international regulations and guidelines so as to ensure the safety of navigation, protection of the marine environment, and the safety of the vessel and persons on board
- identifying all potential navigational hazards accurately
- planning and navigating a voyage for all conditions including restricted waters, meteorological conditions, ice, restricted visibility, traffic separation schemes, vessel traffic service (VTS) areas and areas of extensive tidal effects
- recognising faulty equipment and readings, and taking appropriate action
- recognising problems that may be experienced when planning and navigating a passage, and taking appropriate action
- reporting according to General Principles for Ship Reporting Systems and VTS procedures
- supporting reasons for planned route using facts and statistical data obtained from relevant

sources and publications

- undertaking routing according to the General Provisions on Ships' Routing
- using chart catalogues, charts, nautical publications and vessel particulars to plan and navigate a passage.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- Australian Maritime Safety Authority (AMSA) Watchkeeping Standards (including the Manila Amendments)
- content, application and intent of bridge resource management principles to be observed in keeping a navigational watch
- content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended
- General Principles for Ship Reporting Systems
- General Provisions on Ships' Routing
- method and frequency of checks for errors of magnetic and gyro-compasses to ensure accuracy of information
- methods for fixing position of a vessel
- modern electronic navigational aids, their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing
- operation and care of the main types of gyro-compass
- principles of magnetic and gyro-compasses
- problems experienced when fixing vessel position and appropriate action and solutions
- procedures for filing and maintaining navigational charts, nautical publications and related documentation in serviceable condition
- procedures for swinging a vessel to determine deviation
- relevant AMSA Marine Orders
- requirements for effective passage planning including contingency planning
- systems under control of the master gyro
- vessel reporting systems and their use in planning and conducting a voyage
- voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks
- VTS procedures
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- navigational charts, nautical publications, AMSA Marine Orders and related documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARH013 Plan and navigate a passage for a vessel up to 12 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to conduct the passage of a vessel up to 12 metres within the 15 nautical mile (nm) limit; it includes using the range of equipment found on a vessel to plan and safely conduct the passage.

This unit applies to people working in the maritime industry commanding, and operating the engines of, a commercial vessel:

- <12 m in length with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine
- in inshore waters or designated waters
- as a tender or auxiliary vessel within 3 nm of a parent vessel within the exclusive economic zone (EEZ).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012

## **Pre-requisite Unit**

Not applicable

## Competency Field

H – Navigation

## Unit Sector

Not applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan passage

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Appropriate charts and publications are accessed and checked for currency
- 1.2 Destination is identified, and course and waypoints are plotted
- 1.3 Estimated time of arrival (ETA) at waypoints and final destination are calculated
- 1.4 Safe passage is plotted to comply with all navigational buoys, marks and beacons
- 1.5 Navigational hazards are identified to avoid dangers to vessel
- 1.6 Weather information is accessed to determine expected weather pattern for intended passage
- 1.7 Proposed course is modified as necessary, to meet expected weather conditions
- 1.8 Fuel consumption for passage, including a reserve, is calculated

#### 2 Conduct a pre-departure check

- 2.1 Propulsion equipment and alarms are tested for serviceability and vessel hull is checked for seaworthiness
- 2.2 Navigation equipment and alarms are checked to ensure they are in proper working condition and set for the passage
- 2.3 Navigation equipment is checked for errors and

allowances are made in planning the passage

**2.4** Fuel is checked to ensure there is adequate fuel on board for intended passage

**2.5** Safety equipment is checked for compliance with legislation

**2.6** Communications equipment is checked to ensure it is in proper working condition

**2.7** Anchoring and mooring equipment is checked to ensure it is adequate and in good condition

**2.8** Vessel and equipment are secured for sea

### **3 Conduct passage**

**3.1** Local authorities are advised of departure and passage plan

**3.2** Vessel is steered and propulsion equipment is operated in a safe and controlled manner to complete pre-planned course

**3.3** Pilotage techniques and navigational equipment are used to monitor vessel position and maintain vessel in safe waters at all times

**3.4** Errors detected with navigational equipment are corrected to maintain planned passage

**3.5** Navigational buoys, marks and beacons are identified and complied with

**3.6** Situational awareness is maintained to avoid navigational hazards and to comply with regulations for prevention of collision at sea

**3.7** Weather and sea conditions are monitored during passage and correct adjustments are made for changing conditions

### **4 Complete passage**

**4.1** Local authority is advised of completion of passage

**4.2** Vessel is checked to ensure it is securely moored

**4.3** Propulsion equipment is checked to ensure it is safely shut down and secured

**4.4** Navigational equipment is switched off

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARH001 Plan and navigate a passage for a vessel up to 12 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARH013 Plan and navigate a passage for a vessel up to 12 metres

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying International Regulations for Preventing Collisions at Sea
- applying weather information during passage planning and explaining expected weather patterns
- conducting a pre-departure check of:
  - anchoring and mooring equipment
  - communications equipment
  - engine controls and alarms
  - fuel
  - navigation equipment and alarms
  - safety equipment
- correctly interpreting weather information received
- establishing relationship between degrees and minutes of latitude, with nautical miles
- explaining impact of tidal variation on charted depths
- identifying and complying with all navigational buoys, marks and beacons
- identifying and responding to relevant proximity alarms
- identifying:
  - courses to steer between turning points
  - navigational hazards
  - times and heights of high and low water from local tide tables
- obtaining weather information applicable to an intended passage
- plotting the position derived from global positioning system (GPS)
- plotting visual bearings on a chart to derive a position
- relating information in forecasts to conditions expected for small vessels
- safely operating distress flares
- steering a pre-planned course.



## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken on receiving adverse weather report and on encountering heavy weather
- basic information contained in a navigation chart
- basic meteorological terms
- basic pilotage techniques
- chart information (symbols and abbreviations)
- coastal features
- cyclonic and storm development
- dangers of reliance on the use of GPS in coastal areas
- electronic aids and their limitations
- local weather patterns including features on a synoptic weather chart
- manoeuvring difficulties of larger vessels
- navigational hazards, including:
  - restricted visibility
  - shallow water
  - traffic
  - unlit beacons
- operational checks of radio equipment
- procedure for developing a passage plan, taking into account:
  - anticipated weather conditions
  - depths of water throughout the passage
  - estimated time of arrival (ETA) at destination
  - fuel consumption
  - navigation markers during the passage
  - navigational hazards
  - tidal information
- safety equipment including:
  - alarms and communication equipment
  - distress flares or pyrotechnics
  - emergency position indicating radio beacon (EPIRB)
  - firefighting equipment
  - lifejackets.
- sources and types of weather reports and warnings
- sourcing and applying chart corrections
- speed, distance and time calculations
- use of a compass and compass errors
- use of local tide tables
- work health and safety (WHS)/occupational health and safety (OHS) requirements.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including:
  - electronic or paper charts
  - notice to mariners
  - tide tables
- a commercial vessel  $\geq 5.0$  metres in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including:
  - navigation equipment
  - safety equipment.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARH014 Apply weather information when navigating inland waters as Master**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to predict meteorological conditions and apply them to ensure the safe navigation of a vessel. It includes interpreting and applying information obtained from observations, reports and instruments and forecasting weather for an intended inland waters passage using all available data. This unit applies to those working in the capacity of a Master on commercial vessels up to 24 m in length in inland waters.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters) as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## **Competency Field**

H – Navigation

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Obtain weather information**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Relevant weather forecasts are obtained from a range of sources and correctly interpreted

**1.2** Weather conditions are observed and correctly interpreted according to established nautical and meteorological practice

**1.3** Basic measurements of meteorological conditions are correctly made and recorded using established procedures

**1.4** Relevant meteorological charts, publications and related documentation are obtained, used, updated, stored and maintained

#### **2 Apply weather data to safe navigation**

**2.1** Weather condition hazards relevant to a proposed voyage are identified using relevant forecasts based on interpretation of meteorological observations, reports and measurements

**2.2** Voyage is modified as required to take into account weather and water condition hazards according to established navigational practice and operational instructions

#### **3 Maintain records of weather and oceanographic information**

**3.1** Meteorological measurements, observations, reports and forecasts are recorded and stored according to organisational procedures and regulatory requirements

**3.2** Actions taken to maintain safety of navigation and to minimise risk to safety of vessel as a result of weather and oceanographic forecasts, are documented according to organisational procedures

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH002 Apply weather information when navigating inland waters as Master.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH014 Apply weather information when navigating inland waters as Master**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- carrying out and interpreting weather observations
- completing required records and documentation
- reading, interpreting and applying weather information
- recognising problems that may occur when interpreting and applying weather information to navigation and taking appropriate action
- selecting and using relevant instruments and equipment to measure meteorological conditions, including:
  - anemometers
  - barometers
  - thermometers
- using weather forecasts to ensure safe navigation.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- air masses and cold and warm fronts
- basic principles of, and procedures for, interpreting meteorological information
- cloud classifications
- cyclones, storms and gales
- effects on navigation and vessel handling of wind, currents and bottom topography
- heat exchange process
- meteorological parameters:
  - air temperature
  - atmospheric pressure
  - cloud
  - pressure gradient and isobar patterns

- relative humidity
- visibility (in conditions of fog, mist, rain and snow)
- wind direction
- wind strength
- pressure systems
- principles of weather forecasting using information obtained from observations, reports and instruments
- procedures for applying forecast of likely weather and water conditions to the planning of a typical voyage
- procedures to be followed during gale conditions and cyclones, including the means of securing a vessel in a cyclone mooring
- sources and interpretation of weather data
- tropical meteorology
- vertical division of the atmosphere.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals, including:
  - notices and instructions of relevant maritime authorities
  - vessel log
  - weather reports, charts and satellite images
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including instruments and equipment for measuring and observing the weather.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARH015 Manage and maintain a navigational watch on board vessels up to 80 metres**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Application**

This unit involves the skills and knowledge required to apply the recommended principles to be observed in managing and maintaining a navigational watch on board vessels up to 80 m.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <35 m in length within the exclusive economic zone (EEZ) or
- master on vessels <80 m in inshore waters or
- chief mate or deck watchkeeper on vessels <80 m in length within the EEZ; and
- master on commercial vessels <24 m in length in inland waters.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters), Master <24m NC, Mate <80m NC and Master <35m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

### **Pre-requisite Unit**

Not Applicable



## Competency Field

H – Navigation

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Maintain watch on bridge when berthed or anchored**

- 1.1** Checks and inspections are scheduled to comply with organisational procedures and regulatory requirements
- 1.2** Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of vessel
- 1.3** Restrictions on access to vessel by non-authorised persons are followed according to organisational procedures and regulatory requirements
- 1.4** Internal and external communications systems are used according to organisational procedures

#### **2 Maintain watch on bridge when at sea**

- 2.1** Proper watch is maintained at all times according to organisational procedures and regulatory requirements
- 2.2** Lights, shapes and sound signals are correctly recognised and acted upon
- 2.3** Frequency and extent of monitoring traffic, vessel and environment are scheduled to conform with organisational procedures and regulatory requirements
- 2.4** Wheelhouse communication is maintained with other crew members on matters relevant to safety and integrity of vessel
- 2.5** Clear and concise wheelhouse communications are maintained and clarification is sought from or given to other crew members when watch information or instructions are not clearly understood

	<b>2.6</b>	Internal and external communications systems are used according to organisational procedures
	<b>2.7</b>	Log and record books are maintained according to regulatory requirements and organisational procedures
<b>3 Respond to potential emergency situations</b>	<b>3.1</b>	Watchkeeping problems and emergency situations are promptly reported to crew according to organisational procedures
	<b>3.2</b>	Distress signals are recognised and acted upon
	<b>3.3</b>	Appropriate action is taken to handle watchkeeping problems and emergency situations according to organisational procedures and regulatory requirements
<b>4 Manage crew performing watchkeeping and lookout duties</b>	<b>4.1</b>	Watchkeeping schedule is developed with due regard to crew qualifications, experience and organisational procedures
	<b>4.2</b>	Instructions are provided on watchkeeping and lookout requirements in relation to monitoring traffic, vessel and environment
	<b>4.3</b>	Clear and concise roles and responsibilities of watchkeeping team are established
	<b>4.4</b>	Effective communication is maintained with crew on matters relevant to safety and integrity of vessel
	<b>4.5</b>	Fatigue management strategies are correctly applied in allocating watchkeeping and lookout duties

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARH003 Manage and maintain a navigational watch on

board vessels up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARH015 Manage and maintain a navigational watch on board vessels up to 80 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with others about watchkeeping issues, arrangements and requirements, including:
  - verbal instructions relating to watchkeeping duties
  - written instructions, such as Master's standing orders and night orders
- interpreting and implementing procedures relevant to the role and responsibilities of watchkeeper
- maintaining situational awareness
- monitoring and anticipating hazards and risks that may arise during watchkeeping duties and taking appropriate action
- scheduling checks and inspections (rounds) of the vessel to include appropriate coverage, frequency and timing
- selecting and using appropriate internal and external communications equipment during watchkeeping duties
- using bridge equipment in normal and emergency situations on vessels up to 80 metres
- using internal and external communications systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action to be taken in the event of irregularities or abnormal conditions, including:
  - fog and restricted visibility
  - heavy weather, including cyclones
- application and intent of the International Ship and Port Facility Security (ISPS) Code as it applies to Australian coastal vessels and ports
- bridge instrumentation, controls and alarms relevant to the function of watchkeeper
- content, application and intent of the International Regulations for Preventing Collisions at Sea

- fatigue management principles, including:
  - maintaining personal fitness and health and appropriate dietary habits
  - observing appropriate hours of duty in a 24-hour period
  - observing policy concerning alcohol and or drug use prior to watchkeeping duties
  - recognising symptoms of fatigue
- functions and responsibilities of the wheelhouse team on board a vessel
- general provisions on ship routing
- identification and appropriate action in the event of emergency situations, including:
  - cargo shift
  - collision
  - fire
  - fouled hawse
  - grounding
  - injured crew or passenger
  - loss of watertight integrity
  - missing crew or passenger
  - person overboard
  - reception of a distress signal
  - retrieval of survivors from the water
  - synchronous rolling
- identification and appropriate action in the event of problems that may arise during watchkeeping, including:
  - dragging of anchor
  - failure of bridge equipment, steering equipment and navigational lights
  - loss of main engines or propulsion controls
  - loss of mooring lines or winches when berthing
  - machinery and bilge alarms
- International Association of Lighthouse Authorities (IALA) buoyage system A
- International Aeronautical and Maritime Search and Rescue Manual (IAMSAR)
- International Code of Signals
- lights, shapes and sound signals and their application, including:
  - alternative power source for lights
  - day time shapes for a vessel
  - emergency lights
  - means of making sound signals for a vessel up to 80 metres
  - navigation lights
- maritime communication techniques on board a vessel, including:
  - global maritime distress and safety system (GMDSS) equipment
  - radios
  - international single letter code flags

- navigational hazards and implications for watchkeeping
- procedures and communications used for coordinating search and rescue operations are in accordance with International Maritime Organisation (IMO) and National Standard for Commercial Vessels (NSCV) requirements
- procedures for assisting a vessel in search and rescue operations
- procedures for the relief, maintenance and handover of a watch
- procedures for the use of internal communications and alarm systems
- relevant sections of state and territory marine regulations and the NSCV, in particular Part E
- typical watchkeeping problems and emergency situations, and appropriate actions and solutions
- vessel traffic services
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including:
  - IAMSAR
  - International Regulations for Preventing Collisions at Sea
  - NSCV
- a commercial vessel  $\geq 7.5$  m in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARH016 Plan and navigate a passage for a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to plan and safely conduct a passage on a vessel up to 80 m, including obtaining and interpreting weather information and position fixing.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <35 m in length within the exclusive economic zone (EEZ) or
- master on vessels <80 m in inshore waters; and
- chief mate or deck watchkeeper on vessels <80 m within the EEZ.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master <24m NC, Mate <80m NC and Master <35m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## **Competency Field**

H – Navigation

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Plan passage

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Navigational charts, nautical publications and related documentation are accessed and checked for currency
- 1.2 Documentation is used to identify navigational hazards relevant to proposed voyage
- 1.3 Route for voyage is determined and critical points along proposed route of voyage are identified and plotted
- 1.4 Potential navigational contingencies and problems along planned route are identified and appropriate strategies for dealing with them are developed and recorded
- 1.5 Weather forecasts are obtained and interpreted, and weather and sea condition hazards relevant to proposed voyage are identified prior to departure
- 1.6 Route is modified as required to take into account weather and sea condition hazards
- 1.7 Planned route for voyage and strategies for dealing with critical situations and contingencies along route are recorded

#### 2 Conduct a pre-departure check

- 2.1 Propulsion steering equipment and alarms are tested for serviceability and vessel hull is checked for seaworthiness
- 2.2 Wheelhouse equipment and alarms are checked to ensure they are in proper working condition and set for passage
- 2.3 Wheelhouse equipment is checked for errors and allowances are made in planning passage
- 2.4 Fuel is checked to ensure that there is adequate fuel, including a reserve, on board for the intended passage



- 2.5** Safety equipment is checked for compliance with relevant legislation
  - 2.6** Communication equipment is checked to ensure it is in proper working condition
  - 2.7** Anchoring and mooring equipment is checked to ensure it is in proper working condition
  - 2.8** Vessel and equipment are secured for sea
  - 2.9** Latest weather information is obtained and interpreted, and proposed route is modified as required to take into account weather and sea condition hazards
- 3 Conduct passage**
  - 3.1** Local authorities are advised of departure and passage plan
  - 3.2** Mode of steering is selected appropriate for prevailing weather, sea and traffic conditions, and intended manoeuvres
  - 3.3** Weather forecasts and observations of sea and weather conditions are used to determine vessel speed and direction
  - 3.4** Information from wheelhouse equipment is interpreted to identify navigational hazards and fix vessel position
  - 3.5** Alterations to vessel course or speed are made to meet prevailing circumstances and changing conditions
  - 3.6** Navigational manoeuvres are conducted within safe operational limits of vessel
  - 3.7** Details of passage are recorded in vessel log according to regulations
- 4 Fix vessel position**
  - 4.1** Primary position fixing method is selected according to navigational principles and prevailing conditions
  - 4.2** Position is fixed using selected method and information derived from relevant wheelhouse equipment
  - 4.3** Position is recorded according to regulations
  - 4.4** Fixes are taken at time intervals appropriate for prevailing navigational conditions

- 4.5** Performance checks of position fixing instruments and wheelhouse equipment are carried out according to organisational procedures and manufacturer instructions

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARH004 Plan and navigate a passage for a vessel up to 80 metres.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARH016 Plan and navigate a passage for a vessel up to 80 metres

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying hazard avoidance techniques in passage planning
- applying variation and deviation to compass courses
- completing required records relevant to planning and navigating a passage
- conducting a pre-departure check, including:
  - anchoring and mooring equipment
  - communications equipment:
    - very high frequency (VHF) and high frequency (HF) radio
  - ensuring vessel and equipment are secured for sea
  - fuel
  - propulsion equipment and alarms
  - safety equipment:
    - distress flares or pyrotechnics
    - electronic position indicating radio beacon (EPIRB)
    - firefighting equipment
    - lifejackets
    - life rafts and hydrostatic release systems
  - steering equipment and alarms
  - vessel hull
  - wheelhouse equipment and alarms, including:
    - alarm devices including bilge, depth, off-course, radar range and watch alarms
    - automatic identification system (AIS)
    - automatic pilot
    - echo sounder
    - electronic charts
    - global navigation satellite system (GNSS) receiver
    - magnetic compasses

- plotters
- radar
- speed and distance log
- determining times and heights of:
  - high and low water from Australian tide tables for any port and the relevance of chart datum
  - tides at standard and secondary ports for any state of tide
- developing a passage plan taking into account:
  - anticipated weather conditions
  - courses to steer
  - depths of water throughout passage
  - estimated time of arrival (ETA) at destination
  - knowledge of navigation markers during passage
  - tidal information
- developing effective planning documents
- estimating position using dead reckoning
- fixing a vessel's position using:
  - electronic navigational systems
  - radar ranges or bearings
  - running fix
  - simultaneous bearings and transits of coastal features
- interpreting and applying tidal stream data
- laying off a safe course on a chart
- maintaining situational awareness
- observing and interpreting weather and sea state conditions
- producing accurate and reliable documentation
- reading and interpreting:
  - charts and other published information relevant to planning and navigating a passage
  - instrument and equipment readings relevant to planning and navigating a passage
- reading aneroid barometer and interpreting information obtained
- recognising and correctly responding to cross-track error resulting from effects of tide and wind
- recognising faulty navigation equipment and taking appropriate action according to operating instructions
- recognising problems that may be experienced when planning and navigating a passage
- selecting and using relevant equipment required for planning and navigating a passage
- selecting and switching between modes of steering
- using parallel indexing to maintain a required distance of a point of land
- using meteorological information available.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian tide tables and sailing directions
- basic meteorological terms
- effects of current and of leeway on course and speed of vessel (without calculations) and recognising the presence of either or both factors
- factors to be considered when conducting a passage, including:
  - buoyage
  - navigational hazards
  - overall passage plan requirements
  - prevailing weather and sea conditions
  - proximity and course of other vessels
- Great Barrier Reef and Torres Strait Vessel Traffic Service (REEFVTS) and Great Barrier Reef and Torres Strait Ship Reporting System (REEFREP)
- information given on a chart or plan, particularly buoyage, hazards to navigation, depth and nature of bottom, lights, tides and tidal streams
- interpreting set and drift of current from information available on chart
- measuring distance on a chart
- method of finding variation from chart
- modes of steering, including:
  - automatic pilot
  - emergency steering – manual, or electric or hydraulic
- Modernised Australian Ship Tracking and Reporting System (MASTREP)
- navigational charts, title block, Zone of Confidence diagrams and datums, nautical publications and related documentation, including:
  - electronic chart display and information systems (ECDISs)
  - Notice to Mariners
  - paper charts
  - temporary warning notices
  - tide tables
  - weather reports and warnings
- navigational hazards, including:
  - restricted visibility
  - shoals and reefs
  - traffic
  - unlit beacons
- obtaining bearings on small vessels
- ocean currents
- procedures to determine compass accuracy by methods appropriate to the standards of

- watchkeeping when beyond sight of land
- recognition of coastal features
- relating coastal features to a chart
- relationship between:
  - compass, magnetic, true and gyro courses and bearings
  - latitude and longitude
  - relative bearings
- selection of suitable:
  - anchorage or shelter
  - points for bearings
  - primary position fixing method
- sound signals, such as:
  - appropriate signals for alteration of course to port or starboard
  - danger warnings
  - moving astern
- sources of weather forecasts and interpretation of that information in simple terms
- traffic separation schemes
- use and application of ship routing services
- use and limitations on use of electronic position fixing equipment found on small vessels
- use of a deviation card without mathematical interpolation
- using a single position line
- using modern electronic navigational aids to determine vessel position
- using rhumb line navigation
- using soundings in determining position
- using terrestrial observations to determine vessel position individually or in combination with other methods
- weather, including:
  - air masses and cold and warm fronts
  - cloud classifications
  - conditions affecting Australian coast liable to endanger vessel
  - cyclones, storms and gales
  - effects on predicted tidal information
  - heat exchange process
  - pressure systems
  - sea state
  - synoptic chart analysis
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures, operational manuals, navigational charts, nautical publications and related documentation, including:
  - MASTREP and Australian Reporting Guide
  - Notice to Mariners
  - paper charts
  - REEFVTS User Guide
  - tide tables
  - weather reports
- a commercial vessel  $\geq 7.5$  m in length
- equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARH017 Use wheelhouse equipment for safe navigation

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to maintain safe navigation of a commercial vessel through the use of radar and other equipment used for the navigation of a vessel.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <35 m in length within the exclusive economic zone (EEZ) or
- master on vessels <80 m in inshore waters; and
- chief mate or deck watchkeeper on vessels <80 m within the EEZ.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master <24m NC, Mate <80m NC and Master <35m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) for AMSA certification as Master <24 m NC. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

H – Navigation



## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Set up wheelhouse navigation equipment

- 1.1 Wheelhouse navigation equipment is initialised and displays are set up and maintained
- 1.2 Operational performance and accuracy of wheelhouse equipment is confirmed and appropriate action is taken when performance is out of limits
- 1.3 Misrepresentation of information is detected and corrected or allowed for

#### 2 Use radar to navigate safely

- 2.1 Radar is operated according to manufacturer instructions to produce data on position and speed of vessel, other vessels and fixed objects
- 2.2 Radar plot is constructed on a radar plotting sheet or automatic plotting devices are initialised
- 2.3 Systematic radar observations of vessels in the vicinity are made where there is a risk of collision
- 2.4 Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers
- 2.5 Radar bearings are corrected for vessel heading and compass error as appropriate
- 2.6 Radar plotting data is analysed to anticipate potential collisions
- 2.7 Analysis is used to make informed command decisions on action needed to avoid collisions

#### 3 Use wheelhouse navigation equipment

- 3.1 Wheelhouse navigation equipment is safely and efficiently used to conduct navigation of the vessel
- 3.2 Position of vessel is monitored during voyage to ensure planned passage is followed

- |  |            |   |
|--|------------|---|
|  | <b>3.3</b> | Movement of vessels in the vicinity is monitored to ensure collision situations do not occur  |
|  | <b>3.4</b> | Wheelhouse navigation equipment is maintained according to manufacturer requirements and organisational procedures  |
| <b>4 Maintain navigational records</b> | <b>4.1</b> | Navigational data produced by wheelhouse navigation equipment that should be retained to conform with organisational procedures and regulatory requirements is identified |
|  | <b>4.2</b> | Navigational data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements   |
|  | <b>4.3</b> | Security and access requirements for data are adhered to according to organisational procedures   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARH005 Use wheelhouse equipment for safe navigation.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARH017 Use wheelhouse equipment for safe navigation

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- constructing a radar plot
- interpreting radar displays
- reading and interpreting service manuals and instructions for radar and other electronic navigational aids
- recognising faulty radar equipment and taking appropriate action
- recognising problems when using radar and other navigational aids, to maintain safe navigation, and taking appropriate action, including:
  - incorrect radar settings for heading marker and range marker
  - incorrect set up of electronic chart system (ECS)
  - incorrect set up of global navigation satellite system (GNSS) receiver
  - rain clutter
  - sea clutter
- setting up and operating an automatic radar plotting aid (ARPA)
- setting up and operating marine radar equipment on a vessel
- setting up and operating or using other navigational instruments and equipment on a vessel
- using radar to determine action to avoid a close-quarters situation or collision with another vessel in accordance with the International Regulations for the Prevention of Collision at Sea.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- different types of navigational aids, including their features, key applications and operational characteristics, including:
  - alarm devices, including off-course and watch alarms
  - automatic identification system (AIS)
  - automatic pilot
  - azimuth mirrors or pelorus

- coverage areas
- echo sounders
- ECS
- GNSS receivers
- magnetic and gyro compasses
- radar
- speed and distance indicators
- limitations and potential errors associated with each type of navigational aid
- methods for the interpretation and analysis of navigational data produced by radar and other navigational instruments
- navigation safety warnings
- procedures for the initialisation and operation of radar and other navigational instruments
- procedures for the use of data generated by radar and other navigational instruments
- process for identifying and storing navigation data
- radar plotting, including:
  - target's closest point of approach and time of closest point of approach
  - course and speed of other vessels
  - detecting course changes of other ships
  - effects of changes in own ships course and/or speed
- recognising problems when using radar and other navigational aids to maintain safe navigation, and taking appropriate action, including:
  - false echoes
  - global positioning system (GPS) or differential global positioning system (DGPS) errors
- recognising radar display of search and rescue transponders (SART) and racon signals
- recording courses steered
- relevant sections of state and territory regulations and National Standard for Commercial Vessels (NSCV) dealing with navigational equipment and the responsibilities of a Master or deck officer
- techniques for the use of radar and other navigational instruments
- terminology and principles of operation of radar and other navigation aids typically used on vessels
- using radar to assist in collision avoidance in accordance with International Regulations for the Prevention of Collision at Sea
- weather and oceanographic reports
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include

requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- a commercial vessel  $\geq 7.5$  m in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARI003 Comply with regulations to ensure safe operation of a vessel up to 12 metres**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Application**

This unit involves the skills and knowledge required to apply current Commonwealth, state and territory Acts, legislation, codes of practice and other publications pertaining to the safe operation of a vessel up to 12 m in length.

This unit applies to people working in the maritime industry commanding and operating the engines of a commercial vessel:

- <12 m in length
- with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine
- in inshore waters or designated waters or
- as a tender or auxiliary vessel within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 2 NC and a Coxswain Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, or deck officer, issued under the Navigation Act 2012.

### **Pre-requisite Unit**

Not Applicable

## Competency Field

I – Regulations and Port Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Determine relevant rules and regulations impacting on work practices**

**1.1** International Regulations for Preventing Collisions at Sea are comprehended and implemented

**1.2** Responsibilities as the person in charge of a vessel are identified and recorded

**1.3** Relevant Commonwealth, state, territory and local legislation governing the vessel and the passage are comprehended

#### **2 Comply with industry and professional codes of practice**

**2.1** Relevant industry and professional codes of practice are sourced

**2.2** Commitment to comply with industry and professional codes of practice is demonstrated through own behaviour

#### **3 Apply legislative and regulatory requirements to the operation of the vessel**

**3.1** Regulatory requirements relating to operational aspects of the vessel are recognised and appropriate procedures are developed

**3.2** Situations where rules must be applied in order to avoid collisions are recognised

**3.3** Safety requirements are implemented according to legislative and regulatory requirements

**3.4** Compliance with all relevant rules and legislation is demonstrated while operating the vessel

- |   |            |  |
|---|------------|--|
| <b>4 Identify changes in laws and regulations and their implications for vessel operation</b> | <b>4.1</b> | Changed legislation and regulations are accessed   |
|   | <b>4.2</b> | Changes in regulatory requirements are identified and applied  |
|   | <b>4.3</b> | Operational procedures are reviewed to reflect changes in legislation and regulations  |
| <b>5 Maintain statutory records</b>   | <b>5.1</b> | Copies of relevant records are maintained  |
|   | <b>5.2</b> | Evidence of current authorisation, training and relevant licences is maintained according to legislative and regulatory requirements |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARI001 Comply with regulations to ensure safe operation of a vessel up to 12 metres.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## Assessment Requirements for MARI003 Comply with regulations to ensure safe operation of a vessel up to 12 metres

### Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying regulations pertaining to the safe operation of a vessel
- applying safety management plan
- conducting inductions for crew
- demonstrating an understanding of the duties and responsibilities of a Coxswain
- obtaining and complying with information from Commonwealth, state and territory Acts, legislation, codes of practices and other publications relating to the safe navigation of a vessel.

### Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action that must be taken when assisting vessels in distress
- certificates on board a vessel
- contents of marine notices, annual notices to mariners
- distress signals
- duties and responsibilities of a Coxswain
- function of risk assessments
- International Association of Lighthouse Authorities (IALA) Buoyage System A
- International Regulations for Preventing Collisions at Sea, including:
  - large commercial traffic
- lifesaving and firefighting appliances
- logbook or vessel record book
- *Marine Safety (Domestic Commercial Vessel) National Law Act 2012*, *Marine Safety (Domestic Commercial Vessel) National Law Regulation 2013* and marine orders
- marine pollution prevention
- National Standard for Commercial Vessels (NSCV), in particular, Part B, Part C Section 7, Part D and Part E

- operational areas and classifications of vessels
- safety management systems
- state and territory marine legislation
- work health and safety (WHS)/occupational health and safety (OHS) legislation.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals including:
  - International Regulations for Preventing Collisions at Sea
  - marine orders 500 series
  - *Marine Safety (Domestic Commercial Vessel) National Law Act 2012*
  - *Marine Safety (Domestic Commercial Vessel) National Law Regulation 2013*
  - National Standard for Commercial Vessels (NSCV), in particular, Part B, Part C Section 7, Part D and Part E
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARI004 Observe regulations to ensure safe operation of a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to apply current Commonwealth, state and territory Acts, legislation, codes of practice and other publications pertaining to the safe operation of a vessel up to 80 m.

This unit applies to people working in maritime industry in the capacity of:

- master on commercial vessels <35 m in length within the exclusive economic zone (EEZ) or
- master a vessel up to 80 m in inshore waters or
- chief mate or deck watchkeeper on vessels <80 m in length within the EEZ; and
- master on commercial vessels <24 m in length in inland waters.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters), Master <24 metres NC and Master <35m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## Competency Field

I – Regulations and Port Operations

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Interpret relevant maritime rules and regulations impacting on vessel operations and personal responsibilities**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1.1** Regulatory requirements for vessel operations and maintenance are followed

**1.2** Duties and responsibilities as the person in charge of a vessel are recognised

**1.3** Relevant Commonwealth, state and territory or local legislation governing the vessel and the passage are identified

**1.4** Organisational procedures relating to the vessel's safety management system (SMS) are identified

**1.5** Copies of relevant rules and regulations are stored in an accessible location on the vessel according to regulations

#### **2 Ensure continuous validity of vessel certification**

**2.1** Certification expiry dates for the vessel, renewal requirements and periodic inspections or extensions are checked to ensure continuous validity

**2.2** Survey items and equipment are tested, checked and maintained according to certificate conditions

**2.3** Arrangements for renewals and surveys are completed in a timely manner and comply with issuing authority requirements

**2.4** Vessel's documents are completed and any effects of damage and alterations or additions to the vessel or

- operations are specified according to certification requirements and authority procedures
- 2.5** Certificates and documentation are stored in a location on the vessel according to regulations
- 3 Apply legislative and regulatory requirements to vessel operations and maintenance**
- 3.1** Regulatory requirements relating to operations and maintenance of the vessel are interpreted and applied as required
- 3.2** Vessel procedures for monitoring operations and maintenance are implemented
- 3.3** Training and instruction, including induction training, on procedures is instigated to ensure crew comply with regulations
- 3.4** Failure to comply with procedures is identified and dealt with according to organisational procedures
- 3.5** Tasks are monitored to ensure compliance with regulatory requirements
- 3.6** Problems that may lead to potential non-compliance are promptly identified and rectified or reported according to organisational procedures
- 3.7** Compliance with all relevant legislative and regulatory requirements is demonstrated while operating the vessel
- 4 Maintain statutory records of compliance**
- 4.1** Regulatory requirements related to records and reports are interpreted
- 4.2** Records and reports are completed to comply with applicable regulations
- 4.3** Records and reports are distributed to the required maritime authority at appropriate times and places
- 4.4** Copies of records and reports are maintained according to regulatory requirements
- 4.5** Evidence of current authorisation, training and relevant licences are maintained according to legal and regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARI002 Observe regulations to ensure safe operation of a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARI004 Observe regulations to ensure safe operation of a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- identifying and acting according to the duties and responsibilities of the Master
- identifying and solving problems relating to the implementation of regulations for the operation, security and maintenance of a vessel up to 80 m
- interpreting and applying regulations related to the operation, security and maintenance of a vessel up to 80m
- maintaining statutory records of compliance, including logbooks
- obtaining information from Commonwealth, state and territory Acts, legislation, codes of practice and other publications relating to the operation, security and maintenance of a vessel up to 80 m
- providing detailed reports
- providing training, inductions and briefings to crew and passengers
- recognising navigation marks in the International Association of Lighthouse Authorities (IALA) Buoyage System.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- action that must be taken in the event of non-compliance with applicable maritime regulations, including reporting accidents, incidents and non-compliant activities
- applicable International Maritime Organisation (IMO) conventions, including:
  - Safety of Life at Sea (SOLAS)
  - Standards of Training Certification and Watchkeeping (STCW)
- applicable state and territory maritime regulations relating to the operation of vessels up to 80 metres
- certificates to be carried on board a vessel
- Commonwealth and state or territory legislation reflecting the provisions of International Conventions for the Prevention of Pollution from Ships (MARPOL)

- Commonwealth legislation concerning safety of life at sea
- content of Notices to Mariners, Marine Notices and other publications, including:
  - navigational warnings, including firing practices
  - precautions concerning submarine cables and pipelines
  - search and rescue
- IALA Buoyage System A
- importance of maintaining a logbook or vessel record book
- information relating to safe navigation in coastal waters
- laws relating to lifesaving appliances; fire appliances; and distress, urgency and safety signals
- legal certification requirements for a vessel less than 80 metres
- local legislation governing the vessel and its operations
- National Standard for Commercial Vessels (NSCV), in particular Part B, Part C Section 7, Part D and Part E
- procedures for monitoring compliance with relevant maritime regulations
- regulatory requirements for vessel operations and maintenance, including:
  - assisting in distress
  - duties and responsibilities of the Master
  - International Regulations for Preventing Collisions at Sea
  - operational areas and classifications of vessels
  - radio regulations
- relevant aspects of a safety management system (SMS) (International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM) Code), including:
  - safety management plans
  - standard and emergency operating procedures
  - understanding and applying SMS
- relevant state or territory Acts, regulations, notices, determinations or other legislation about the operation of vessels for which the certificate will be valid
- relevant work health and safety (WHS)/occupational health and safety (OHS) legislation
- requirements for records and reports that must be made under applicable maritime regulations, including:
  - environmental control logbooks
  - logbook or vessel record book
  - radio logbook
  - survey certificates
- responsibilities for the prevention of pollution of the marine environment
- risk management principles and application.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include



requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, SMS, workplace procedures and operational manuals, including:
  - certificates required on board a vessel up to 80 metres
  - Commonwealth and state or territory legislation reflecting the provisions of MARPOL
  - environmental control logbooks
  - International Regulations for Preventing Collisions at Sea
  - logbook or vessel record book
  - Marine Orders
  - *Marine Safety (Domestic Commercial Vessel) National Law Act 2012*
  - *Marine Safety (Domestic Commercial Vessel) National Law Regulation 2013*
  - National Standard for Commercial Vessels (NSCV), in particular, Part B, Part C Section 7, Part D and Part E
  - radio logbook and regulations
  - survey certificates
  - WHS/OHS legislation.
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARJ003 Ensure compliance with environmental management legislation

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to coordinate environmental activities on a vessel to ensure compliance with relevant legislation, regulations, permits and/or licences.

This unit applies to people working in the maritime industry as an Engineer Watchkeeper, or a Marine Engineer Class 3 Near Coastal, or a Master up to 500 gross tonnage (GT), or a Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

J - Environment

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Confirm environmental management responsibilities**

- 1.1 Legislative and regulatory requirements, and approvals that apply to the vessel are interpreted
- 1.2 Own scope of authority/responsibility for achieving specific environmental outcomes for the vessel and the roles of other key personnel are clarified

- |  |     |   |
|--|-----|---|
|  | 1.3 | Resources available to implement environmental management policies for the vessel are identified  |
| <b>2 Develop a positive environmental reputation</b>               | 2.1 | Stakeholders, their relationship to the vessel and perceived attitudes about the vessel are identified                                    |
|  | 2.2 | Appropriate strategies are used to foster the trust and confidence of stakeholders  |
|  | 2.3 | Requests for information are responded to in the appropriate format and a timely manner   |
|  | 2.4 | Difficult situations are identified and solutions are negotiated using a collaborative approach   |
|  | 2.5 | Regular feedback is obtained and used to enhance positive relations   |
| <b>3 Provide environmental management information and training</b> | 3.1 | Environmental management plans and recent incident reports are used to identify training needs of crew members                            |
|  | 3.2 | Information and training is developed and provided to ensure all crew members understand their environmental obligations/responsibilities |
|  | 3.3 | Crew member understanding of environmental obligations/responsibilities for work areas and activities is confirmed                        |
|  | 3.4 | Effectiveness of the information and training is monitored and additional information/training is provided as required                    |
| <b>4 Assess environmental impacts and risks</b>                    | 4.1 | Activities are reviewed to identify implications for environmental management   |
|  | 4.2 | Potential risks and incidents that may cause harm to the environment are identified   |
|  | 4.3 | Inspections and in situ measurements are conducted to quantify risks and impacts  |
|  | 4.4 | Assessment of risks and impacts are reported according to organisational procedures   |
| <b>5 Ensure environmental monitoring and management plans</b>      | 5.1 | Environmental monitoring instruments are checked to ensure they are fully functioning   |
|  | 5.2 | Specified environmental monitoring and inspections are conducted to check performance against environmental                               |

<b>are implemented</b>		management requirements
<b>6 Respond to environmental non-conformance and incidents</b>	5.3	Additional monitoring/inspections are conducted after atypical events or requests from authorities to assess whether environmental management plan is operating
	5.4	Results for monitoring/inspections are analysed to identify significant trends, non-conformance and/or incidents
	6.1	Unusual situations, unexpected risks/hazards and potential/actual environmental incidents are recognised
	6.2	Organisational procedures for responding to environmental noncompliance and incidents are implemented to ensure prompt control and remediation
	6.3	Causes of noncompliance and incidents are investigated according to organisational procedures
	6.4	Findings are analysed to identify opportunities to improve work practices, environmental controls, crew training and/or management procedures
	6.5	Corrective/preventative actions are implemented to prevent recurrence of noncompliance and incidents, and to reduce risks
	6.6	Reports are completed according to organisational procedures
	7.1	Regular reports about environmental performance are provided
	7.2	Opportunities and recommendations for improvements are reported
<b>7 Keep the Master informed about environmental performance</b>	7.3	Master's advice is sought when challenges are beyond own scope of technical competence or when input from environmental specialist may be required
	8.1	Required records are prepared and maintained according to regulatory and organisational requirements
	8.2	Records are stored to enable easy access and review by authorised personnel according to regulatory and organisational requirements
<b>8 Maintain environmental records</b>		

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Legislative and regulatory requirements, and approvals include one or more of the following:

- Australian and international standards
- commonwealth legislation and regulations
- Marine Orders
- International Convention for the Prevention of Pollution from Ships (MARPOL) and International Maritime Organization (IMO) circulars
- state/territory legislation and regulations

Stakeholders include one or more of the following:

- cargo owners
- government officials
- port authorities

Information and training include one or more of the following:

- due diligence and duty to notify
- environmental management actions and checklists, methods/procedures for specific activities
- incident management and reporting
- introduction to vessel, environmental considerations and sources of environmental information
- legislative requirements
- licensing/compliance requirements
- organisational environmental management policy

Potential risks and

- ballast water discharge

incidents include one or more of the following:

- disposal of waste material including sewage and garbage
- over-side maintenance work
- spill or release of hazardous chemicals/materials

Environmental monitoring instruments include one or more of the following:

- emission control equipment
- fuel management systems
- oily water separators
- waste storage monitoring equipment

Reports include one or more of the following:

- hazard near miss report form
- monthly environmental report
- non-conformance report form
- regulatory agency reports
- vessel incident investigation report
- waste disposal log books
- weekly environmental report

Records include one or more of the following:

- contractor and supplier information
- correspondence
- digital photographs
- environmental monitoring data
- records of training
- records of monitoring equipment purchase, calibration, inspection, maintenance and service
- records of environmental non-conformance, incidents or significant impacts
- records required by permit, approval or licence conditions

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARJ5001A Ensure compliance with environmental management legislation.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARJ003 Ensure compliance with environmental management legislation**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing, interpreting and applying regulatory requirements
- applying procedures for monitoring vessel operations and ensuring compliance with International Convention for the Prevention of Pollution from Ships (MARPOL) requirements are fully observed
- clearly explaining environmental management concepts, principles and procedures to others
- maintaining accurate environmental records
- maintaining actions to ensure a positive environmental reputation
- monitoring the implementation of environmental management plans, policy and procedures, and specified work methods
- regularly inspecting vessel for environmental risks and impacts
- responding to complaints and requests for information from authorities and authorised personnel.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anti-pollution procedures and all associated equipment
- environmental legislative/regulatory requirements and responsibilities relevant to the vessel
- environmental protection/management terminology, concepts and principles
- importance of proactive measures to protect the marine environment
- organisational environmental management plans, procedures, control measures and management actions for vessel
- organisational procedures for:
  - identifying and assessing environmental risks and impacts
  - managing stakeholder relations
  - responding to complaints and other environmental incidents
  - record management and reporting

- precautions to be taken to prevent pollution of the marine environment
- vessel characteristics and environmental issues, risks and impacts
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARJ004 Inspect and report defects and damage to vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to inspect and report defects and damage to vessels.

This unit applies to a Watchkeeper Deck, Master up to 500 gross tonnage (GT) and Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

J – Environment

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Plan inspections

- 1.1 Elements of the vessel structure critical to the safety of the vessel are identified
- 1.2 Location of defects and damage caused by vessel operations and the environment are ascertained
- 1.3 Parts of the vessel to be inspected for defects and damage are identified

- |   |     |   |
|---|-----|---|
|   | 1.4 | Inspections are scheduled to ensure all parts are covered within a given time   |
|   | 1.5 | Damage control plan is developed to ensure the seaworthiness of the vessel  |
| <b>2 Check condition of vessel in normal and emergency situations</b> | 2.1 | Organisational procedures for coverage and frequency of tests and inspections on the vessel are complied with                     |
|   | 2.2 | Watertight integrity is checked and appropriate action is taken to prepare for prevailing and forecast weather and sea conditions |
|   | 2.3 | Degree to which vessel is secured is appropriate to prevailing and forecast conditions  |
|   | 2.4 | Defects and damage are reliably detected and appropriate action is taken to rectify the situation                                 |
|   | 2.5 | Irregularities beyond own ability to rectify are recognised in time to enable remedial action to be taken                         |
| <b>3 Prepare reports</b>  | 3.1 | Reports are completed and maintained as required according to regulatory and organisational requirements                          |
|   | 3.2 | Relevant reports are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements      |
|   | 3.3 | Documents are stored according to regulatory and organisational requirements  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the

candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |  |
|---|--|
| Elements of the vessel structure include one or more of the following:      | <ul style="list-style-type: none"><li>• ballast tanks</li><li>• bulkheads</li><li>• cargo holds</li><li>• cargo tanks</li><li>• frames</li><li>• fresh water tanks</li></ul>                                     |
| Defects and damage include one or more of the following:                    | <ul style="list-style-type: none"><li>• cargo operation damage</li><li>• damage to structures through heavy weather</li><li>• damage caused by corrosion</li><li>• defects to ballast water tank vents</li></ul> |
| Vessel operations and the environment include one or more of the following: | <ul style="list-style-type: none"><li>• loading and unloading operations</li><li>• severe weather conditions</li></ul>   |
| Parts of the vessel include one or more of the following:                   | <ul style="list-style-type: none"><li>• cargo holds</li><li>• deck structures</li><li>• hatch covers</li><li>• machinery spaces</li><li>• ventilators and fire closing devices</li></ul>                         |
| Coverage includes one or more of the following:                             | <ul style="list-style-type: none"><li>• areas requiring inspection under the planned maintenance schedule and survey requirements</li></ul>  |
| Reports include one or more of the following:                               | <ul style="list-style-type: none"><li>• defects and damage reports to management</li><li>• inspection records</li><li>• maintenance reports</li><li>• survey reports</li></ul>                                   |

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARJ5002A Inspect and report defects and damage to vessel.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARJ004 Inspect and report defects and damage to vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adhering to procedures to distinguish between normal and defective or damaged parts of vessel
- developing damage control plans
- developing effective planning documents
- identifying those elements of the vessel structure that are critical to vessel safety
- inspecting and reporting defects and damage to cargo spaces, hatch covers and ballast tanks
- interpreting and following procedures for the coordination of planned maintenance processes
- preparing appropriate reports on inspection and maintenance outcomes.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- causes of corrosion to cargo spaces and ballast tanks, and how corrosion can be identified and prevented
- construction, layout and subdivision of a vessel, including freeboard and bulkhead deck, watertight compartments, weather tight compartments, the bulkhead of the vessel and collision bulkhead
- corrosion control measures
- damage control measures that may be required to maintain the integrity of a hull in a range of typical emergency situations
- how to ensure reliable detection of defects and damages
- own ability and limits to rectify irregularities and faults
- parts of the vessel to be inspected each time in order to cover all parts within a given period
- planned maintenance systems for vessel and associated maintenance inspection procedures
- principal features of vessel structure
- principal stresses that act on vessel structure

- principles and procedures to ensure watertight integrity of vessel hull in both normal and emergency situations
- procedures for checking and inspecting vessel seaworthiness
- properties and application of materials used to construct vessels
- purpose of the enhanced survey program
- typical vessel construction features and stress characteristics
- where to look for damage and defects most commonly encountered due to loading and unloading operations, corrosion, severe weather conditions
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARJ005 Manage compliance with environmental management legislation

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Application

This unit involves the skills and knowledge required to establish and implement an environmental management plan to ensure compliance with regulations and procedures for the protection of the marine environment as an integral part of vessel operations.

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

J – Environment

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Develop vessel environmental management plan

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1.1 Relevant legislation and compliance documentation for maintaining the marine environment are accessed and interpreted

**framework**

- 1.2 Appropriate measures to prevent pollution of the marine environment are developed and documented in consultation with relevant personnel according to organisational policies and procedures
- 1.3 Structures for applying the environmental management plan are developed and documented in consultation with relevant personnel according to organisational policies and procedures
- 1.4 Responsibilities for applying the environmental management plan are defined and documented in job descriptions and duty statements
- 1.5 Strategies are established to encourage all crew members to meet high standards of environmental performance

**2 Develop processes to support vessel environmental management plan**

- 2.1 Existing and potential environmental hazards and risks are identified from vessel inspection and record system
- 2.2 Organisational criteria for assessing and treating risks are clarified
- 2.3 Detailed procedures and practices for applying the environmental management plan are developed and documented to minimise environmental impacts

**3 Prepare and implement vessel environmental management plan**

- 3.1 Introduction of the environmental management plan is scheduled and documented
- 3.2 Resources to support the introduction of the environmental management plan are made available
- 3.3 Information on the environmental management plan is provided in a readily accessible form to all crew members
- 3.4 Training is provided on the environmental management plan procedures and practices
- 3.5 Support and encouragement is provided to those responsible for implementing the environmental management plan

**4 Monitor environmental management processes**

- 4.1 Compliance with regulatory requirements and the environmental management plan is monitored
- 4.2 Appropriate action is taken where non-compliance is identified



4.3 Breaches of regulations and associated action taken are reported according to regulatory and organisational requirements

4.4 Currency and validity of certificates and other documents required are checked and appropriate plans for their renewal and extension are developed and implemented

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Relevant legislation includes one or more of the following:

- commonwealth, state/ territory legislation
- International Convention for the Prevention of Pollution from Ships (MARPOL), as amended
- international maritime law embodied in international agreements and conventions
- third party standards such as the ISO 1400 series and those of the Marine Stewardship Council

Compliance documentation includes one or more of the following:

- Australian standards
- avoiding or minimising environmental risks
- codes of practice
- documented policies and procedures
- emergency procedures
- environmental:
  - data recording and reporting procedures
  - hazard and risk identification
  - management system
  - monitoring
- hazard and incident reporting and recording procedures
- improving environmental performance
- legislative, organisational and vessel requirements and procedures
- manufacturer guidelines and specifications
- signs and labels
- waste minimisation and segregation
- work plans

Relevant personnel include:

- crew members
- regulatory authorities
- senior management
- subject matter experts

Risks include one or more of the following:

- lack of proper waste, pollution and recycling processes
- polluting emissions of gas and smoke
- spillages of cargo
- spillages of fuel and oil
- spread and carriage of marine pests in ballast water

Procedures and practices include one or more of the following:

- allocation of responsibilities
- certificate requirements
- documentation and reporting requirements
- emergency procedures
- safe operating procedures
- sampling, testing and inspection requirements
- standard operating procedures
- work instructions

## Unit Mapping Information

This unit replaces and is equivalent to MARJ6001A Manage compliance with environmental management legislation.

MARJ6001A replaces and is equivalent to TDMMU107B Monitor compliance with legislative requirements and measures to ensure protection of the environment.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARJ005 Manage compliance with environmental management legislation**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying legislative and organisational requirements and procedures
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- developing effective planning documents
- developing procedures for monitoring operations that comply with legislative requirements
- ensuring currency of relevant legislative and regulatory knowledge
- identifying fully and promptly, potential non-compliance
- interpreting technical information, rules, procedures and regulations
- planning for the renewal and extension of certificates to ensure continued validity of surveyed items and equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- environmental:
  - hazard identification processes
  - risk assessment processes
  - risk treatment processes
  - management reporting and recording procedures
  - management system documentation methods
- hazards (sources of potential harm or situations with the potential to cause loss)
- international maritime law embodied in international agreements and conventions

- methods and aids to prevent pollution of the marine environment by ships
- relevant marine environmental issues
- responsibilities under the International Convention for the Prevention of Pollution from Ships (MARPOL), as amended
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions.

Resources for assessment include access to:

- relevant legislation, Australian standards, workplace procedures, regulations, codes of practice and operation manuals
- emission control equipment, pumps and valves, waste storage and recycling equipment, personal protective equipment and water management equipment, including cooling and ballast water and bilge systems.
- 

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARJ006 Follow environmental work practices

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to identify environmental issues and to apply organisational policies and procedures to minimise environmental threats.

This unit applies to people working in the maritime industry:

- in an engine room capacity on vessels up to 80 metres and with propulsion power <3000 kW within the exclusive economic zone (EEZ) or
- as an integrated rating or chief integrated rating on vessels of any size in any operating area.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 2 NC, Coxswain Grade 1 NC, Marine Engine Driver Grade 3 NC, Marine Engine Driver Grade 2 NC, Marine Engine Driver Grade 1 NC, Integrated Rating and Chief Integrated Rating as defined in the National Standard for Commercial Vessels (NSCV) Part D and the Standards for Training Certification and Watchkeeping (STCW). The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

J – Environment

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Implement environmental work practices**

- 1.1** Workplace practices and work instructions relating to potential environmental impacts are implemented
- 1.2** Relevant legislation, codes of practice and standards that impact on environmental work practices are recognised and followed
- 1.3** Environmental protection measures are implemented
- 1.4** Containment procedures are applied according to workplace procedures, where appropriate
- 1.5** Approved waste management procedures and practices are implemented
- 1.6** Signs or symptoms of a potential environmental threat are recognised and reported to appropriate personnel or authorities

#### **2 Contribute to improved environmental work practices**

- 2.1** Information is gathered and suggestions are made to appropriate personnel for improvements to work practices
- 2.2** Environmental issues and their relationship to work practices are discussed with colleagues and appropriate personnel
- 2.3** Contributions to the review of environmental work practices and policies are made within limits of own responsibility

#### **3 Maintain environmental records**

- 3.1** Environmental records are accurately prepared according to workplace procedures
- 3.2** Environmental records are stored securely

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARJ001 Follow environmental work practices.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARJ006 Follow environmental work practices

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying safety and hazard control procedures when disposing of waste and garbage
- applying work health and safety (WHS)/occupational health and safety (OHS) practices, including hazard identification, risk assessment and risk control options
- preparing and keeping clear and concise environmental records
- recognising procedures and following instructions for environmental work practices
- reporting environmental hazards and risks in a timely way.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- environmental and resource hazards and risks associated with the maritime industry
- environmental laws, regulations and standards relevant to work in the maritime industry, including:
  - Commonwealth, state and territory legislation
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
- means of minimising environmental damage, including:
  - increasing the use of renewable, recyclable, re-usable and recoverable resources
- potential environmental threats, including:
  - anchoring
  - noise
  - wash from propellers
- procedures and processes that support environmentally sustainable principles in the workplace, including:
  - avoiding or minimising environmental risks
  - documented policies and procedures, including:
    - emergency procedures

- environmental data recording and reporting procedures
- hazard and incident reporting and recording procedures
- procedures for stowage of garbage on board
- environmental hazard and risk identification
- environmental management system
- environmental monitoring
- improving environmental performance
- signs and labels
- waste minimisation and segregation
- work plans
- procedures for reporting environmental hazards and risks
- procedures for use and stowage of hazardous chemicals on board
- requirements for waste management and control systems under the MARPOL Convention
- types and application of waste compactors and crushers suitable for use on board a vessel
- use of oil spill equipment and its limitations
- WHS/OHS practices, including hazard identification, risk assessment and risk control options.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals, including:
  - Commonwealth, state and territory legislation
  - local government by-laws and regulations
  - MARPOL
  - third-party standards, such as the ISO 14000 Environmental management series and those of the Marine Stewardship Council
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARJ007 Monitor environmental management on a vessel

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Application

This unit involves the skills and knowledge required to monitor the implementation of environmental management policies and procedures on a vessel up to 80 m to ensure compliance with marine regulations and environmental considerations.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <35 m in length within the exclusive economic zone (EEZ) or
- master on vessels <80 m in length in inshore waters or
- chief mate or deck watchkeeper on vessels <80 m in length within the EEZ or
- chief engineer on vessels with an inboard engine with propulsion power <1500 kW within the EEZ or
- second engineer on vessels with an inboard engine with propulsion power <3000 kW within the EEZ or
- chief or second engineer on vessels with an outboard engine with unlimited propulsion power within the EEZ; and
- assistant to a chief engineer.

## Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit of competency is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters), Master <24m NC, Mate <80m NC, Master < 35m NC and Marine Engine Driver Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## Pre-requisite Unit

Not Applicable

## Competency Field

J - Environment

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Ensure crew are able to implement environmental work practices**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Information on environmental management policies and procedures is accessible and communicated to crew
- 1.2** Information about identified environmental hazards and outcomes of risk assessments and risk control procedures are accessed and communicated to crew
- 1.3** Crew are informed of environmental hazards and risk control measures relating to their work responsibilities
- 1.4** Mentoring and coaching are provided to support individuals or crew to implement procedures to support environmental management
- 1.5** Crew is supported to implement relevant principles to meet environmental obligations and regulatory requirements
- 1.6** Crew is consulted and environmental issues relevant to their work role are identified and promptly resolved or referred to appropriate personnel

#### **2 Monitor observance of environmental management procedures**

- 2.1** Procedures for environmental management on the vessel are clearly defined and followed

- |  |            |   |
|--|------------|---|
|  | <b>2.2</b> | Deviations from environmental management procedures are identified and addressed  |
|  | <b>2.3</b> | Personal behaviour is monitored to ensure it is consistent with environmental management procedures                                   |
|  | <b>2.4</b> | Housekeeping standards on the vessel are maintained   |
|  | <b>2.5</b> | Breaches of environmental protection requirements are documented according to organisational procedures and regulatory requirements   |
| <b>3 Implement emergency procedures to respond to hazardous events</b> | <b>3.1</b> | Procedures for dealing with hazardous events are promptly implemented as required   |
|  | <b>3.2</b> | Hazardous events are investigated to identify cause   |
|  | <b>3.3</b> | Control measures to prevent recurrence and to minimise risks of hazardous events to the marine environment are implemented            |
|  | <b>3.4</b> | Emergency is reported in accordance with organisational procedures and regulatory requirements  |
| <b>4 Maintain and improve vessel environmental management</b>          | <b>4.1</b> | Risk assessments are conducted and appropriate control measures are identified and implemented according to organisational procedures |
|  | <b>4.2</b> | Appropriate records and log book entries are made to assist the review of managing environmental protection measures                  |
|  | <b>4.3</b> | Potential hazards are identified, assessed and removed or reported according to organisational procedures                             |
|  | <b>4.4</b> | Recommendations arising from risk assessments are implemented within level of responsibility  |
|  | <b>4.5</b> | Inadequacies in control measures are identified and reported according to organisational procedures                                   |
|  | <b>4.6</b> | Opportunities for improving environmental performance are identified and raised with appropriate personnel                            |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARJ002 Monitor environmental management on a vessel.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARJ007 Monitor environmental management on a vessel**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating information about environmental management to crew
- conducting a risk assessment for environmental issues and hazards on a vessel and making recommendations to mitigate the risk/s identified
- ensuring that appropriate and timely action is taken in response to emergencies
- ensuring that environmental records and documentation are accurate, complete and timely, according to organisational and regulatory requirements
- ensuring that housekeeping standards are maintained, including:
  - pollution control and equipment
  - waste minimisation and control
- identifying typical pollution control problems and taking appropriate action
- implementing preventative and remedial anti-pollution procedures according to organisational and regulatory requirements
- participating in consultation processes to improve environmental management in the organisation
- implementing recommendations arising from risk assessments
- supporting others to follow environmental management procedures.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- documentation system and procedures
- effects on marine environment of various possible pollution incidents
- environmental control measures, including:
  - ballast water management
  - bilge pumping
  - cofferdams around fuel vents and manifolds



- controlling emissions of gas and smoke
- coping with increased volume of garbage, bilge water, sludge and sewage
- loss of vessel
- oil spill containment equipment
- preventing cargo spillage or loss
- preventing fuel and oil spillage
- preventing sewage discharge
- signage
- sound operational procedures
- special management areas/environmentally sensitive sea areas
- stowage and management of explosive and flammable materials
- waste management - collection, treatment, recycling or disposal
- environmental hazards associated with work activities on a vessel, including:
  - anchoring
  - harm to marine life
  - noise
  - oil pollution
  - polluting emissions of gas and smoke
  - poorly maintained equipment and machinery resulting in pollution
  - spillages of cargo
  - waste pollution
- investigations of non-compliance and risk assessment processes
- legal responsibilities as determined by relevant legislation, codes of practice, policies and procedures to protect the marine environment
- maintaining compliance with legislation for protection of the marine environment
- operational requirements of water, bilge, waste, pollution and recycling management processes used on various types and sizes of vessels
- own responsibilities for preventing pollution of the marine environment
- policies and procedures to support environmental management
- pollution control problems and related measures to protect the marine environment
- principles of environmental management
- principles of risk management
- providing access to and maintaining current environmental management information for the crew
- requirements for fishing, anchoring and other activities in environmentally sensitive areas
- requirements under Australian and or international legislation and conventions for reporting incidents related to breaches of the statutory codes and measures for the protection of the marine environment
- responsibilities of self and employer to manage environmental issues
- responsible resource utilisation on the vessel, consistent with organisational policies
- ways of communicating information about environmental management to crew, including:

- environmental management policies and procedures
- environmental obligations and regulatory requirements
- identified environmental hazards
- outcomes of risk assessments
- outcomes of risk control procedures
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals, including International Convention for the Prevention of Pollution from Ships (MARPOL)
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including bilge systems and spill prevention equipment.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARK003 Manoeuvre a vessel up to 80 metres

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to manoeuvre a vessel up to 80 metres.

This unit applies to people working in the maritime industry in the capacity of Master on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

K – Manoeuvring Vessels

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |
|--|---|
| <b>1 Manoeuvre vessel in normal conditions</b> | 1.1 Features of vessel that relate to its handling characteristics are recognised   |
|  | 1.2 Adequate resources are organised prior to and during operations   |
|  | 1.3 Details of manoeuvres are communicated to relevant personnel clearly and concisely using standard maritime vocabulary |

- 1.4 Situational awareness is maintained to ensure safe manoeuvres
- 1.5 Manoeuvres are completed in relevant conditions of tide and wind to meet passage requirements
- 1.6 Propulsion equipment is used and monitored to assist in completing manoeuvres safely
- 1.7 Appropriate alterations to vessel heading and power are made in response to operational environment
- 1.8 Safe operating limits of propulsion and steering systems are not exceeded
- 2 Manoeuvre vessel in adverse weather conditions**
  - 2.1 Nature of adverse weather conditions is identified and implications for vessel operations are evaluated
  - 2.2 Preparations are made and required precautions are taken to minimise risk and damage to vessel, personnel and time loss on passage
  - 2.3 Manoeuvres are adjusted to allow for weather and sea conditions, and to keep vessel in safe water
  - 2.4 Propulsion equipment is used and monitored to assist in completing actions safely
  - 2.5 Heading is maintained within acceptable limits
  - 2.6 Appropriate allowance is made for effects of deadweight, draft, trim, speed and underwater keel clearances during turning circles and stopping distance
  - 2.7 Safe operating limits of propulsion and steering equipment are not exceeded
  - 2.8 Situational awareness is maintained at all times to review actions and ensure safety of vessel
- 3 Manoeuvre vessel in emergencies**
  - 3.1 Nature of emergency is established and required action is determined
  - 3.2 Risks to vessel and safety of persons on board is assessed and safety of required action is confirmed
  - 3.3 Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary

- 3.4 Appropriate manoeuvres are made during emergency to maintain safety of vessel and those on board, and any other vessels or persons involved
  - 3.5 Propulsion equipment is used and monitored to assist in completing actions safely
  - 3.6 Safe operating limits of propulsion and steering equipment are not exceeded
  - 3.7 Special handling techniques are correctly applied during launching of boats or life rafts and rescues of persons overboard
- 4 Tow and be towed**
- 4.1 Preparations for towing are safely made according to established nautical practice
  - 4.2 Correct towing procedures and precautions are applied when towing and being towed

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Features of vessel include one or more of the following:

- displacement and planing hulls
- propulsion units
- rudders and propellers

- Manoeuvres must include:
- astern movements
  - berthing and leaving a berth
  - berthing in a pen
  - coming to and leaving mooring
  - positioning vessel to safely launch boats or life rafts in bad weather
  - retrieval of person overboard
  - turning short around
  - turning vessel across tide and wind
- Propulsion equipment include one or more of the following:
- inboard engine
  - outboard engine
  - inboard/outboard engine
  - jet propulsion engine
- Adverse weather conditions includes one or more of the following:
- fog and restricted visibility
  - wind and sea conditions that may affect safety of vessel
- Nature of emergencies include one or more of the following:
- beaching
  - collision
  - damage to vessel
  - disabled or partially disabled vessel
  - fire
  - grounding
  - loss of steering gear
  - person overboard
- Preparations for towing include one or more of the following:
- ensuring appropriate lights and shapes for the tow are available and in working order
  - ensuring means of communication between the two vessels is available
  - ensuring tow ropes are in good condition and of adequate strength for proposed tow
  - making appropriate reports to authorities
  - preparing messenger ropes for passing tow lines
- Correct towing procedures
- ensuring tow line is of sufficient length

- include one or more of the following:
- making provision for rapid slipping of tow in emergency situations
  - making tow fast to towing vessel to ensure steerage is maintained

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARK4001A Manoeuvre a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARK003 Manoeuvre a vessel up to 80 metres

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchoring a vessel
- determining required action for a range of emergency situations
- handling a disabled or partially disabled vessel
- issuing helm and engine orders
- manoeuvring a vessel in:
  - bad weather
  - in heavy swell and surf
  - crossing a bar
  - following and quartering seas
- manoeuvring a vessel in normal and emergency situations
- manoeuvring a vessel through:
  - berthing and leaving a berth and anchor work in various wind and tidal conditions
  - berthing and unberthing
  - coming to and leaving a mooring
  - person overboard
  - steering astern through an 's' configuration
  - towing and being towed
  - turn short around
  - turning a vessel across the tide across the wind
- manoeuvring a vessel to embark or disembark a pilot
- manoeuvring in shallow water
- maintaining situational awareness.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- effects of displacement and planing hulls
- effects of inboard propulsion units



- effects of rudders and propellers
- factors that could adversely affect vessel safety during operations
- features of a vessel that relate to its handling characteristics
- interaction with passing vessels, banks and shallow water
- launching boats or life rafts
- lessening drift and use of oil
- manoeuvres assisting a vessel or aircraft in distress
- manoeuvres to beach and refloat the vessel
- manoeuvring characteristics
- means of keeping a vessel out of a trough
- methods of taking on board survivors from lifeboats and life rafts
- precautions in manoeuvring or launching boats or life rafts in bad weather
- procedures for towing and being towed
- radio communications
- requirements for entering, departing and crossing a traffic separation area
- techniques for crossing a coastal bar with and against the sea
- trim and displacement
- use of a sea anchor
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARK004 Perform basic vessel manoeuvres

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to perform basic manoeuvres on a vessel in normal operating conditions and in emergencies under the direction of the Master.

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; as a Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters; as a Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

K – Manoeuvring Vessels

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <b>1 Manoeuvre vessel in normal operations</b> | <b>1.1</b> Vessel heading is maintained within acceptable limits to meet the requirements of the operating situation   |
|  | <b>1.2</b> Alterations of heading and power are smooth and controlled  |
|  | <b>1.3</b> Suitable mode of steering is selected for the manoeuvre to meet the requirements of the operating situation |

- |  |     |   |
|--|-----|---|
|  | 1.4 | Constant rate of turn techniques are used to achieve constant radius turns during manoeuvres                              |
|  | 1.5 | Safe operating limits of vessel propulsion, steering and power systems are not exceeded in normal manoeuvres              |
|  | 1.6 | Orders of the Master are followed to assist in anchoring and berthing operations  |
| <b>2 Make adjustments to vessel course and speed to maintain safe navigation</b> | 2.1 | Effects of operational environment on vessel performance are evaluated at regular intervals                               |
|  | 2.2 | Implications of the changed operational environment on vessel handling are assessed                                       |
|  | 2.3 | Appropriate alterations to vessel heading and power are made in response to the assessment of the operational environment |
| <b>3 Manoeuvre vessel during adverse weather</b>                                 | 3.1 | Impending adverse weather conditions are identified and implications for vessel operations are evaluated                  |
|  | 3.2 | Preparations are made to minimise risk and damage to vessel and personnel   |
|  | 3.3 | Communications are made with engine room to ensure main engines are readied for manoeuvring                               |
|  | 3.4 | Master is advised of developments in sea and weather conditions   |
|  | 3.5 | Vessel heading and power is maintained in response to adverse weather and sea conditions                                  |
| <b>4 Manoeuvre vessel in emergencies under Master's instructions</b>             | 4.1 | Nature of emergency is established and initial action is taken  |
|  | 4.2 | Risk to the vessel and the safety of persons on board is assessed and Master is informed                                  |
|  | 4.3 | Appropriate manoeuvres under Master's instructions are made during the emergency to maintain the safety of the vessel     |
|  | 4.4 | Propulsion equipment is used and monitored to assist in completing actions safely   |
|  | 4.5 | Safe operating limits of propulsion and steering equipment are not exceeded   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Operating situation must include:

- headreach
- requirements of the manoeuvre
- safe water
- stopping distances
- tide
- weather

Suitable mode of steering must include:

- automatic pilot
- emergency steering
- manual steering

Orders include one or more of the following:

- communication with tugs and pilot vessel
- communications with Vessel Traffic Services
- engine
- helm
- internal communication with engine room and berthing stations

Anchoring and berthing operations include one or more of the following:

- manoeuvring in:
  - shallow waters
  - estuaries
  - rivers

- restricted waters

Operational environment includes one or more of the following:

- heavy traffic areas
- ice
- marine park areas
- shallow and restricted waters
- traffic separation zones

Alterations must include:

- adjustment of speed to assist collision avoidance
- allowance for current and wind
- appropriate speed in reduced visibility
- speed adjustment for heavy weather conditions

Adverse weather conditions include one or more of the following:

- fog and restricted visibility
- wind and sea conditions that may impact on the safety of the vessel

Preparations include one or more of the following:

- advice to Master
- allocation of extra lookouts
- reduction in speed
- resources to engage manual steering

Nature of emergency includes one or more of the following:

- beaching
- collision
- damage to the vessel
- disabled or partially disabled vessel
- fire
- grounding
- loss of steering gear
- person overboard

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARK5001A Perform basic vessel manoeuvres.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARK004 Perform basic vessel manoeuvres

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- handling a disabled or partially disabled vessel
- implementing anchoring and berthing procedures
- issuing helm and engine orders
- maintaining situational awareness
- manoeuvring a vessel:
  - in bad weather
  - in heavy swell
  - through coming to and leaving a mooring
- manoeuvring for the rescue of person overboard
- manoeuvring in shallow water
- recognising emergency situations.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances
- effects of wind and current on vessel handling
- effects on vessel handling of wind, currents and bottom topography
- features of a vessel that relate to its handling characteristics
- manoeuvring and engine characteristics for various vessels more than 500 gross tonnage
- manoeuvring problems for vessels more than 500 gross tonnage and appropriate action and solutions
- manoeuvring procedures in and near traffic separation schemes and vessel traffic service areas
- methods for controlling vessel speed and direction
- one's surroundings and changes to these surroundings
- procedures for the rescue of person overboard
- procedures for turning a vessel in various situations



- proper procedures for anchoring and mooring
- safe operating limits of propulsion and power systems, and steering equipment
- squat, shallow-water and similar effects on vessel handling
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARK005 Steer a vessel under direction of the Master

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to steer a vessel under the direction of the Master, complying with helm orders.

This unit applies to an individual working as an Integrated Rating or Able Seafarer-Deck on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

K – Manoeuvring Vessels

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Steer a steady course within acceptable**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Features of vessel that relate to its handling characteristics are recognised

- |  |   |  |
|--|---|--|
| <b>limits in normal conditions under the direction of the Master</b>     | 1.2   | Navigational equipment is used to steer a steady course  |
|  | 1.3   | Situational awareness is maintained to ensure safety of vessel   |
|  | 1.4   | Propulsion equipment is used and monitored to assist in steering a steady course within acceptable limits, having regard to the area of navigation and prevailing state of sea |
|  | 1.5   | Safe operating limits of propulsion and steering equipment are not exceeded  |
|  | 1.6   | Automatic pilot and hand steering are used to steer a steady course, and course is altered smoothly and in a controlled way  |
|  | 1.7   | Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel                               |
|  | <b>2 Steer a vessel in adverse weather conditions under the direction of the Master</b> | 2.1  |
| 2.2  |   | Propulsion equipment is used and monitored to assist in steering a steady course within acceptable limits, having regard to the area of navigation and prevailing state of sea |
| 2.3  |   | Safe operating limits of propulsion and steering equipment are not exceeded  |
| 2.4  |   | Situational awareness is maintained at all times to review actions and ensure the safety of the vessel   |
| 2.5  |   | Automatic pilot and hand steering are used to steer a steady course, and course is altered smoothly and in a controlled way  |
| 2.6  |   | Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel                               |
| <b>3 Steer a vessel in emergencies under the direction of the Master</b> | 3.1   | Nature of the emergency is established and required action is determined and confirmed with the Master   |
|  | 3.2   | Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel                               |
|  | 3.3   | Vessel is steered during the emergency to maintain the safety of the vessel and those on board, and any other vessels or   |

		persons involved in the emergency
	3.4	Propulsion equipment is used under the direction of the Master and is monitored to assist in completing steering safely
	3.5	Safe operating limits of propulsion and steering equipment are not exceeded
<b>4 Steer a vessel while towing and being towed under the direction of the Master</b>	4.1	Correct towing procedures and precautions are applied when towing and being towed in relation to helm orders
	4.2	Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

Emergency includes one or more of the following:

- beaching
- collision
- disabled or partially disabled vessel
- grounding
- person overboard

## Unit Mapping Information

This unit replaces and is equivalent to MARK3002A Steer a vessel under direction of the Master.

MARK3002A replaces and is equivalent to TDMMC1007C Steer a domestic vessel under the direction of the master or officer in charge of the watch.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARK005 Steer a vessel under direction of the Master**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- changing from automatic pilot to hand steering and changing from hand steering to automatic pilot
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- maintaining situational awareness at all times
- steering a vessel:
  - in fog and restricted visibility
  - in bad weather
  - in heavy swell and surf
  - in the vicinity of large vessels
  - in wind and sea conditions that may affect the safety of the vessel
  - through coming to and leaving a mooring
  - through towing and being towed.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- effects on the overall operation of the vessel of:
  - displacement and planning hulls
  - outboard and inboard propulsion units
  - rudders and propellers
  - trim and displacement, on the steering characteristics of a vessel
- features of a vessel that relate to its handling characteristics including:
  - effects of single or twin screw
  - effects when moving astern
  - rate of turn
  - stopping ability
  - use of controllable pitch propeller
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- steering characteristics of vessel that affect manoeuvrability
- use of magnetic and gyrocompasses as applied to the navigation of a vessel.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Steering a vessel under the direction of the Master must occur in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- an appropriate vessel used to demonstrate steering in normal conditions, adverse weather and emergency situations
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment that replicate and are currently used in industry
- navigational equipment including:
  - auto pilot
  - magnetic and gyrocompasses

- manual steering arrangements
- off course alarms
- propulsion equipment including:
  - inboard engine
  - outboard engine.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## MARK006 Manoeuvre a vessel 500 gross tonnage or more

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to issue orders to manoeuvre and handle a vessel in all conditions based on the proper assessment of vessel manoeuvring and engine characteristics.

This unit applies to people working in the maritime industry as a Master Unlimited.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

K – Manoeuvring Vessels

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Provide commands to bridge and engine room to effect manoeuvres

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Situational awareness is maintained to determine progress of vessel
- 1.2 Situation is assessed to determine manoeuvres required

- |   |   |
|---|---|
|   | 1.3 Appropriate orders are issued to ensure vessel is manoeuvred safely in all conditions                           |
| <b>2 Order adjustments to vessel course and speed to maintain safe navigation</b> | 2.1 Effects of the operational environment on vessel performance are evaluated at regular intervals                 |
|   | 2.2 Implications of the changed operational environment on vessel handling are assessed                             |
|   | 2.3 Appropriate alterations are made and orders are issued in response to assessment of the operational environment |
| <b>3 Command vessel during emergencies</b>  | 3.1 Nature of emergency is established and initial action is taken  |
|   | 3.2 Risks to the vessel and the safety of persons on board are assessed   |
|   | 3.3 Appropriate manoeuvres are made to maintain vessel safety   |
| <b>4 Work with pilot to ensure safe passage to berth or anchorage</b>             | 4.1 Vessel is manoeuvred to ensure safe embarkation of pilot  |
|   | 4.2 Pilot is provided access to vessel resources  |
|   | 4.3 Pilot is provided with information on vessel handling characteristics   |
|   | 4.4 Proposed berthing/anchoring plan is discussed with pilot  |
|   | 4.5 Pilot activities are monitored to ensure safe operation of vessel according to agreed berthing/anchoring plan   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Situational awareness includes:

- berthing and unberthing with tugs
- choice of anchorage
- dry-docking
- effects of current, wind and restricted waters on helm response
- headreach
- in or near ice or ice accumulation on board
- interaction between passing vessels and between own vessel and nearby banks
- launching life boats or survival craft
- load conditions
- own vessel bow wave and stern wave
- pilot boarding grounds
- requirements of the manoeuvre
- rivers, estuaries and restricted waters
- safe water
- shallow water
- stopping distances and turning circles
- taking on board survivors from life boats or survival craft
- tide
- traffic operation schemes
- vessel and tug interaction
- vessel traffic service (VTS) areas
- weather conditions

Manoeuvres include:

- application of constant-rate-of-turn techniques
- berthing and unberthing under various conditions of wind, tide and current with and without tugs
- choice of anchorage: anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
- determining the manoeuvring and propulsion characteristics of common types of vessels, with special references to stopping distances and turning circles at various draughts and speeds
- dragging anchor, clearing fouled anchors
- dry-docking, both with and without damage
- handling vessel in rivers, estuaries and restricted waters with due regard to the effects of current, wind and restricted water on helm response
- importance of navigating at reduced speed to avoid damage caused by own vessel bow wave and stern wave
- interaction between passing vessel and own vessel and nearby banks
- managing and handling vessels in heavy weather including assisting a vessel or aircraft in distress; towing operations; means of keeping unmanageable vessel out of trough of the sea, lessening drift and use of oil
- manoeuvres when approaching pilot stations and embarking and disembarking pilots with due regard to weather, tide, headreach and stopping distances
- manoeuvring in shallow water including the reduction in under-keel clearance caused by squat, rolling and pitching
- methods of taking on board survivors from rescue boats and survival craft
- practical measures to be taken when navigating in or near ice or in conditions of ice accumulated on board
- precautions in manoeuvring to launch rescue boats or survival craft in bad weather
- turning a vessel on a reciprocal track to rescue a person overboard
- using, and manoeuvring in or near, traffic operation schemes and in VTS areas
- using propulsion and manoeuvring systems
- vessel and tug interaction

Orders include one or more of the following:	<ul style="list-style-type: none"><li>• communications with shore</li><li>• embarking or disembarking a pilot</li><li>• engine</li><li>• helm</li><li>• preparation for being towed or towing another vessel</li><li>• preparation for taking tug lines</li><li>• running mooring lines</li></ul>
Operational environment includes one or more of the following:	<ul style="list-style-type: none"><li>• banks</li><li>• conditions of loading</li><li>• ice</li><li>• marine park areas</li><li>• own vessel bow and stern wave</li><li>• passing vessels</li><li>• shallow and restricted waters</li><li>• tidal conditions</li><li>• traffic separation zones</li><li>• weather</li></ul>
Alterations include:	<ul style="list-style-type: none"><li>• alterations of course</li><li>• reduction in speed</li></ul>
Nature of emergency includes one or more of the following:	<ul style="list-style-type: none"><li>• beaching</li><li>• cargo shift</li><li>• collision</li><li>• damage to the vessel</li><li>• disabled or partially disabled vessel</li><li>• fire</li><li>• grounding</li><li>• loss of steering gear including rudder</li><li>• person overboard</li></ul>
Vessel resources include one or more of the following:	<ul style="list-style-type: none"><li>• bow and stern thrusters</li><li>• communications equipment</li><li>• engine control systems</li><li>• helm and rate of turn indicators</li><li>• personnel</li><li>• propulsion systems</li></ul>
Vessel handling characteristics include one	<ul style="list-style-type: none"><li>• effects of single or twin screw</li><li>• effects when moving astern</li></ul>

or more of the following:

- rate of turn
- stopping ability
- use of controllable pitch propeller

## Unit Mapping Information

This unit replaces and is equivalent to MARK6001A Manoeuvre a vessel 500 gross tonnage or more.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARK006 Manoeuvre a vessel 500 gross tonnage or more**

## **Modification History**

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying constant-rate-of-turn techniques
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- basing all decisions concerning berthing and anchoring on a proper assessment of vessel manoeuvring and engine characteristics and the forces to be expected while berthed alongside or lying at anchor
- berthing and unberthing under various conditions of wind, tide and current with and without tugs
- clearing fouled anchors
- determining the manoeuvring and propulsion characteristics of common types of vessels, with special references to stopping distances and turning circles at various draughts and speeds
- dragging anchor
- handling vessels in rivers, estuaries and restricted waters having due regard to the effects of current, wind and restricted water on helm response
- issuing helm and engine orders
- making a full assessment of possible effects of shallow and restricted waters, ice, banks, tidal conditions, passing vessels and own vessel bow and stern wave while under way, so that the vessel can be safely manoeuvred under various conditions of loading and weather
- managing and handling vessels in heavy weather including assisting a vessel or aircraft in distress, towing operations, keeping unmanageable vessel out of trough of the sea, lessening drift and using oil
- manoeuvring in shallow water including the reduction in under-keel clearance caused by squat, rolling and pitching
- using propulsion and manoeuvring systems
- using remote controls of propulsion plant and auxiliary machinery.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
- choice of anchorage
- clearing fouled anchors
- effects of current, wind and restricted water on helm response
- entering a dry-dock under normal conditions with hull damage
- features of a vessel that relate to its handling characteristics
- importance of navigating at reduced speed to avoid damage caused by own vessel bow wave and stern wave
- interaction between passing vessel and own vessel and nearby banks
- manoeuvres when approaching pilot stations and embarking and disembarking pilots, with due regard to weather, tide, headreach and stopping distances
- manoeuvres when towing or under tow
- manoeuvring and propulsion characteristics of common types of vessels
- means of keeping an unmanageable vessel out of trough of the sea, lessening drift and use of oil
- methods of taking on board survivors from rescue boats or survival craft
- practical measures to be taken when navigating in or near ice or in conditions of ice accumulated on board
- precautions in manoeuvring to launch rescue boats or survival craft in bad weather
- procedures for entering and leaving traffic separation zones
- reduction in under-keel clearance caused by squat, rolling and pitching
- use of propulsion and manoeuvring systems
- use of, and manoeuvring in or near, traffic operation schemes and in vessel traffic service (VTS) areas
- vessel and tug interaction
- WHS/OHS requirements and work practices.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.



Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site where manoeuvring a vessel in a range of conditions can be undertaken.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARK007 Handle a vessel up to 12 metres

### Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### Application

This unit involves the skills and knowledge required to manoeuvre a vessel up to 12 metres in length. This includes the ability to berth, moor, anchor and manoeuvre a vessel during emergencies.

This unit applies to people working in the maritime industry in the capacity of:

- coxswain on vessels <12 m in length, with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine, operating in inshore or designated waters or
- coxswain on tenders or auxiliary vessels operating within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

### Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 2 NC and Coxswain Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

### Pre-requisite Unit

Not Applicable

### Competency Field

K – Manoeuvring Vessels

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Handle vessel in normal conditions

- 1.1 Features of vessel that relate to its handling characteristics are recognised
- 1.2 Details of manoeuvres are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
- 1.3 Situational awareness is maintained to ensure safety of manoeuvres
- 1.4 Manoeuvres are completed to meet passage requirements
- 1.5 Propulsion equipment is used and monitored to assist in completing manoeuvres safely
- 1.6 Safe operating limits of propulsion and steering equipment are not exceeded

#### 2 Handle vessel in adverse weather conditions

- 2.1 Nature of adverse weather conditions is identified and potential impact on the manoeuvrability of the vessel is determined
- 2.2 Appropriate action is determined to ensure the safety of the vessel
- 2.3 Correct use of propulsion equipment is established to assist in completing manoeuvres safely
- 2.4 Safe operating limits of propulsion and steering equipment are not exceeded
- 2.5 Situational awareness is maintained at all times to review actions and ensure the safety of the vessel

#### 3 Handle vessel in emergencies

- 3.1 Nature of emergency is established and required action is determined

- 3.2** Risks to vessel and safety of persons on board are assessed and safety of required action is confirmed
  - 3.3** Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
  - 3.4** Appropriate manoeuvres are made during the emergency to maintain the safety of the vessel and those on board, and any other vessels or persons involved
  - 3.5** Propulsion equipment is used and monitored to assist in completing manoeuvres safely
  - 3.6** Safe operating limits of propulsion and steering equipment are not exceeded
- 4 Tow and be towed**
  - 4.1** Preparations for towing are made safely according to established nautical practice
  - 4.2** Correct towing procedures and precautions are applied when towing and being towed

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARK001 Handle a vessel up to 12 metres.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARK007 Handle a vessel up to 12 metres

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchoring a vessel
- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- handling a disabled or partially disabled vessel
- manoeuvring a vessel to:
  - berth and leave a berth
  - come to and leave a mooring
  - maintain a steady course
  - retrieve a person overboard
  - steer astern
  - turn short around
  - turn a vessel across the tide and across the wind
- maintaining situational awareness
- undertaking preparations for towing, including:
  - crew briefings that include the task at hand and risks to persons on both vessels
  - ensuring means of communication between the two vessels is available
  - ensuring tow ropes are in good condition and of adequate strength and length for the proposed tow
  - ensuring tow line is of sufficient length to minimise shock loading on tow-line
  - making tow fast to the towing vessel to ensure steerage can be maintained
  - making provision for rapid slipping of the tow in emergency situations
  - preparing messenger ropes for passing tow lines
- towing and being towed
- using appropriate communication.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- adverse weather conditions, including:
  - fog and restricted visibility
  - tropical revolving storms
  - wind and sea conditions that may affect the safety of the vessel
- avoidance of tropical revolving storm activity
- elliptical turn
- features of a vessel that relate to its handling characteristics, and their effects, including:
  - displacement and planing hulls
  - propellers
  - propulsion units, including:
    - jet units
    - inboard engines
    - outboard motors
  - rudders
  - trim and displacement
- manoeuvring in the event of emergencies, including:
  - collision
  - disabled or partially disabled vessel
  - grounding
  - person overboard
- manoeuvring characteristics of small power-driven vessels
- manoeuvring a vessel in the vicinity of large vessels
- manoeuvring to beach and re-float the vessel
- manoeuvring a vessel in adverse weather conditions, including:
- altering course to minimise the effect of wind and sea
  - berth and leave a berth in various wind and tidal conditions
  - deploying a sea anchor to keep vessel head to sea
  - heading to wind and sea to ride out the adverse weather
  - reduction of speed
  - seeking shelter
- procedures for towing and being towed
- stability of a small vessel and stability terms
- techniques for crossing a coastal bar with and against the sea
- techniques for handling a vessel in heavy swell and surf
- trim and displacement
- use of a sea anchor
- Williamson turn

- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures, operational manuals and maritime publications and procedures relating to emergency response
- a vessel  $\geq 5.0$  m in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARK008 Manoeuvre a vessel up to 24 metres within Near Coastal waters**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to manoeuvre a vessel of up to 24 m in length within Near Coastal (NC) waters.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <24 m in length within the exclusive economic zone (EEZ) or
- chief mate or deck watchkeeper on vessels <35 m in length within the EEZ or
- chief mate or deck watchkeeper on vessels <80 m in length in inshore waters; and
- master on commercial vessels <24 m in length in inland waters.

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters) and Master <24 m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## Competency Field

K – Manoeuvring Vessels

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### **1 Manoeuvre vessel in normal conditions**

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Features of vessel that relate to its handling characteristics are recognised
- 1.2** Details of manoeuvres are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
- 1.3** Situational awareness is maintained to ensure safe manoeuvres
- 1.4** Manoeuvres are completed to meet passage requirements
- 1.5** Propulsion equipment is used and monitored to assist in completing manoeuvres safely
- 1.6** Appropriate alterations to vessel heading are made in response to operational environment
- 1.7** Safe operating limits of propulsion and steering equipment are not exceeded

#### **2 Manoeuvre vessel in adverse weather conditions**

- 2.1** Nature of adverse weather conditions is identified and the potential impact on the manoeuvrability of the vessel is determined
- 2.2** Appropriate action is taken to ensure the safety of vessel
- 2.3** Propulsion equipment is used and monitored to assist in completing actions safely
- 2.4** Heading is maintained within acceptable limits

- |          |  |   |
|----------|--|---|
|          | <b>2.5</b>                             | Appropriate allowance is made for effects of deadweight, draft, trim, speed and underwater keel clearances during turning circles and stopping distance |
|          | <b>2.6</b>                             | Safe operating limits of propulsion and steering equipment are not exceeded   |
|          | <b>2.7</b>                             | Situational awareness is maintained at all times to review actions and ensure safety of vessel  |
| <b>3</b> | <b>Manoeuvre vessel in emergencies</b> |   |
|          | <b>3.1</b>                             | Nature of the emergency is established and required action is determined  |
|          | <b>3.2</b>                             | Risks to the vessel and the safety of persons on board are assessed and safety of required action is confirmed  |
|          | <b>3.3</b>                             | Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary                                       |
|          | <b>3.4</b>                             | Appropriate manoeuvres are made during the emergency to maintain the safety of the vessel and those on board, and any other vessels or persons involved |
|          | <b>3.5</b>                             | Propulsion equipment is used and monitored to assist in completing actions safely   |
|          | <b>3.6</b>                             | Safe operating limits of propulsion and steering equipment are not exceeded   |
| <b>4</b> | <b>Tow and be towed</b>                |   |
|          | <b>4.1</b>                             | Preparations for towing are safely made according to established nautical practice  |
|          | <b>4.2</b>                             | Correct towing procedures and precautions are applied when towing and being towed   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARK002 Manoeuvre a vessel up to 24 metres within near coastal waters.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARK008 Manoeuvre a vessel up to 24 metres within Near Coastal waters

## Modification History

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchoring a vessel
- determining required action for a range of emergency situations
- handling a disabled or partially disabled vessel
- issuing helm and engine orders
- manoeuvring a vessel astern
- manoeuvring a vessel to:
  - approach an anchorage
  - berth and leave a berth
  - come to and leave a mooring
  - safely launch and retrieve boats or life rafts
  - turn short around
  - turn across the tide or across the wind
- maintaining situational awareness, including:
  - vessels in the vicinity
  - own vessel position in relation to shallow water and other obstructions
  - weather conditions that may affect the manoeuvre
- operating secondary or emergency means of steering
- rescuing a person overboard, including:
  - manoeuvring to retrieve person overboard
  - Williamson turn
- manoeuvring a vessel in adverse weather conditions, including:
  - steering a course to minimise the effect of wind and sea
  - reducing speed
  - seeking shelter
- towing and being towed
- undertaking preparations for towing.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- appropriate reports to be made for authorities when towing
- deployment and use of sea anchor to keep vessel head to sea
- effects of interaction with passing or moored vessels
- effects of trim and displacement on the manoeuvring characteristics of a vessel
- factors that could adversely affect vessel safety during operations
- features of a vessel that relate to its handling characteristics, and their effects, including:
  - displacement and planing hulls
  - propellers
  - propulsion units, including:
    - inboard engines
    - inboard-outboard engines
    - jet propulsion
    - outboard engines
  - rudders
- launching procedures for boats or life rafts
- manoeuvring conditions that may affect the safety of the vessel, including:
  - heading to wind and sea to ride out the adverse weather
  - to cross a bar with and against the sea
  - in heavy weather
  - in heavy swell and surf
  - in a narrow channel or shallow water
  - in fog and restricted visibility
- lessening drift and use of oil
- manoeuvring procedures to:
  - assist a vessel or aircraft in search and rescue
  - beach and re-float the vessel
  - position for helicopter evacuation
- manoeuvring procedures in the event of:
  - beaching
  - collision
  - damage to the vessel
  - disabled or partially disabled vessel
  - fire
  - grounding
  - loss of steering gear
  - person overboard

- precautions when manoeuvring or launching boats or life rafts in bad weather
- procedures for towing and being towed
- process and requirement to assist vessels in distress
- preparations for towing, including:
  - crew briefings that include the task at hand and risks to persons on both vessels
  - ensuring appropriate lights and shapes for the tow are available and in working order
  - ensuring means of communication between the two vessels is available
  - ensuring tow ropes are in good condition and of adequate strength for the proposed tow
  - ensuring tow line is of sufficient length to minimise shock loading on tow-line
  - making tow fast to the towing vessel to ensure steerage can be maintained
  - making provision for rapid slipping of the tow in emergency situations
  - preparing messenger ropes for passing tow lines.
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system (SMS), workplace procedures and operational manuals
- a commercial vessel  $\geq 7.5$  m in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) that are currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL001 Carry out engineering calculations

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to carry out calculations related to fuel consumption, fuel storage and engine performance that conform to accepted engineering tolerances.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 Near Coastal on vessels up to 1500 kW.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Calculate fuel consumption and storage**

- 1.1 Information required for calculations related to fuel consumption and storage is obtained from relevant sources
- 1.2 Calculations are completed to accepted working tolerances
- 1.3 Results of calculations are verified
- 1.4 Results of calculations are applied to managing fuel as



		required
<b>2 Complete calculations related to engine performance</b>	2.1	Information required for calculations related to engine performance is obtained from relevant sources
	2.2	Calculations are completed to accepted working tolerances
	2.3	Results of calculations are verified
	2.4	Results of calculations are applied to managing engine performance as required

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Calculations related to fuel consumption and storage must include:
- calculations involving:
    - specific fuel consumption
    - volume and capacity of regular shaped tanks
    - pumping capacities for tank filling and emptying
    - consumption of fuel and lubricating oil
    - hourly fuel consumption
  - requirements for replenishing lubricating oil in oil tank
  - using calibration tables to measure quantities in tanks
  - using relative density/specific gravity to convert quantity in litres and volume to mass

Calculations related to engine performance must include:

- calculations involving:
  - theoretical steaming times
  - distances covered
  - specific power, speed and range
  - theoretical steaming times
  - mechanical advantage, load, effort moments
  - stress, strain and safe working load
- remaining steaming times

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL4001A Carry out engineering calculations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARL001 Carry out engineering calculations

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- calculating:
  - area and circumference of a circle
  - consumption of fuel and lubricating oil for a particular voyage, using quantity in litres and mass in tonnes and specified regular shaped tanks
  - distances covered
  - hourly fuel consumption
  - mechanical advantage, load, effort moments
  - pumping capacities for tank filling and emptying
  - remaining steaming times
  - requirements for replenishing lubricating oil in oil tank
  - specific fuel consumption, power, speed and range
  - stress, strain and safe working load
  - tank capacities and pumping capacities for tank filling and emptying
  - theoretical steaming times
  - velocity ratio and efficiency of simple machines
  - volume and capacity of regular shaped tanks
- converting:
  - fractions to decimals
  - units to multiples of base units
- performing accurate and reliable calculations
- using calibration tables to measure quantities in tanks
- using relative density/specific gravity to convert quantity in litres and volume.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- area and circumference of a circle

- calibration tables
- common SI units such as kilogram, tonne, Newton, Newton metre, Pascal, joule, watt and metre
- relationship between theoretical vessel speed, propeller pitch and revolutions per minute (RPM)
- terminology of:
  - simple levers
  - material technology
- volumes of regular shaped tanks
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL002 Apply basic principles of naval architecture

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to perform basic calculations related to the seaworthiness of commercial vessels, including those dealing with watertight integrity and vessel stability.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Calculate shipboard areas and volumes**

- 1.1 Basic principal structural members of ship and proper names of various parts are detailed
- 1.2 Simpson's Rules are applied to calculate shipboard areas
- 1.3 Simpson's Rules are applied to calculate shipboard volumes

- |  |   |
|--|---|
| <b>2 Calculate vessel displacement</b>   | 2.1 Tonnes per centimetre (TPC) values and Simpson's Rules are applied to calculate vessel displacement   |
|  | 2.2 Calculations are performed using TPC values and Simpson's Rules to solve problems related to vessel displacement  |
| <b>3 Calculate ship dimensions</b>   | 3.1 Ship form dimensions are calculated using coefficients for areas  |
|  | 3.2 Ship form coefficients for underwater volumes are calculated  |
|  | 3.3 Influence of common hull modifications on hull form coefficients is explained   |
|  | 3.4 Calculations are performed to solve problems of ship form coefficients following change to vessel length resulting from mid body insertion or removal           |
| <b>4 Explain position of centre of gravity of vessel in relation to its keel and midships</b>    | 4.1 Centre of gravity calculations for a vessel are performed   |
|  | 4.2 How centre of gravity changes with redistribution, addition and/or removal of mass is explained   |
|  | 4.3 How addition, removal or transfer of mass may cause overturning moments is identified   |
|  | 4.4 Problems are solved involving addition, removal and vertical movement of mass by performing centre of gravity calculations for typical vessel loaded conditions |
|  | 4.5 Calculations are performed using results from inclining experiments to obtain initial stability characteristics   |
| <b>5 Explain effects of water density and flooding of mid-length compartment on vessel draft</b> | 5.1 Relationship between changes in underwater volume and changes in water density is outlined  |
|  | 5.2 Fresh water allowance of a vessel is determined   |
|  | 5.3 Change in mean draft for vessel movement between waters of different densities is calculated  |
|  | 5.4 Volume lost-volume gained relationship for flooded compartments is explained  |
|  | 5.5 Calculations are performed to solve problems of mid-length compartment flooding in simple box-shaped hull forms   |
|  | 5.6 Fundamental actions to be taken in the event of partial loss of intact buoyancy are identified  |

<b>6 Perform calculations related to propellers and vessel speed</b>	6.1	Relationship between propellers and vessel speed is explained
	6.2	Problems related to vessel speed and propellers are solved by calculating theoretical, apparent and true speeds, apparent and true slips, wake speed and Taylor wake fraction
	6.3	Impact of fouling on vessel hull and propeller is outlined
<b>7 Calculate voyage and daily fuel consumptions</b>	7.1	Fuel consumption is determined by applying admiralty coefficient for fuel consumption taking account of ship speed, shaft power and displacement
	7.2	Calculations are performed to solve problems of vessel fuel consumption taking account of ship speed, shaft power and displacement
	7.3	Impact of fouling on vessel fuel consumption is explained
<b>8 Calculate pressures and loads on surfaces due to hydrostatics</b>	8.1	Standard formula for hydrostatic pressure is defined
	8.2	Hydrostatic load on vertical and horizontal surfaces is calculated
	8.3	Method of calculating loads on typical tank structures for different filling rates is explained

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

Shipboard areas include one or more of the following:

- bulkheads
- elemental areas
- water planes

Shipboard volumes include one of the following:

- transverse sectional areas
- water plane areas

Problems related to vessel displacement include one of the following:

- addition of mass
- removal of mass

Coefficients for areas include one of the following:

- midships (CM)
- waterplane (CW)

Coefficients for underwater volumes include one of the following:

- block (Cb)
- prismatic (Cp)

Centre of gravity includes one or more of the following:

- centre of gravity (CG)
- longitudinal centre of gravity (LCG)
- vertical centre of gravity (VCG)

Mass includes one or more of the following:

- ballast
- cargo
- fuel
- passengers

Filling rates include one or more of the following:

- accidental flooding
- tank testing



## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5004A Apply basic principles of naval architecture.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL002 Apply basic principles of naval architecture**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic principles of naval architecture
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to speed, fuel consumption and stability of commercial vessels
- identifying and interpreting numerical and graphical information, and performing mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure
- identifying, collating and processing information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- performing accurate and reliable calculations
- reading and interpreting written information needed to perform calculations related to the seaworthiness of commercial vessels
- solving problems using appropriate laws and principles
- using calculators to perform mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic structural members of a ship and the proper names of the various parts
- buoyancy
  - centre of gravity:
  - centre of gravity (CG), longitudinal centre of gravity (LCG), vertical centre of gravity (VCG)
  - calculations
- density correction formula
- fuel consumption calculations

- hydrostatic pressure
- principle of displacement
- ship:
  - stability
  - stability calculations
  - measurements
  - displacement
- shipboard:
  - areas
  - volumes
- Simpson's Rules
- Tonnes per centimetre (TPC) immersion
- trim and stress tables, diagrams and stress calculating equipment
- vessel speed calculations
- watertight integrity.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL003 Demonstrate basic knowledge of marine auxiliary boilers

## Modification History

Release 1. new unit of competency.

## Application

This unit involves the knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |
|---|--|
| <b>1 Distinguish between different types of auxiliary boilers</b> | 1.1 Design and use of water tube and fire tube auxiliary boilers are compared and contrasted                           |
|   | 1.2 Movement of water and gas in an operating boiler is sketched   |
|   | 1.3 How variations to operating pressure and saturation temperature in an auxiliary boiler can be used to get wet, dry |

		or superheated steam is explained
<b>2</b>	<b>Recognise different functions of steam and different components of steam systems</b>	<p>2.1 Key features of steam and other heating systems are compared and contrasted</p> <p>2.2 Steam side requirements of an auxiliary steam turbo alternator are compared and contrasted with other steam-powered machinery</p> <p>2.3 Typical steam and condensate system is outlined</p>
<b>3</b>	<b>Explain fuel oil system of auxiliary boilers</b>	<p>3.1 Combustion process is explained and factors that affect combustion in a boiler are outlined</p> <p>3.2 Differentiation is made between different burner types</p> <p>3.3 Operation of a complete fuel oil system for an auxiliary boiler including the functions of components for automatic combustion control is outlined</p>
<b>4</b>	<b>Explain procedure for operating fired and unfired boilers</b>	<p>4.1 Locations of all mountings and fittings on auxiliary boilers are identified and their functions are outlined</p> <p>4.2 Purpose of all alarms and shut downs incorporated in auxiliary boilers is clarified</p> <p>4.3 Types and operation of safety valves are outlined</p> <p>4.4 Procedure for lighting off a boiler from cold is clarified</p> <p>4.5 Procedure for laying up for short and long periods including full blow down and shut down procedures is clarified</p> <p>4.6 Procedure for isolating an auxiliary boiler after shut down is clarified</p>
<b>5</b>	<b>Explain procedure for sampling and testing boiler water</b>	<p>5.1 Effects of poor water treatment practices on safety and boiler function are identified</p> <p>5.2 Correct procedure for taking boiler and feed water sample and possible errors that might occur are clarified</p> <p>5.3 Common water tests carried out are outlined and typical results are stated</p> <p>5.4 Chemicals used for treatment of boiler water are named and acceptable range of chemical reserves found in boiler waters are confirmed</p>
<b>6</b>	<b>Explain procedure</b>	<p>6.1 Method of testing and changing a gauge glass is outlined</p>

<b>for maintaining water level in the boiler</b>	6.2	Effects of blockages in water, steam and drain cocks on levels in gauge glass are outlined
	6.3	Procedure for when a gauge glass apparently shows no water is clarified
<b>7 Explain common hazards and defects and relevant prevention/ control procedures</b>	7.1	Hazards and defects associated with auxiliary boilers are identified
	7.2	How water hammer can be prevented in auxiliary boilers is outlined
	7.3	Symptoms, causes, effects and actions to be taken in the event of oil contamination of boiler water are determined
	7.4	Difference between and measures taken to avoid fire and water side explosions are clarified
	7.5	Causes, mechanism, prevention and control of economiser fires are detailed

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Mountings and fittings on auxiliary boilers include one or more of the following:

- air release cock
- auxiliary steam stop valve
- blow down valve
- feed check or control valve

- main steam stop valve
- pressure gauge connection
- safety valves
- sampling connection
- scum valve
- water level gauge
- whistle stop valve

Hazards and defects include one or more of the following:

- chemical hazards
- enclosed space
- illumination of work area
- machine guarding
- manual handling
- materials
- rubbish and combustible
- steam and fuel leaks
- thermal hazards
- trips

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5005A Demonstrate basic knowledge of marine auxiliary boilers.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL003 Demonstrate basic knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. new unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information related to marine auxiliary boilers
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic operation of marine auxiliary boilers
- identifying and applying relevant solutions for addressing problems associated with marine auxiliary boilers
- identifying and interpreting diagnostic information and performing mathematical calculations related to operating, maintaining and repairing marine auxiliary boilers
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine auxiliary boilers.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of operation of boilers and steam systems
- combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- common boiler defects and repair procedures
- fuel oil system for an auxiliary boiler
- fittings mounted on boilers
- hazards associated with running boiler plant
- operating principles relating to steam generation in fired and unfired boilers
- principles of boiler operation in normal and emergency situations



- procedures for maintaining water level in boilers
- purpose of alarms and shut downs in marine boilers
- treatment, sampling and testing of boiler water
- types of auxiliary boilers and typical operating pressures and temperatures
- typical feed systems for marine boilers
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL004 Demonstrate basic knowledge of marine auxiliary machinery and equipment**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems on board a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L - Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Outline layout of engine room and functions of auxiliary machinery in engine room**

- 1.1 Layout of a typical engine room is outlined
- 1.2 Types and functions of auxiliary machinery found in an engine room are explained
- 1.3 Location, function and operation of all safety devices found on main and auxiliary machinery and within engine room,

- including shut downs and engine room escape routes is outlined
- 1.4 Common operating pressures and temperatures of fluids within engine room are identified and how to respond to abnormal parameters is clarified
- 2 Explain duties and responsibilities of a watchkeeper engineer during a watch**
- 2.1 Duties and responsibilities of a watchkeeper engineer with respect to safety of personnel and vessel during and taking over the watch are clarified
- 2.2 Importance of ensuring all events related to machinery are recorded in the log is explained
- 2.3 Duties and responsibilities of a watchkeeper engineer in prevention and extinction of fire in machinery spaces are clarified
- 2.4 Duties and responsibilities of a watchkeeper engineer in relation to prevention of flooding and avoidance of pollution are clarified
- 2.5 Routine duties and responsibilities of a watchkeeper engineer with respect to safe operation of propulsion and auxiliary machinery are clarified
- 2.6 Duties and responsibilities of a watchkeeper engineer on an unmanned machinery space (UMS) vessel are clarified
- 2.7 Procedure for familiarising oneself on joining a new vessel is clarified
- 3 Recognise key features, applications and treatment of fuels, lubricants and chemicals used on board vessels**
- 3.1 Types, properties, applications and treatments of various fuels used on board vessels are outlined
- 3.2 Procedures to be followed before and during fuel bunkering are clarified
- 3.3 Types, properties, applications and treatments of various lubricants used on board vessels are outlined
- 3.4 Uses and safe handling methods for various types of chemicals used on board vessels are outlined
- 3.5 Fuel system layout including fuel treatment method is detailed
- 3.6 Working principle, construction and safe operation of purifiers and clarifiers is explained

- |  |     |  |
|--|-----|--|
| <b>4 Explain operation and maintenance of typical pumping systems used on board vessels</b>                  | 4.1 | Basic working principles, components and properties of different types of pumps are outlined   |
|  | 4.2 | Types of heat exchangers, their basic working principles and applications are outlined   |
|  | 4.3 | Correct operation and maintenance of pumps and heat exchangers is detailed   |
|  | 4.4 | Key features of bilge, cargo and ballast pumping systems are outlined  |
|  | 4.5 | Types, operating principles and requirements for oily-water separators or similar equipment are outlined   |
|  | 4.6 | Other approved methods of disposing of oily water are identified   |
|  | 4.7 | Procedure for completing oil record book is clarified  |
| <b>5 Explain operation and maintenance of marine air compressors</b>   | 5.1 | Types, characteristics, components and applications of various compressors used on board vessels are compared and contrasted   |
|  | 5.2 | Correct pre-operational checks, starting procedure, safe operation and basic maintenance required for air compressors are detailed   |
|  | 5.3 | Potential safety hazards associated with compressed air are identified   |
|  | 5.4 | Locations of all mountings, safety devices, alarms and shut downs on compressors, air receivers and compressed air systems are identified and their functions are outlined |
|  | 5.5 | Different requirements and production methods for control air, method of production and special requirements for a breathing apparatus compressor, are clarified           |
| <b>6 Explain different types, safe operation and testing of steering gear commonly used on board vessels</b> | 6.1 | Essential statutory regulations covering operation of steering gear are established  |
|  | 6.2 | Operation of different types of steering gear used on board vessels is clarified   |
|  | 6.3 | Working principle of variable delivery pumps used in steering gear is explained  |
|  | 6.4 | Location of all alarms and safety devices associated with  |

		steering gear is identified and their functions are outlined
	6.5	Process for testing steering gear and monitoring its performance is explained
<b>7 Explain operation of an evaporator</b>	7.1	Why 'fresh water' may have to be produced from seawater is explained
	7.2	Function, construction and operation of evaporators is explained
	7.3	Correct starting procedure, safe operation and basic maintenance required for an evaporator is clarified
	7.4	Process for testing the evaporator and monitoring performance is explained
	7.5	Treatment of distillate for domestic purposes is outlined
	7.6	Quality necessary if water being produced by a distiller is to be used for human consumption is outlined
<b>8 Explain basic operation of marine refrigeration systems</b>	8.1	Properties of an ideal refrigerant are listed
	8.2	Refrigerants commonly used on board are listed and reason for their use is clarified
	8.3	Basic construction and operation of a marine refrigeration system is explained
	8.4	Preparation, operation, fault detection and necessary actions to prevent damage in marine refrigeration systems is confirmed
	8.5	Personal safety and environmental hazards associated with CFCs and ozone depleting substances are identified
<b>9 Explain basic operation of marine air-conditioning and ventilation systems</b>	9.1	Basic construction and operation of marine air-conditioning and ventilation systems in routine and emergency situations is explained
	9.2	Preparation, operation, fault detection and necessary actions to prevent damage in marine air-conditioning and ventilation systems is confirmed
<b>10 Explain basic operation of marine gas turbines</b>	10.1	Basic flow of air and gas through a simple cycle marine gas turbine is outlined
	10.2	Materials and construction of compressor, combustion system and turbine in a single and two-shaft design turbine

are detailed

- |   |      |  |
|---|------|--|
|   | 10.3 | Basic controls required for the control and protection of the plant are outlined                               |
|   | 10.4 | Accessories necessary for safe operation are listed  |
| <b>11 Explain types, safe operation and maintenance of deck machinery</b> | 11.1 | Types, basic construction and operation of deck machinery are outlined   |
|   | 11.2 | Preparation, operation, fault detection and necessary actions to prevent damage in deck machinery is confirmed |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| Types of auxiliary machinery include one or more of the following: | <ul style="list-style-type: none"><li>• boiler</li><li>• compressors</li><li>• diesel generator</li><li>• evaporators</li><li>• pumps</li><li>• refrigerating installation</li><li>• separators</li></ul> |
|--|---|

- |  |  |
|--|--|
| Functions of auxiliary machines include one or | <ul style="list-style-type: none"><li>• applying main power of engines for propulsion and manoeuvring</li><li>• keeping ship dry and trimmed</li><li>• mooring ship and handling cargo</li></ul> |
|--|--|

- more of the following:
- providing for safety
  - supplying domestic needs such as fresh water
  - supplying needs of main engines and boilers
  - supplying ship with electric power and lighting

- Types of chemicals include one or more of the following:
- cleaning fluids
  - fuel additives
  - solvents

- Types of pumps include one or more of the following:
- axial flow
  - centrifugal
  - gear
  - reciprocating
  - screw
  - vane

- Types of heat exchangers include one or more of the following:
- plate
  - shell and tube

- Features of bilge, cargo and ballast pumping systems include one or more of the following:
- safety fittings
  - sensing devices
  - types of valves

- Compressors include one or more of the following:
- breathing apparatus compressor
  - lubricated reciprocating air compressors
  - non-lubricated reciprocating air compressors
  - oil free air compressors
  - rotary screw compressors

- Types of steering gear include one or more of the following:
- electrical
  - ram
  - rotary vane
  - oscillating steering

Steering gear includes one or more of the following:

- hunting gear
- telemotor

Accessories include one or more of the following:

- accessory gear
- lube oil coolers
- lube oil drive
- lube oil filter
- starting device

Deck machinery includes one or more of the following:

- accommodation ladders
- anchor winch
- cranes
- davits
- mooring winch

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5006A Demonstrate basic knowledge of marine auxiliary machinery and equipment.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL004 Demonstrate basic knowledge of marine auxiliary machinery and equipment**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information and sketching diagrams to interpret and explain testing requirements related to the operation of marine auxiliary machines
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic principles of marine auxiliary machines
- identifying and interpreting numerical and graphical information related to starting up and shutting down marine auxiliary machines on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications and electrical and control circuit diagrams.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- fuels and basic principles of fuel systems
- nature and causes of typical start up and shut down malfunctions of main and auxiliary machinery and associated systems, and available methods for their detection and rectification
- operational characteristics and performance specifications for different types of auxiliary machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators
- principles and procedures of machinery lubrication

- procedures for carrying out start up and shut down of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- purpose and content of safety data sheets/material safety data sheets
- safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine auxiliary machinery and associated systems
- types of auxiliary machinery and components
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL005 Demonstrate basic knowledge of marine control systems and automation

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the knowledge of marine automation and process control required by engineers to operate control systems on board a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Outline basic actions and functions of automation equipment in marine contexts**

- |     |  |
|-----|--|
| 1.1 | Basic concept of an automatic control system is explained using a simple block diagram, correct Australian Standard symbols and layout |
| 1.2 | Components and operation of automatic control systems are outlined   |

- |   |     |  |
|---|-----|--|
|   | 1.3 | Relative advantages and disadvantages of different mediums used in shipboard automatic control systems are explained               |
| <b>2 Explain action of nozzle flapper mechanism in pneumatic instruments</b>  | 2.1 | Principle of operation of nozzle/flapper as a pneumatic control system component is outlined                                       |
|   | 2.2 | Modifications required to make the simple nozzle/flapper mechanism suitable for use in process control systems are explained       |
| <b>3 Explain operating principles and application of sensing and transmitting elements</b>                              | 3.1 | Different methods of measuring level in an unpressurised tank and in a closed pressurised vessel are sketched and outlined         |
|   | 3.2 | Applications at sea, advantages and disadvantages and temperature ranges of filled system thermometers are outlined                |
|   | 3.3 | Operating principles of resistance temperature detector and thermocouple are outlined  |
|   | 3.4 | Different methods for measuring flow on board ships that are suited to remote indication and automatic control are identified      |
|   | 3.5 | Different methods for measuring pressure on board a ship that are suited to remote indication and automatic control are identified |
| <b>4 Explain function of controller element and associated hand/auto changeover station in an analogue control loop</b> | 4.1 | Difference between 'off-on' control action and fully modulating proportional control action is explained                           |
|   | 4.2 | 'Offset' and how it may be removed is explained  |
|   | 4.3 | Basic principles of operation of a simple pneumatic controller are outlined  |
|   | 4.4 | Action and function of hand/auto change over station in an automatic control loop is explained, using suitable schematic diagrams  |
| <b>5 Explain basic operating principles of electronic circuits and components</b>                                       | 5.1 | Components are identified and electronic circuit diagrams are interpreted  |
|   | 5.2 | Correct methods of testing electronic components are detailed  |
|   | 5.3 | Basic operation of operational amplifiers is outlined  |

- |  |     |   |
|--|-----|---|
| <b>6 Explain use of solid state diodes and transistors to control monitoring and alarm systems</b>   | 6.1 | Basic concept of logic and operation of logic gates is outlined   |
|  | 6.2 | Operation of input/output devices and their application to sequential control systems are explained   |
| <b>7 Explain ‘fail safe’ philosophy and its implications for design and operation of main types of actuators available for operating final correcting elements</b> | 7.1 | Purpose and function of a typical valve actuator and positioner are confirmed   |
|  | 7.2 | Constructional differences between typical ‘air-to-open’ and ‘air-to-close’ actuators are confirmed   |
|  | 7.3 | Why ‘fail safe’ may mean valves could either close, open, or remain where they are, upon failure of their associated automatic (or servo remote) operating system, is clarified |
|  | 7.4 | Pneumatic piston actuator/positioner assembly used to move final correcting elements pneumatically is outlined  |
|  | 7.5 | Operating principles of electrical actuators are outlined   |
|  | 7.6 | Operation of a hydraulic steering gear actuator is compared and contrasted with valve actuator and positioner assemblies  |
| <b>8 Specify requirements for a pneumatic control system air supply</b>  | 8.1 | Standard specifications for cleanliness, moisture and oil content of a typical control air system are outlined  |
|  | 8.2 | Importance of ensuring that standards for cleanliness, moisture and oil content are maintained throughout operation of control air system is explained                          |
|  | 8.3 | Typical system that is able to supply compressed air that meets required standards for cleanliness, moisture and oil content is outlined  |
| <b>9 Explain mechanisms for control of physical parameters in a ship’s machinery space</b>   | 9.1 | Typical control loops associated with centralised cooling systems that serve the cooling water system are sketched  |
|  | 9.2 | Function of typical loops required for control of temperature, pressure and viscosity of fuel supplies to main and auxiliary engines are outlined and sketched                  |
|  | 9.3 | Typical pressure and temperature control loops associated with main and auxiliary engine lubricating oil services are sketched  |
|  | 9.4 | Function of components of typical control loops for the automatic control of boilers are outlined and sketched  |

- 9.5 Location and reasons for alarms associated with remote and/or automatic machinery operation to be separate from control function are explained
  - 9.6 Tests and procedures required to meet unmanned machinery space (UMS) requirements are specified and different types of associated alarm and monitoring systems are evaluated
  - 9.7 Power output and control of a main propulsion diesel engine (slow speed two-stroke) and an electrical generator prime mover (high or medium speed four-stroke) are compared and contrasted
- 10 Explain schematically total bridge control of a commercial vessel**
- 10.1 Engine manufacturer schematic diagram is interpreted and how Total Bridge control may be achieved to manoeuvre and control the engine is explained
  - 10.2 Safety interlocks in sequence of operation depicted in schematic diagram are identified and why they are required is explained
  - 10.3 Location of engine control positions, apart from the bridge, is identified from schematic diagram
  - 10.4 Why bridge control is preferred option for manoeuvring main engine in modern commercial vessels is explained

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

Components include one or more of the following:

- actuators
- responders
- sensors

Mediums include one or more of the following:

- compressed air
- electric currents
- electric voltages
- hydraulic fluids

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5007A Demonstrate basic knowledge of marine control systems and automation.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL005 Demonstrate basic knowledge of marine control systems and automation**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing information and sketching diagrams to interpret and explain testing requirements related to control systems on commercial vessels
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic principles of marine automation and process control
- identifying and interpreting numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in control systems on commercial vessels
- identifying methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting written information related to the operation of control systems on commercial vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian Standards for drawing symbols/layouts for schematic diagrams
- characteristics and functions of temperature, pressure and viscosity of fuel
- concept of 'fail safe' philosophy
- concepts of machinery space (UMS), and automated monitoring and control of machinery
- control and monitoring of ship machinery
- control loops
- instrument process and control terms
- mechanical and electrical sensors
- pneumatic and electrical instrumentation transmitters



- principles of:
  - process control
  - basic pneumatic systems and action of pneumatic instruments
  - basic electronic circuits
- safety devices, alarms and monitoring systems
- sensing and transmitting elements
- tests and procedures required to meet UMS requirements
- total bridge control
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL006 Demonstrate basic knowledge of marine diesel engines and systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the knowledge required to operate and maintain marine diesel engines and systems on a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Outline stages of combustion in two-stroke and four-stroke cycle diesel engines**

- 1.1 Two-stroke and four-stroke cycle diesel engines are compared and contrasted
- 1.2 Methods and diagnostic information used in determining engine combustion characteristics are specified
- 1.3 Diagnostic information is used to identify and interpret

			common combustion faults and to produce typical diagrams for analysing faults
<b>2</b>	<b>Explain means of pressure- charging diesel engines</b>	2.1	Pressure-charging principles and their influence on engine design and waste heat recovery are explained
		2.2	Different methods of pressure-charging diesel engines are clarified
		2.3	Emergency isolation procedures used when pressure-charging diesel engines are clarified
<b>3</b>	<b>Explain operation of diesel engine governors</b>	3.1	Governing principles, common governor types and related controls are outlined
		3.2	Different requirements for governing diesel engines for propulsion and power generation are explained
		3.3	Problems of mismatched engine sizes/prime mover types when sharing common loads are outlined
<b>4</b>	<b>Explain properties of materials used in construction of engine components</b>	4.1	Properties of materials used in construction of engine components are specified
		4.2	Dynamic stresses and loads, materials and service limitations of engine components are outlined
		4.3	Construction and operating cycle forces of diesel engine components are outlined
		4.4	Relationship between critical speed, use of detuners/dampers and materials in engine components is clarified
<b>5</b>	<b>Explain safe working practices associated with diesel engines during maintenance, repair and operation</b>	5.1	Safe practices for isolating propulsion and power generation diesel engines prior to work commencement are confirmed
		5.2	Safety protective clothing to be used during all aspects of diesel maintenance is identified
		5.3	Hazards associated with working on diesel engines and systems including working in enclosed spaces are identified
		5.4	Correct procedures for using hydraulic tools and high-pressure fuel injection test equipment are clarified
		5.5	Purpose, operation and maintenance of safety interlocks and protective cut-outs of engine manoeuvring systems is determined
<b>6</b>	<b>Explain procedures</b>	6.1	Causes, symptoms and means of preventing and

**for preventing and responding to crankcase and airline explosions, and scavenge and uptake fires**

- extinguishing uptake and economiser fires are outlined
- 6.2 Risks of continued service with an isolated waste heat unit are assessed
- 6.3 Causes, symptoms, methods of extinguishing and prevention of scavenge fires are evaluated
- 6.4 Causes and hazards associated with starting airline explosions are identified
- 6.5 Protective devices fitted to air starting systems to minimise risk of explosion, and routine inspection and maintenance required are detailed
- 6.6 Causes and ways of preventing crankcase explosions in both diesel and dual-fuel engines are outlined
- 6.7 Procedure to be taken in the event of an early warning of a hazardous crankcase atmosphere and required procedure to be followed after engine has stopped are clarified

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Diagnostic information includes one or more of the following:

- engine efficiency
- fuel consumption
- temperature

- 
- Common combustion faults include one or more of the following:
  - engine cylinder fuel supply
  - lack of total combustion
- Methods of pressure-charging diesel engines include one or more of the following:
  - exhaust gas turbo charging
  - positive displacement engine-driven blowers
  - under-piston assistance
- Diesel engine components include one or more of the following:
  - bedplates
  - camshafts
  - crankshafts
  - cross-heads
  - cylinder heads
  - exhaust valves
  - frames
  - fuel injectors
  - fuel pumps
  - liners
  - pistons
  - tie-rods for two- or four-stroke engines
  - turbochargers
  - valves and rocker gear
- Hazards include one or more of the following:
  - acids
  - chemicals
  - defective or bypassed machinery protective devices
  - defective or inappropriately adjusted exhaust systems
  - enclosed spaces
  - flammable liquids under pressure
  - hydrocarbons
  - lifting heavy components both unaided and with lifting gear
  - leaking oil and fuel
- Causes include one or more of the following:
  - airlock in feed water system
  - cleanliness of economiser tubes
  - failure of economiser feed pump

- loss of feed-water supply

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5008A Demonstrate basic knowledge of marine diesel engines and systems.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL006 Demonstrate basic knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- accessing diagnostic information related to marine diesel engines and systems
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic operation of marine diesel engines and systems
- identifying and applying relevant solutions for addressing problems associated with marine diesel engines and systems
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, maintaining and repairing marine diesel engines and systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine diesel engines and systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of diesel engine operation
- components of diesel engines
- crankcase and air-line explosions, scavenge and uptake fires
- diesel engine
- diesel engine:
  - lubrication systems
  - propulsion and power generation
- manoeuvring systems of diesel engines

- pressure-charging diesel engines, including common service faults, actions to rectify faults, emergency operation and isolation procedures
- properties and characteristics of fires
- safe working practices associated with diesel engines during operation, maintenance, and repair
- starting methods of diesel engines
- work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures.

## **Assessment Conditions**

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARL007 Demonstrate basic knowledge of marine electrical systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate alternators, generators and control systems to supply shipboard electrical power on board a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |     |   |
|--|-----|---|
| <b>1 Explain hazards and isolation procedures associated with live electrical components</b> | 1.1 | Effects of electricity on the human body are outlined                                   |
|  | 1.2 | Procedure to be taken in the event of a person suffering an electric shock is clarified |
|  | 1.3 | Correct procedure for isolating an electrical circuit is clarified                      |

	1.4	Electrical hazards in a vessel at sea or port are identified
<b>2 Explain basic operation of and hazards associated with marine high voltage installations</b>	2.1	Functional and operational requirements for a marine high voltage system are detailed
	2.2	Safety procedures required when working in high voltage environments are outlined
	2.3	Procedure for assisting suitably qualified personnel to carry out maintenance and repair of high voltage switchgear of various types is outlined
<b>3 Explain principles of power generation and transmission in AC and DC circuits</b>	3.1	Excitation methods used to produce alternating current (AC) and direct current (DC) voltages are outlined
	3.2	Basic voltage control of generated AC voltages is outlined
<b>4 Outline key features of basic electrical diagrams used on vessels</b>	4.1	Types of diagrams used to depict electrical systems on ships are outlined
	4.2	Electrical symbols used in basic electrical diagrams are identified
	4.3	Electrical devices used in basic electrical circuits are clarified
<b>5 Use common electrical measuring and testing instruments</b>	5.1	Different types of multimeters are used appropriately
	5.2	Functions of insulation and 'tong' testers are explained
	5.3	Safety requirements when using test equipment are applied
<b>6 Rectify basic electrical faults</b>	6.1	Fault situation is determined by appropriate questioning of client or operator
	6.2	Safe working practices are demonstrated when carrying out fault-finding work
	6.3	Basic common faults of equipment and techniques used to find faults are outlined
	6.4	Knowledge of various types of basic common faults of circuits and techniques is used to find faults
	6.5	Basic common faults in electrical equipment are identified and rectified
<b>7 Outline basic components and layout of a marine electrical</b>	7.1	Layout of a typical three wire insulated electrical system is sketched
	7.2	Interconnections between main switchboard, emergency

<b>switchboard</b>		switchboard and shore supply are explained	
		7.3	Procedure for changing over to emergency switchboard for testing or during loss of mains power is outlined
		7.4	Safety features on a typical marine switchboard are identified
<b>8 Explain operation of shipboard alternators</b>	8.1	Types and construction methods of alternators used on a marine vessel are outlined	
	8.2	Principles of operation of a marine type alternator are outlined	
	8.3	Relationship is shown between voltage and speed in regulation of alternator	
	8.4	Operational characteristics of a marine alternator are outlined	
	8.5	Excitation and automatic voltage regulation systems used with marine alternators are clarified	
<b>9 Explain procedures for paralleling of alternators</b>	9.1	Process of measuring voltage, frequency and phase angle is outlined	
	9.2	Automatic and manual procedures for synchronising and paralleling marine alternators, including machines of different capacities are clarified	
	9.3	How two machines can be adjusted to share kVAR and kW loads is confirmed	
	9.4	Process of removing an alternator from the bus is outlined	

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential

operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Electrical hazards include one or more of the following:

- electric shock
- electrical fire
- moving and rotating electrical equipment
- non-compliance with safe working procedures
- over-speed of electrical machinery
- poor housekeeping procedures
- using equipment beyond safe working limits

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5009A Demonstrate basic knowledge of marine electrical systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL007 Demonstrate basic knowledge of marine electrical systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic principles of alternators, generators and control systems
- identifying and interpreting numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- identifying and suggesting ways of rectifying electrical hazards and emergency situations on a vessel
- identifying methods, procedures and materials needed for operating, maintaining and repairing basic marine electrical systems
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting written information related to electrical circuitry and components on commercial vessels
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- AC/DC voltage
- alternators:
  - construction
  - characteristics
  - synchronised operation
- electrical:
  - safe working practices
  - measuring and testing instruments
  - symbols, basic electrical diagrams/circuits
- marine electrical systems:

- switchboards
- instrumentation
- earthing
- phase angle, power factor and current flow
- procedures for dealing with hazards and emergencies
- resistance, inductance and capacitance
- switchboards and protection:
  - purpose
  - testing and maintenance
  - equipment removal
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL008 Demonstrate basic knowledge of ships and ship routines

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain a safe engineering watch on a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |     |   |
|--|-----|---|
| <b>1 Outline key features of different types of commercial ships</b> | 1.1 | Annotated sketch of profile and midship section of a range of ship types is constructed |
|  | 1.2 | Terms used to quote size of a ship are used appropriately                               |
|  | 1.3 | Plate materials and joining methods used in ship construction are detailed              |

- |   |     |  |
|---|-----|--|
|   | 1.4 | Basic principles of watertight integrity are identified and applied  |
|   | 1.5 | Shipping terms are applied to describe characteristics of commercial vessels   |
| <b>2 Explain dangers associated with entry into engine room spaces</b>          | 2.1 | How atmosphere in engine room spaces may be hazardous is detailed  |
|   | 2.2 | Procedures for obtaining permission to enter engine room spaces are outlined   |
|   | 2.3 | Administrative procedures applying to work in engine room after normal hours are outlined  |
| <b>3 Explain need for standards and other monitoring requirements for ships</b> | 3.1 | International standards relating to construction, equipment and conditions of commercial vessels are outlined  |
|   | 3.2 | National legislation and International Maritime Organization (IMO) conventions concerning safety of life at sea, security and protection of marine environment are outlined  |
|   | 3.3 | Requirements of International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM) Code and safety management system are outlined  |
|   | 3.4 | Qualifications and experience requirements for key personnel on a ship are outlined  |
|   | 3.5 | Personal and ship certificates, and other documents required to be carried on board ship by international conventions, how they are obtained, how they may be verified and period of their legal validity are identified |
|   | 3.6 | Roles and functions of key national and international shipping authorities and organisations are outlined  |
|   | 3.7 | Purpose of surveys and dry-docking of ships are explained  |
| <b>4 Explain responsibilities of personnel on board ship</b>                    | 4.1 | Roles and responsibilities of personnel on board ship are clarified  |
|   | 4.2 | Organisational structure, lines of responsibility and communication on board ship are outlined   |
|   | 4.3 | International maritime conventions, recommendations and national legislation concerning shipboard personnel and training are clarified   |



- |  |      |  |
|--|------|--|
|  | 4.4  | Daily work and shipboard routines relating to engineering watchkeeping are outlined  |
|  | 4.5  | Personal and social responsibilities of personnel on board ship are confirmed  |
| <b>5 Explain engineering watchkeeping procedures</b>                               | 5.1  | Established marine engineering practice and regulatory requirements for conduct, handover and relief of an engineering watch are outlined                            |
|  | 5.2  | Operational procedures and requirements for main propulsion, auxiliary systems and associated controls are outlined  |
|  | 5.3  | Operational procedures and requirements for monitoring the performance of main propulsion, auxiliary systems and associated controls are outlined                    |
|  | 5.4  | Procedures for identifying, rectifying and reporting problems associated with performance of main propulsion, auxiliary systems and associated controls are outlined |
|  | 5.5  | Basic operation, monitoring and maintenance of shafting installations and propeller systems is detailed  |
|  | 5.6  | Engine room resource management principles and procedures required for a safe engineering watch are outlined   |
|  | 5.7  | Safety precautions to be observed during a watch and immediate action to be taken in the event of fire or accident are clarified                                     |
|  | 5.8  | Requirements for recording activities and incidents that occur during keeping an engineering watch are detailed  |
|  | 5.9  | Fatigue management strategies for engine room management team are identified   |
|  | 5.10 | Personal task and workload management techniques appropriate for an engineering watchkeeper are outlined   |
| <b>6 Outline procedures and responses to malfunctions and emergency situations</b> | 6.1  | Potential malfunctions and emergencies relating to main propulsion and auxiliary systems are identified  |
|  | 6.2  | Correct response and required action relating to potential malfunctions and emergencies in main propulsion and auxiliary systems are detailed                        |
|  | 6.3  | Regulatory requirements and reporting requirements for incidents and emergency situations outside watchkeeper  |

limits of responsibility are confirmed

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Ship types include one or more of the following:

- bulk carrier
- container
- general dry cargo
- passenger
- ro-ro
- tanker

Shipping terms include one or more of the following:

- hogging
- panting
- pounding
- racking
- sagging

Key personnel includes one or more of the following:

- crew
- master
- officers

Shipping organisations

- Australian Maritime Safety Authority (AMSA)

and authorities include one or more of the following:

- classification societies
- IMO
- National Maritime Safety Committee
- state and territory marine authorities

Personal and social responsibilities include one or more of the following:

- alcohol and drug abuse
- discipline
- finance
- health and fitness
- hygiene
- relationships
- safety

Engine room resource management principles include one or more of the following:

- allocation, assignment and prioritisation of resources
- assertiveness and leadership
- considering team experience
- effective communication
- obtaining and maintaining situational awareness

Personal task and workload management techniques include one or more of the following:

- coordination
- managing resource constraints
- managing time constraints
- personnel assignment
- planning

Potential malfunctions and emergencies include one or more of the following:

- accidents
- breakdowns
- collisions
- explosion fire
- flooding
- groundings

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5011A Demonstrate basic knowledge of ships and ship routines.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL008 Demonstrate basic knowledge of ships and ship routines**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- access information required to undertake watchkeeping duties in routine and emergency situations
- apply effective decision making techniques
- assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- develop, implement and oversee standard operating procedures
- identify and determine appropriate ways of responding to malfunctions and emergency situations in daily watchkeeping operations
- identify, interpret and process numerical and graphical information required to undertake watchkeeping duties in routine and emergency situations
- identify methods and procedures needed to implement watchkeeping duties on commercial vessels
- read and interpret written instructions, procedures and information relevant to watchkeeping duties.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bridge instrumentation, controls and alarms
- bridge resource management systems
- causes of groundings, collisions and casualties
- composition of bridge/engine room management team
- enclosed spaces
- engineering watchkeeping procedures and practices
- fatigue management principles and techniques
- functions of unmanned machinery space (UMS) controls, alarms and indicators
- hierarchy and organisational structure of shipboard personnel
- key international and Australian Standards relating to shipping
- key shipping authorities and organisations

- maritime communication techniques
- navigational hazards and implications for watchkeeping
- personal and social responsibilities on board ship
- procedures for dealing with malfunctions and emergencies
- rudder and propeller control and vessel manoeuvring characteristics
- sections of International Maritime Organization (IMO) Standards of Training, Certification & Watchkeeping (STCW) Convention and Codes and Australian Maritime Safety Authority (AMSA) Marine Orders dealing with watchkeeping principles, arrangements, procedures, roles and responsibilities
- signs of fatigue
- types of ships and key features of ships
- watch handover procedures
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL009 Perform basic marine engineering calculations

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to perform basic marine engineering calculations required for the operation of marine machinery and equipment.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW or as an Engineer Class 3 Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |   |     |   |     |   |     |  |
|---|---|-----|---|-----|---|-----|--|
| <b>1 Apply mathematical formulae to solve marine engineering problems</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Proportions, variation, percentages and averages are calculated, and method of unity is applied</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Problems involving the manipulation of indices are solved</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Written descriptions of actual or hypothetical marine engineering problems are expressed in mathematical terms</td></tr></table> | 1.1 | Proportions, variation, percentages and averages are calculated, and method of unity is applied | 1.2 | Problems involving the manipulation of indices are solved | 1.3 | Written descriptions of actual or hypothetical marine engineering problems are expressed in mathematical terms |
| 1.1   | Proportions, variation, percentages and averages are calculated, and method of unity is applied   |     |   |     |   |     |  |
| 1.2   | Problems involving the manipulation of indices are solved   |     |   |     |   |     |  |
| 1.3   | Written descriptions of actual or hypothetical marine engineering problems are expressed in mathematical terms  |     |   |     |   |     |  |

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|---|-----|--|
|   | 1.4 | Algebraic formulae and equations are manipulated to change subjects, as and when required  |
|   | 1.5 | Index problems are converted to logarithmic problems, and vice versa, according to the Law of Logarithms   |
|   | 1.6 | Calculator is used to resolve marine engineering problems  |
| <b>2 Calculate areas, volumes and masses of regular and irregular figures</b>                               | 2.1 | Problems related to areas and volumes of regular geometric figures are solved using standard formulae  |
|   | 2.2 | Problems relating to surface areas and volumes of circular figures are solved  |
|   | 2.3 | Centres of gravity and centroids of area are found for both line figures and areas   |
|   | 2.4 | Concept of density is applied to calculate masses  |
| <b>3 Apply trigonometry to solve problems relating to angular measurement and the resolution of vectors</b> | 3.1 | Basic trigonometric ratios of sine, cosine and tangent, together with their reciprocals are explained with respect to the sides of a right-angled triangle                             |
|   | 3.2 | Pythagoras' Theorem is proved  |
|   | 3.3 | Problems associated with single angle trigonometric identities including those derived from the application of Pythagoras' Theorem to the basic sin, cos and tan identities are solved |
|   | 3.4 | Derivation of multiple, double and half angle trigonometric identities are shown and used to simplify complicated trigonometric expressions and identities                             |
|   | 3.5 | Sine Rule and Cosine Rule for solution of triangles are proved and applied   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Not Applicable.

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARL5012A Perform basic marine engineering calculations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL009 Perform basic marine engineering calculations**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining basic mathematical concepts and techniques relevant to marine engineering, and
- identifying and determining appropriate mathematical techniques and formula to solve marine engineering problems
- identifying the methods and procedures needed to select mathematical techniques and formula to solve marine engineering problems
- imparting knowledge and ideas through verbal, written and visual means
- performing accurate and reliable calculations
- performing calculations relevant to marine engineering, including volumes and masses of regular and irregular areas
- reading and interpreting written information on marine engineering problems and express this information in mathematical terms
- solving problems using appropriate laws and principles
- using a calculator to resolve marine engineering problems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- centre of gravity (CG), longitudinal centre of gravity (LCG), vertical centre of gravity (VCG)
- centroids of area
- formulae for areas, volumes and masses of regular and irregular shapes
- indices
- Law of Logarithms
- proportions, variation, percentages, averages and method of unity
- Pythagoras' Theorem.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL010 Apply basic principles of marine electrotechnology

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to explain basic marine electrotechnology principles and to perform basic electrical calculations.

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW.

This unit forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Explain how material properties affect resistance of electrical conductors**

- 1.1 Terms and symbols used in the formula for resistivity are used correctly
- 1.2 How resistance varies with changes in conductor length and cross sectional area is outlined
- 1.3 How resistance varies with temperature is outlined

- |  |     |   |
|--|-----|---|
|  | 1.4 | Calculations are performed that illustrate how material properties affect resistance of electrical conductors   |
| <b>2 Apply Ohm's Law to electrical circuits</b>                      | 2.1 | Main sources of EMF are identified  |
|  | 2.2 | Terms and symbols used in Ohm's Law are used correctly  |
|  | 2.3 | Calculations are performed using Ohm's Law to solve problems involving internal, external and variable resistances in both series and parallel circuits                               |
|  | 2.4 | Calculations are performed to determine power required and /or energy expended by electrical devices  |
|  | 2.5 | Circuits for a wheatstone bridge and a slide wire bridge are sketched and their application on a ship is outlined   |
|  | 2.6 | Calculations are performed dealing with resistances, currents and voltage drops in bridge circuits under null or balanced conditions  |
| <b>3 Apply principles of electrolytic action to electrical cells</b> | 3.1 | How the theory of electrolytic disassociation when applied to common electrolytic solutions and electrode materials explains the generation of EMF from chemical sources, is outlined |
|  | 3.2 | Primary cells are distinguished from secondary cells  |
|  | 3.3 | Calculations are performed to solve problems involving currents, voltage drops and terminal potential difference of cells connected to form batteries in series and in parallel       |
|  | 3.4 | How capacity of a battery is measured is explained  |
|  | 3.5 | Construction of typical batteries used in marine environments is outlined   |
| <b>4 Apply principles of electromagnetism to EMF generation</b>      | 4.1 | Form and properties of the magnetic fields surrounding single conductor and multi-turn solenoid coils when carrying an electrical current are compared and contrasted                 |
|  | 4.2 | Terms and symbols used in Faraday's and Lenz's laws of electromagnetic induction are used correctly   |
|  | 4.3 | Calculations are performed using Faraday's and Lenz's laws of electromagnetic induction to solve problems related to electromagnetism and EMF generation                              |
|  | 4.4 | Fleming's Right Hand Rule is outlined   |

- |   |   |
|---|---|
| <b>5 Explain operation of direct current rotating machinery</b>   | <p>5.1 Construction and methods of maintaining and repairing typical direct current (DC) machines are illustrated</p> <p>5.2 Principle wiring arrangements used with DC machines are outlined</p> <p>5.3 Action of the commutator in DC generators is outlined</p> <p>5.4 Significance of Back EMF (<math>E_b</math>) in the operation of DC motors is outlined</p> <p>5.5 Mathematical formula are applied to show relationships between operational parameters of DC motors</p> <p>5.6 Calculations are performed to solve simple problems relating to power output and efficiency in DC motors</p> |
| <b>6 Explain operation of AC rotating machinery</b>               | <p>6.1 How three-phase AC may be developed out of simple single phase AC is explained</p> <p>6.2 Difference between Star and Delta connections is outlined</p> <p>6.3 How a three-phase supply can generate a rotating magnetic field is explained</p> <p>6.4 Construction of an AC synchronous generator is outlined</p> <p>6.5 Construction of an AC induction motor is outlined</p> <p>6.6 Calculations are performed to show how driving torque is produced in an induction motor</p>   |
| <b>7 Explain parallel operation and load sharing of generator</b> | <p>7.1 Load/voltage curves of AC and DC generators are compared</p> <p>7.2 Main requirements for satisfactory power sharing between both AC and DC generators are outlined</p> <p>7.3 Sequences that occur when load changes on two DC generators working in parallel without an equaliser connection are outlined</p> <p>7.4 Effect of varying power factors on the load/voltage curve of an AC generator is outlined</p>  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Operational parameters of DC motors must include:

- current
- flux density
- torque
- voltage

## Unit Mapping Information

This unit replaces and is equivalent to MARL5001A Apply basic principles of marine electrotechnology.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL010 Apply basic principles of marine electrotechnology**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to marine electrotechnology
- identifying and interpreting numerical and graphical information, and performing mathematical calculations such as resistance of electrical conductors, power output and efficiency in DC motors, and driving torque in induction motors
- identifying, collating and processing information required to perform basic calculations related to marine electrotechnology
- performing accurate and reliable calculations
- reading and interpreting written information needed to perform basic electrical calculations
- solving problems using appropriate laws and principles.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- AC:
  - rotating machinery
  - principles
- basic electrical circuits
- basic principles of marine electrotechnology
- batteries
- DC:
  - rotating machinery



- motors
- difference between AC and DC
- electrical:
  - current
  - power
  - safety
  - units of measurement
- electromagnetic:
  - induction
  - force
- effective verbal, written and visual communication techniques
- Ohm's Law
- parallel circuits
- principles of electromagnetism and electrolytic action
- resistance
- series circuits
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where basic principles of marine electrotechnology can be applied.

Resources for assessment include access to:

- electrical diagrams, specifications and other information required for performing basic electrical calculations
- relevant and appropriate tools, equipment and personal protective equipment currently used in industry

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on basic marine electrotechnology.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL011 Apply basic principles of marine engineering thermodynamics

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to apply basic principles of marine engineering thermodynamics to perform calculations and to explain the operation of marine machinery, including engines, compressors, steam plants, refrigeration and air-conditioning units.

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Explain common thermodynamic

1.1 Desired System International (SI) units applicable to thermodynamic calculations are developed

- |   |     |   |
|---|-----|---|
| <b>principles</b>   | 1.2 | Basic properties of fluids are outlined   |
|   | 1.3 | Gauge pressure is distinguished from absolute pressure  |
|   | 1.4 | Temperature is defined and temperature scales are outlined  |
|   | 1.5 | Calculations are performed by applying formulae for work, power and efficiency  |
| <b>2 Calculate properties of gas during expansion and compression</b> | 2.1 | Calculations are performed by applying Boyle's, Charles's and combined gas law  |
|   | 2.2 | Gas equation is derived and applied to gas process calculations   |
|   | 2.3 | Specific heat of gases and the relationship between $C_p$ , $C_v$ , $R$ and $\Gamma$ is defined   |
|   | 2.4 | Heat transfer is calculated for constant pressure and constant volume processes   |
|   | 2.5 | Isothermal, adiabatic and polytropic processes are outlined and properties of gases after expansion and compression including the effects of turbocharging are calculated |
|   | 2.6 | Work required to compress gases is illustrated and calculated   |
| <b>3 Explain methods of heat transfer</b>                             | 3.1 | Different forms of heat transfer and their application to marine systems are explained  |
|   | 3.2 | Heat transfer through flat layers is calculated   |
|   | 3.3 | Purpose of insulation is explained  |
| <b>4 Explain enthalpy and apply to mixture calculations</b>           | 4.1 | Heat energy is defined  |
|   | 4.2 | Fundamental formula for heat energy transfer is developed   |
|   | 4.3 | Specific heat and its application are identified  |
|   | 4.4 | Enthalpy and change of phase are outlined   |
|   | 4.5 | Heat mixture problems involving water equivalent, ice, water and steam are solved   |
|   | 4.6 | Specific heat of materials are calculated   |
|   | 4.7 | Latent heat and dryness fraction are identified   |
|   | 4.8 | Steam tables are used to find values of enthalpy for water,   |

		saturated and superheated steam and dryness fraction
	4.9	Temperature/enthalpy diagram is constructed from steam table data
<b>5 Explain steam plants and calculate thermal efficiency</b>	5.1	Basic steam plant cycles are sketched and function of each component is outlined
	5.2	Steam cycles on a temperature/enthalpy diagram are illustrated
	5.3	Effects of superheating and under cooling are clarified
	5.4	Calculations are performed for heat supplied, rejected, work and thermal efficiency of a steam plant
	5.5	Methods of improving cycle efficiency are outlined
<b>6 Explain operation of internal combustion engine cycles</b>	6.1	Operating principles of two stroke and four stroke internal combustion engines are outlined
	6.2	Differentiation is made, by use of a pressure/volume diagram, between Otto, Diesel and Dual combustion cycles
	6.3	Mean effective pressure is calculated from an indicator diagram
	6.4	Indicated power formula is developed and related calculations are solved
	6.5	Specific fuel consumption is defined and calculated
	6.6	Ideal cycle and air standard efficiency is defined
<b>7 Explain operating cycle of reciprocating air compressors</b>	7.1	Pressure/volume diagram is used to describe operating cycle of single stage reciprocating air compressors
	7.2	Mass of air delivered by single stage reciprocating air compressors is calculated
	7.3	Clearance volume and its effect on volumetric efficiency is outlined, and volumetric efficiency is calculated
	7.4	Work per cycle for isothermal and polytropic processes is calculated
<b>8 Explain operating cycle of refrigeration and air conditioning</b>	8.1	Principle of refrigeration is outlined
	8.2	Temperature/enthalpy and pressure/enthalpy diagrams are compared

<b>plant</b>	8.3	Refrigerants used in refrigeration and air conditioning machines are identified
	8.4	Refrigeration effect and plant capacity are defined
	8.5	Refrigeration tables are used to calculate refrigeration effect and condition of vapour after expansion
	8.6	Operating cycle of self-contained and centralised air conditioning systems are outlined and compared
	8.7	Relative humidity is defined and key features of a psychrometric chart are outlined
<b>9 Apply linear, superficial and volumetric expansion equations to calculate expansion of liquids and metals</b>	9.1	Expansion processes for metals is defined
	9.2	Coefficient of linear expansion is outlined
	9.3	Linear expansion is applied to calculate machinery clearances and to shrink fit allowances
	9.4	Superficial and volumetric expansion of solids is calculated and recorded
	9.5	Apparent expansion of liquids in tanks is calculated and recorded

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Not applicable.

## Unit Mapping Information

This unit replaces and is equivalent to MARL5002A Apply basic principles of marine engineering thermodynamics.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL011 Apply basic principles of marine engineering thermodynamics**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to marine engineering thermodynamics
- identifying and interpreting numerical and graphical information, and perform basic mathematical calculations related to marine engineering thermodynamics, such as gas expansion and contraction, heat transfer, thermal efficiency, and the expansion of liquids and solids
- identifying, collating and processing information required to perform basic calculations related to marine engineering thermodynamics
- reading and interpreting written information needed to perform basic calculations related to marine engineering thermodynamics
- performing accurate and reliable mathematical calculations using a calculator
- solving problems using appropriate laws and principles.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- basic principles of marine engineering thermodynamics
- enthalpy
- effective verbal, written and visual communication strategies
- expansion processes for metals (conduction, convection, radiation)
- forms of heat transfer (conduction, convection, radiation)
- gas laws
- internal combustion engine cycles
- methods of heat transfer
- operating cycle of reciprocating air compressors
- operating principles of two stroke and four stroke internal combustion engines
- principles of refrigeration
- properties of fluids (density, mass, pressure, specific volume, temperature)
- SI units
- steam plants
- thermodynamic principles
- thermal efficiency calculations
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where this is not available, in simulated workplace operational situations or an industry-approved marine operations site that replicate workplace conditions where basic principles of marine engineering thermodynamics can be applied.

Resources for assessment include access to:

- diagrams, specifications and other information required for performing basic calculations related to marine engineering thermodynamics
- regulations, codes of practice and operation manuals

- relevant and appropriate tools, equipment and personal protective equipment currently used in industry
- relevant documentation including workplace procedures,
- technical reference library with current publications on basic marine thermodynamics.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL012 Apply basic principles of marine mechanics

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to apply the basic principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |     |  |
|--|-----|--|
| <b>1 Use vector diagrams to calculate the resultant and equilibrant of up to</b> | 1.1 | Meaning of force as a vector, moment of a force, resultant and equilibrant are explained |
|  | 1.2 | Forces using the triangle and polygon of forces are determined                           |

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| <b>four coplanar forces</b>                                     | 1.3 | Moments and couples applied to beams and levers are explained  |
|   | 1.4 | Centroid of an area is calculated  |
|   | 1.5 | Centre of gravity of regular geometrical shapes is calculated  |
|   | 1.6 | Resultant and equilibrant of a system of concurrent coplanar-planer forces are calculated  |
| <b>2 Solve problems involving friction</b>                      | 2.1 | Nature of friction and the laws of dry sliding friction are explained  |
|   | 2.2 | Influence of lubrication on bearings and plain surfaces is outlined  |
|   | 2.3 | Coefficient of friction is derived   |
|   | 2.4 | Laws of friction are applied to movement in a horizontal plane and the force to overcome friction on horizontal surfaces                               |
|   | 2.5 | Effect of lubricating two surfaces in contact with each other is outlined  |
| <b>3 Apply laws of motion</b>                                   | 3.1 | Laws of motion are explained   |
|   | 3.2 | Velocity/time and acceleration/displacement graphs are sketched and adapted to derive the standard velocity formula for both linear and angular motion |
|   | 3.3 | Formula and/or graphs are applied to solve problems of linear and angular velocity   |
|   | 3.4 | Linear motion is converted to angular motion and revolutions to radians  |
| <b>4 Solve problems in dynamics related to marine machinery</b> | 4.1 | Relationship between torque, work, energy and power in marine engines and compressors is explained   |
|   | 4.2 | Conservation of energy theorem is used to calculate energy and power during linear and angular motion  |
|   | 4.3 | Meaning of momentum is explained   |
|   | 4.4 | Calculations are performed associated with the collision of rigid bodies   |
|   | 4.5 | Centrifugal force is distinguished from centripetal force  |

	4.6	Centrifugal and centripetal force in relation to marine machinery is calculated
<b>5 Determine efficiency of lifting and geared marine machinery</b>	5.1	Velocity ratio, mechanical advantage and efficiency of simple machines is calculated
	5.2	Calculations are performed to solve problems related to the operation of simple machines
<b>6 Calculate stress and strain due to axial loads</b>	6.1	Normal stress is distinguished from strain
	6.2	Hooke's Law for stress and strain is explained
	6.3	Meaning of elastic limit, ultimate tensile strength, yield stress, limit of proportionality and factor of safety is explained
	6.4	Normal stress and strain caused by axial loads is calculated
<b>7 Determine shear stress and strain in coupling bolts and simple bolted connections</b>	7.1	Shear stress in simple bolted connections is determined
	7.2	Torque theory is applied to calculate shear stress in coupling bolts
<b>8 Determine stresses in thin walled pressure vessels</b>	8.1	Factor of safety and joint efficiency factor for pressure vessels is calculated
	8.2	Hoop and longitudinal stress in thin walled pressure vessels is calculated

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Simple machines include one or more of the

- hydraulic jack
- pulley blocks
- reduction gears

following:

- screw jack
- single and double purchase crab winches
- warwick screw
- wheel and axle
- worm driven chain blocks

## Unit Mapping Information

This unit replaces and is equivalent to MARL5003A Apply basic principles of marine mechanics

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL012 Apply basic principles of marine mechanics**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to marine mechanics
- identifying and interpreting numerical and graphical information, and performing mathematical calculations to determine resultant and equilibrant of coplanar forces, linear and angular velocity, and hoop and longitudinal stress in thin walled pressure vessels
- identifying, collating and processing information required to perform basic calculations related to marine mechanics
- reading and interpreting written information needed to perform basic calculations in marine mechanics
- solving problems using appropriate laws and principles
- performing accurate and reliable mathematical calculations using a calculator.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- centre of gravity
- conservation of energy theorem
- effective verbal, written and visual communication strategies
- factor of safety
- force
- joint efficiency factor
- laws of motion

- momentum
- nature and laws of friction
- pressure vessels
- principles of marine mechanics
- stress and strain
- thin cylinder theory
- types and uses of simple machines
- WHS)/(OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where basic principles of marine mechanics can be applied.

Resources for assessment include access to:

- diagrams, specifications and other information required for performing basic calculations related to marine mechanics
- relevant regulatory and equipment documentation that impacts on work activities including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on basic marine mechanics
- tools, materials and equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.



## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARL013 Demonstrate basic knowledge of marine steam turbines and main boilers**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel.

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

L – Marine Engineering

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Interpret an energy balance diagram for a shipboard steam plant**

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|-----|---|
| 1.1 | Ideal theoretical thermodynamic cycle for the operation of a steam plant is outlined  |
| 1.2 | Why actual expansion of steam through a turbine differs from ideal cycle is explained |

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|---|-----|---|
|   | 1.3 | Typical heat losses around a steam plant are identified   |
|   | 1.4 | Effect of air preheating, feed heating and economisation upon energy balance of steam plant's thermodynamic cycle are explained |
|   | 1.5 | Typical heat (and/or mass) balance diagram for a ship's steam plant is interpreted  |
| <b>2 Explain construction and operation of marine high-pressure water boilers</b> | 2.1 | Advantages of water tube boiler over fire tube boiler for shipboard applications are outlined                                   |
|   | 2.2 | Construction and operation of a 'D' type membrane furnace boiler with superheater, economiser and air pre-heater is explained   |
|   | 2.3 | External fittings required by Classification Society Rules on any large boiler are identified                                   |
|   | 2.4 | Internal fittings of a boiler's main steam drum are identified  |
|   | 2.5 | How automation is applied to boiler control is clarified  |
|   | 2.6 | Start up, operation and shut down of a main propulsion steam boiler is outlined   |
| <b>3 Explain construction and operation of a main propulsion steam plant</b>      | 3.1 | How common forms of blading and rotor construction are manufactured is clarified  |
|   | 3.2 | How casings of common marine steam turbines are fitted out is clarified   |
|   | 3.3 | Principles of thermodynamics are applied to explain expansion of steam in a typical marine turbine                              |
|   | 3.4 | Importance of start up and warming-through procedures for a steam turbine set is conveyed                                       |
|   | 3.5 | Checks required during routine turbine operation are explained  |
|   | 3.6 | Safety devices for a steam turbine set are identified and normal emergency shut-down procedures are identified                  |
|   | 3.7 | Operation of turbines under normal and emergency conditions is outlined   |
| <b>4 Explain auxiliary machinery required</b>                                     | 4.1 | Construction and operation of different types of auxiliary machinery needed to support main propulsion steam turbines           |

	<b>to support operation of main propulsion steam turbines and boilers</b>		and boilers is outlined
		4.2	Construction and operation of steam and electric motor prime movers required for driving auxiliary machinery are outlined
<b>5</b>	<b>Explain configuration and operating principles of different steam distribution systems used in steam-powered vessels</b>	5.1	Configuration and operating principles of different steam distribution systems is outlined
		5.2	Typical pressure reducing and pressure control valves suitable for steam service are outlined and illustrated
<b>6</b>	<b>Explain operation principles of close feed systems used by boiler/turbine sets</b>	6.1	Difference between an open and a closed feed system is clarified
		6.2	Closed feed system is outlined
		6.3	Pressure feed heaters are outlined
		6.4	Chemical injection equipment suitable for use on any ship's main feed system is explained
<b>7</b>	<b>Explain feed and boiler water treatment</b>	7.1	Recommended limits of characteristics for boiler water and recommended intervals at which tests are undertaken are clarified
		7.2	Reasons for treating boiler water are outlined
		7.3	Different types of hardness in water, their consequences if left untreated, and ways of minimising their effect are explained
		7.4	How corrosion within a boiler is minimised by treating boiler water is explained
		7.5	Causes and ways of avoiding carry-over and caustic embrittlement are explained
		7.6	Safety requirements for handling feedwater and boiler water treatment chemicals are explained
<b>8</b>	<b>Explain transmission of power from the steam turbine main engine to the propeller</b>	8.1	Why reduction gearing is required between steam turbines and propeller is clarified
		8.2	Generation of tooth form is outlined
		8.3	Double helical gearing and difference between single and double reduction gearing are explained

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|--|-----|--|
|  | 8.4 | Applications of epicyclic gearing are explained  |
|  | 8.5 | Function of flexible couplings in a turbine/gearing set is clarified   |
|  | 8.6 | Components of a driveline from main wheel connection, aft, to propeller are listed                                   |
|  | 8.7 | Methods and mechanisms for lubricating a driveline are detailed  |
| <b>9 Explain procedures for preventing and responding to fires and explosions specific to steam propulsion plant</b> | 9.1 | Causes, symptoms and means of preventing and extinguishing fires associated with steam propulsion plant are detailed |
|  | 9.2 | Protective devices associated with boilers to minimise risk of fires, explosions and water shortages are identified  |
|  | 9.3 | Routine inspection and maintenance requirements to prevent fires, explosions and water shortages are outlined        |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Marine steam turbines include one of the following:

- impulse
- reaction

Warming-through procedures include one or more of the following:

- ensuring air vent is open
- minimising thermal shock
- warming up according to manufacturer instructions
- shutting down

Safety devices include one

- axial movement
- gland temperature

or more of the following:

- lube oil pressure
- lube oil temperature
- remote stops
- vacuum condenser pressure
- vibration

Auxiliary machinery includes one or more of the following:

- lube oil supply pump and system
- main boiler forced draught fan
- main condensate extraction pump and air ejector
- main condenser
- main cooling water circulating pump
- main fuel oil supply pump and system
- main feed pump

Steam distribution systems include one or more of the following:

- auxiliary exhaust steam range
- auxiliary superheated steam range
- bled steam systems
- superheated main steam range

Fires include one or more of the following:

- blow back
- economiser
- explosions
- low water level
- uptake

## Unit Mapping Information

This unit replaces and is equivalent to MARL5010A Demonstrate basic knowledge of marine steam turbines and main boilers.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL013 Demonstrate basic knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing diagnostic information related to marine steam turbines
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions to problems that can occur when operating steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, repairing and maintaining marine steam turbines
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- providing accurate and reliable information
- providing appropriate level of detail in responses
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine steam turbines.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
  - methods of turbine control, including safety devices
  - symptoms, causes, effects, and actions to be taken with defects of auxiliary steam turbines
  - construction and operation of main and auxiliary steam turbines
  - procedures for emergency operation of a steam turbine
- effective verbal, written and visual communication strategies
- established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start up, normal running, emergency and shut down situations
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur when operating steam propulsion plant and associated systems, and appropriate preventative and remedial action
- methods of lubricating the principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- procedures for reading, interpretation of readings and indications of the performance of steam propulsion plant and associated systems
- typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements and established safety and anti-pollution rules and regulations
- types, properties, tests, applications and treatment of fuels, lubricants, and solvents/chemicals used onboard a steam vessel, including a basic understanding of the working principles, construction, maintenance and safe operation of centrifuges, filters, and other treatment devices
- units of measurement
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.



Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where basic knowledge of marine steam turbines and main boilers can be demonstrated.

Resources for assessment include access to:

- diagrams, specifications and other information required for performing basic calculations related to marine steam turbines
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on basic marine steam turbines
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL014 Apply intermediate principles of marine electrotechnology

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to apply intermediate marine electrotechnology principles and perform intermediate electrical calculations.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <b>1 Apply concepts of resistivity, resistance and capacitance to series and parallel AC and DC circuits</b> | <b>1.1</b> Calculations are performed to solve problems related to resistance, voltage drop, current and power in series and parallel circuits |
|  | <b>1.2</b> Calculations are performed to solve problems related to temperature coefficient of resistance and change of resistance              |

- of a conductor with a change of temperature
- 1.3 Basic relationships that give total equivalent capacitance for capacitors arranged in series and parallel combinations are derived
  - 1.4 Relationships that give total equivalent capacitance to solve numeric problems involving alternating current (AC) and direct current (DC) circuits are applied
- 2 Explain how principles of electrolytic action apply to electrical cells and batteries**
- 2.1 Kirchhoff's circuit laws are explained
  - 2.2 Calculations to solve problems involving currents, voltage drop and terminal potential difference for cells connected to form batteries in series and in parallel are performed
  - 2.3 Calculations to solve secondary cell charging and discharging problems are performed
  - 2.4 Calculations to solve problems related to the efficiency of cells are performed
- 3 Analyse a magnetic circuit**
- 3.1 Key parameters of magnetic circuits are identified
  - 3.2 Formula for calculating the amount of flux generated by a multi turn solenoid coil carrying a current to give the B/H relationship is applied
  - 3.3 Significance of the varying slopes in the B/H curves for a solenoid coil with air, cast iron, cast steel and mild steel cores is explained
  - 3.4 How a magnetic circuit may be created by using a toroidal core within the solenoid coil is demonstrated
  - 3.5 Calculations to solve problems relating to magnetic circuits using different materials in different parts of their cores, including air gaps, are performed
  - 3.6 Effect on flux density of applying an alternating magnetising force to an iron core is shown diagrammatically
- 4 Interpret electromagnetic consequences of a conductor moving relative to a magnetic field**
- 4.1 Faraday's and Lenz's Laws are applied to solve problems relating to the electromagnetic induction of EMF and current
  - 4.2 Generation of EMF is illustrated by a simple, single loop conductor rotating in a uniform magnetic field and how this EMF may be tapped to an external circuit as either AC or DC is explained

- 4.3 How alternating electrical quantities may be represented by rotating phasors is illustrated and explained
- 4.4 Relationships between instantaneous, maximum, average and RMS values of sinusoidally alternating electrical quantities is derived
- 4.5 Mathematical problems are solved by applying relationships between instantaneous, maximum, average and RMS values of sinusoidally alternating electrical quantities
- 5 Analyse circuits that incorporate combinations of resistive, inductive, and capacitive elements**
  - 5.1 Time constant for different circuit combinations subjected to DC EMF's is defined
  - 5.2 Calculations are performed to solve problems involving time constants in DC circuits with changing rates of current in resistive/inductive elements and changing voltages through resistive/capacitive circuit elements
  - 5.3 Differentiation is made between inductive reactance, capacitive reactance and impedance as applied to AC circuits
  - 5.4 Effects of inductive and capacitive reactance upon phasor relationships between applied AC voltage and current are shown
  - 5.5 Concept of total impedance is applied to solution of problems involving single phase AC quantities in the presence of both resistive/inductive and resistive/capacitive circuit elements, arranged in either series or parallel
  - 5.6 Power factor is defined and concepts of real and reactive power usage are applied to solution of problems involving RL and RC elements
- 6 Analyse operation of polyphase AC circuits**
  - 6.1 How three phase AC may be developed out of simple single phase AC is explained
  - 6.2 Voltage and current relationships between line and phase in both Star and Delta 3 phase connections are derived
  - 6.3 Standard Star to Delta and Delta to Star conversion relationships for current and voltage are derived
  - 6.4 Numeric problems involving both balanced and unbalanced circuit loads are solved
  - 6.5 Relationships between kW, kVA and kVAr for 3 phase AC circuits is derived

	6.6	Calculations are performed using the relationship between kW, kVA and kVAR to solve problems in 3 phase AC circuits
<b>7 Describe basic operating principles of shipboard DC machinery</b>	7.1	Schematic circuits are prepared for separately excited, series, shunt and compound connected generators and motors to illustrate wiring arrangements used with DC machines
	7.2	EMF equation for a DC generator to solve shipboard problems is applied
	7.3	Torque equation for a DC motor to solve shipboard problems is applied
	7.4	Expression linking back EMF parameters for a DC motor is derived and used to solve shipboard problems
	7.5	Various losses that can occur in DC motors and generators are calculated
<b>8 Perform calculations related to operation of AC generators</b>	8.1	Construction features of the AC synchronous generator are explained
	8.2	EMF equation for an AC generator is derived, taking into account distribution and pitch factors
	8.3	Expression for the magnitude and speed of the rotating flux generated by a three-phase supply is derived
	8.4	Voltage regulation for synchronous generator is defined
	8.5	Effect of power factor on load characteristic of an AC generator is illustrated
<b>9 Perform calculations related to operation of three-phase AC induction motors</b>	9.1	Construction features of the AC induction motor are explained
	9.2	Expression for slip of an induction motor rotor is derived and applied to frequency of its rotor EMF and current
	9.3	Expression for magnitude of rotor EMF and current is derived, taking into account distribution and pitch factors
	9.4	Relationships between rotor torque, rotor losses and slip indicating factors that affect torque are outlined
	9.5	Significance of torque/slip curves for an induction motor is explained
	9.6	Relationship between starting torque and applied voltage is established and consequences of this upon starting methods

are outlined

**10 Explain operating principles of basic electrical instrumentation**

- 10.1 Schematic circuit diagrams are prepared that illustrate the main features and applications of moving coil and moving iron voltmeters and ammeters
- 10.2 Schematic circuit diagrams are prepared that illustrate the main features and applications of air and iron cored dynamometer type wattmeters
- 10.3 Dangers associated with current and voltage transformers on high current and voltage systems are identified

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Key parameters of magnetic circuit include one or more of the following:

- current
- flux
- flux density
- magnetising force
- magneto motive force

Circuit combinations must include:

- resistive/capacitive
- resistive/inductive

Losses include one or more of the following:

- copper losses
- iron losses or magnetic losses
- mechanical losses

## Unit Mapping Information

This unit replaces and is equivalent to MARL6001A Apply intermediate principles of marine electrotechnology.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL014 Apply intermediate principles of marine electrotechnology**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formula and techniques to solve problems related to marine electrotechnology
- identifying and interpreting numerical and graphical information, and performing mathematical calculations such as the relationship between starting torque and applied voltage in three phase AC induction motors
- identifying, collating and processing information required to perform calculations related to marine electrotechnology
- performing accurate and reliable mathematical calculations using a calculator
- reading and interpreting written information needed to perform intermediate electrical calculations
- solving problems using appropriate laws and principles.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- AC induction motors
- AC principles
- batteries
- circuit diagrams
- DC motors
- difference between AC and DC
- effective verbal, written and visual communication strategies
- electrical:
  - current
  - power
  - units of measurement
- electromagnetic:
  - force
  - induction
- Faraday's and Lenz's Laws of Electromagnetic Induction
- intermediate electrical circuits
- intermediate principles of marine electrotechnology
- Kirchhoff's circuit laws
- magnetic circuits
- National and international maritime regulations, IMO Conventions and Codes applicable to the operation of electrical and electronic control equipment on vessels of typically unlimited propulsion power
- Ohm's Law
- polyphase AC circuits
- principles of:
  - electrical safety
  - electrolytic action
  - electromagnetism
- parallel circuits
- principles and procedures for electrical and electronic measurement
- series circuits
- shipboard DC machinery
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where intermediate principles of marine electrotechnology can be applied.

Resources for assessment include access to:

- appropriate range of relevant operational situations in the workplace
- electrical diagrams, specifications and other information required for performing intermediate electrical calculations
- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- relevant tools, equipment, materials and personal protective equipment currently used in industry
- technical reference library with current publications on intermediate marine electrotechnology.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL015 Apply intermediate principles of marine engineering thermodynamics

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to apply intermediate principles of marine engineering thermodynamics to perform calculations and explain the operation of marine machinery, including engines, compressors, steam plants, refrigeration and air-conditioning units.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Calculate heat mixtures involving water equivalent,**

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|-----|--|
| 1.1 | Key terms associated with heat transmission are explained    |
| 1.2 | Heat transfer is calculated between liquids and solids using |

<b>change of phase, and feed heating</b>		water equivalent
	1.3	Flow is differentiated from non-flow heating and cooling processes
	1.4	Effects of superheating and sub-cooling on steam plant efficiency are outlined
	1.5	Mass balance throughout a steam plant cycle is constructed and effects of pressure and temperature on cycle efficiency are analysed
<b>2 Determine fluid properties of steam</b>	2.1	Relationship between saturated and superheated steam, including dryness fraction, is explained
	2.2	Regions on a temperature/enthalpy diagram are constructed and identified
	2.3	Steam tables are used to determine fluid properties
	2.4	Changes of enthalpy throughout a system are identified
	2.5	Operating principles and application in steam plants of throttling, separating and combined throttling, and separating calorimeters are explained
	2.6	Calorimeters are applied to determine dryness fraction of steam
<b>3 Calculate boiler efficiency and boiler water density</b>	3.1	Efficiency of saturated and superheated steam boilers is calculated
	3.2	Where loss of efficiency occurs is shown
	3.3	Concept of parts per million for density of boiler water is explained
	3.4	Changes in boiler water density due to contaminated feed are calculated
	3.5	How acceptable dissolved solids and water levels may be maintained in a boiler is shown
<b>4 Determine steam turbine velocity</b>	4.1	Principles and differences between pressure and velocity changes in reaction and impulse steam turbines are explained
	4.2	Velocity diagrams to calculate steam velocity at exit of nozzles and blades are applied
	4.3	Graphical and mathematical methods to determine blade

		angle, steam velocity, thrust, power, and efficiency of single stage impulse and reaction steam turbines are applied
<b>5 Calculate calorific value and the air fuel ratio for solid and liquid fuels</b>	5.1	Elements and compounds present in fuel and the products of combustion are evaluated
	5.2	Air/fuel ratio, gravimetric and volumetric analysis are explained
	5.3	Chemical equations for combustion elements and compounds are developed and elements of combustion are analysed
	5.4	Bomb calorimeter is used to find calorific value of a fuel
	5.5	Formula to calculate calorific value of a fuel from mass analysis of fuel is applied
	5.6	Air required for combustion is calculated
<b>6 Calculate thermal expansion</b>	6.1	Coefficient of linear expansion and its significance to different materials is explained
	6.2	Clearances and shrink fit allowances are calculated
	6.3	Stresses generated with restricted expansion are calculated
	6.4	Volumetric expansion of solid and liquids, and allowance required for fluid expansion in tanks and systems is calculated
<b>7 Apply gas law equations</b>	7.1	Compression and pressure ratio is explained and related to combined gas law equation
	7.2	Combined gas law equation is applied to constant volume and constant pressure processes
	7.3	Specific gas constant of a gas or mixture of gases is calculated
	7.4	Differentiation is made between specific heat of gases, ratio of specific heats, work and change in internal energy
	7.5	Changes in internal energy associated with specific heat of gases, ratio of specific heats and work are calculated
<b>8 Calculate gas conditions, work and thermal efficiency of internal combustion</b>	8.1	Processes associated with expansion and compression of gases are explained
	8.2	Gas conditions and index of compression at end of each process are determined

<b>engines</b>	8.3	Work formula is derived for each process and derived formula is applied to calculate work and power per cycle
	8.4	Air standard cycle is applied to determine amount of fuel consumed and work produced by an internal combustion engine
	8.5	Differentiation is made between air standard efficiency and thermal efficiency
	8.6	Thermal efficiency of engine cycles is calculated
<b>9 Perform calculations related to refrigeration and air conditioning cycles</b>	9.1	Pressure/enthalpy diagram is applied to describe the refrigeration cycle
	9.2	Importance of superheating and under-cooling in determining stability and well-functioning of refrigeration systems is explained
	9.3	Properties and hazards of refrigerants used in refrigeration and air conditioning systems are identified
	9.4	Refrigeration tables are applied to calculate refrigeration effect, cooling load and coefficient of performance
	9.5	Basic air conditioning cycles are explained
	9.6	Wet and dry bulb temperatures are explained
	9.7	Humidity conditions are determined using psychrometric charts
<b>10 Solve heat transfer problems involving flat plates and thin cylinders</b>	10.1	Different forms of heat transfer are identified
	10.2	Heat flow through composite flat plates using thermal conductivity is calculated
	10.3	Interface temperatures of composite flat layers are calculated
	10.4	Radial conduction of heat through a thin cylinder is calculated
<b>11 Solve problems related to single and multi stage air compression</b>	11.1	Pressure–volume diagram is applied to describe operating cycle of reciprocating compressors
	11.2	Work done by constant pressure, isothermal processes and polytropic processes in reciprocating compressors is calculated
	11.3	Effect of clearance volume on efficiency of reciprocating

	compressors is explained
11.4	Volumetric efficiency and free air discharge in reciprocating compressors is calculated
11.5	Volume, mass flow and temperature are calculated at completion of each process in reciprocating compressors
11.6	How inter-cooling and after-cooling affects overall efficiency of reciprocating compressors is explained
11.7	Quantity of cooling water required by reciprocating compressors is calculated
<b>12 Perform calculations related to engine power and heat balances</b>	
12.1	Indicator and timing diagrams for internal combustion engines are plotted
12.2	Formula is applied to solve problems related to indicated power of internal combustion engines
12.3	Formula is applied to solve problems related to brake power of internal combustion engines
12.4	Morse test is applied to determine the indicated power of internal combustion engines
12.5	Tabular and graphical heat balance diagrams are applied to calculate mechanical, thermal and overall efficiencies of internal combustion engines

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Key terms include:

- enthalpy of fusion
- evaporation
- sensible heat
- transfer of heat energy

- |  |   |
|--|---|
| Processes include one or more of the following:        | <ul style="list-style-type: none"><li>• adiabatic</li><li>• isothermal</li><li>• polytropic</li></ul>   |
| Fluid properties include one or more of the following: | <ul style="list-style-type: none"><li>• density</li><li>• dryness fraction</li><li>• enthalpy of water</li><li>• pressure</li><li>• saturated steam</li><li>• specific volume</li><li>• superheated steam</li><li>• temperature</li></ul> |
| Forms of heat transfer must include:                   | <ul style="list-style-type: none"><li>• conduction</li><li>• convection</li><li>• radiation</li></ul>   |

## Unit Mapping Information

This unit replaces and is equivalent to MARL6002A Apply intermediate principles of marine engineering thermodynamics.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL015 Apply intermediate principles of marine engineering thermodynamics**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- effectively communicating knowledge and ideas through verbal, written and visual means
- identifying and applying appropriate laws and principles and relevant mathematical formulas and techniques to solve basic problems related to marine engineering thermodynamics
- identifying and interpreting numerical and graphical information, and performing basic mathematical calculations related to marine engineering thermodynamics, such as gas expansion and contraction, heat transfer, and thermal efficiency
- identifying, collating and processing information required to perform basic calculations related to marine engineering thermodynamics
- reading and interpreting written information needed to perform basic calculations related to marine engineering thermodynamics.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- air compressor:
  - components
  - faults and hazards
  - first law of thermodynamics
  - operating cycle of reciprocating air compressors
  - performance characteristics
  - property diagrams
  - types

- uses
- working principles of reciprocating compressors
- basic principles of marine engineering thermodynamics
- enthalpy
- expansion and compression of gases
- gas laws
- internal combustion engines:
  - second law of thermodynamics
  - heat engine cycles
  - operating principles of two stroke and four stroke internal combustion engines
  - performance characteristics
  - improvements
- principles of heat transfer and refrigeration
- refrigeration and air conditioning cycles
- steam plants
- System International (SI) units
- thermal efficiency calculations
- thermodynamic principles
- WHS/OHS requirements and work practices

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where intermediate principles of marine engineering thermodynamics can be applied.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

- diagrams, specifications and other information required for performing intermediate calculations related to marine engineering thermodynamics
- relevant and appropriate materials and equipment
- relevant regulatory and equipment documentation that impacts on work activities
- technical reference library with current publications on intermediate marine thermodynamics.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL016 Apply intermediate principles of marine mechanics

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to apply intermediate principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |     |  |
|--|-----|--|
| <b>1 Apply principle of moments to determine forces in supports, connections, bearings and</b> | 1.1 | Equilibrium of solids is explained                               |
|  | 1.2 | Polygon of forces is applied to determine an unknown force       |
|  | 1.3 | Principle of moments is applied to solve moments of any quantity |

<b>support systems</b>	1.4	Resultant of a system of co-planer forces is calculated
	1.5	Twisting moment due to engine crank mechanisms is calculated
	1.6	Moments of areas and solids are calculated
<b>2 Perform friction calculations</b>	2.1	Laws of friction are applied to solve problems involving friction in inclined planes
	2.2	Coefficient of friction is converted to angle of repose
	2.3	Friction theory is applied to solve problems involving screw threads
	2.4	Brake torque is analysed and problems are solved relating to work lost on brake shoes and brake discs
<b>3 Solve motion problems</b>	3.1	Linear velocity/time and acceleration/time graphs are applied to derive standard linear formula
	3.2	Problems of linear and angular motion involving uniform acceleration and deceleration are solved
	3.3	Marine engineering problems involving free falling bodies are solved
<b>4 Solve problems using principle of momentum</b>	4.1	Relationship between momentum and impulse is explained
	4.2	Conservation of energy theory is applied to problems involving collision of perfectly elastic bodies
<b>5 Solve problems using principles of dynamics</b>	5.1	Centripetal force is distinguished from centrifugal force
	5.2	Relationship between centripetal and centrifugal force and mass, angular velocity and radius is clarified
	5.3	Problems are solved involving centripetal and centrifugal forces
	5.4	Centripetal acceleration is distinguished from centrifugal force
	5.5	Out-of-balance forces on co-planer systems are calculated
	5.6	Bearing reactions in rotating shafts are determined
	5.7	Radius of gyration and moment of inertia when applied to rotating bodies is explained

	5.8	Centrifugal forces in governors are calculated
	5.9	Principles of dynamics are applied to solve problems involving rotating bodies, accelerating shafts, motors and flywheels
<b>6 Calculate stresses and strains on components due to axial loading and restricted thermal expansion</b>	6.1	Reduction in area and percentage elongation of tensile test specimens is calculated
	6.2	Stresses in composite bodies of dissimilar dimensions and dissimilar materials are calculated
	6.3	Problems involving thermal stress on components due to temperature change with free and restricted expansion are solved
<b>7 Apply thin cylinder theory to determine stresses in pressure vessels</b>	7.1	Stress on thin-shelled pressure vessels due to internal pressure is calculated
	7.2	Formula for calculating stress on thin-shelled pressure vessels to incorporate special conditions is modified
<b>8 Apply torsion theory to calculate shear stress</b>	8.1	Torsion equation is applied to solve problems involving solid and hollow shafts
	8.2	Power transmitted in shafts and coupling bolts is calculated
	8.3	Torsion equation is applied to calculate stress and deflection in a close-coiled helical spring
	8.4	Power transmitted by shafts and couplings is calculated
<b>9 Solve problems involving fluids</b>	9.1	Variation of fluid pressure with depth is calculated
	9.2	Bernoulli's Theorem is used to solve problems of velocity, pressure and head in pipes and ducted systems
	9.3	Archimedes' Principle is used to solve problems related to floating vessels using real and apparent weight
<b>10 Apply beam theory to solve problems</b>	10.1	Reactions of a loaded beam are calculated
	10.2	Shear force and bending moment diagrams are constructed for simply supported and cantilever beams
	10.3	Shear force and bending moment diagrams for beams with concentrated and uniformly distributed loads are calculated
	10.4	Beam equation is applied to derive stresses in beams loaded

with concentrated and uniformly distributed loads

10.5 Beam equation is applied to calculate bending stresses

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Governors must include:
- porter
  - watt
- Special conditions must include:
- joint efficiencies
  - safety factors

## Unit Mapping Information

This unit replaces and is equivalent to MARL6003A Apply intermediate principles of marine mechanics.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL016 Apply intermediate principles of marine mechanics**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to marine mechanics
- identifying and interpreting numerical and graphical information, and performing mathematical calculations to solve problems related to fluids and stresses
- identifying, collating and processing information required to perform basic calculations related to marine mechanics
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform basic calculations in marine mechanics
- solving problems using appropriate laws and principles
- using calculators to perform mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- basic principles of marine mechanics
- beam theory
- conservation of energy theorem
- factor of safety
- fluids
- forces:
  - balanced and unbalanced forces
  - centre of gravity
  - conditions for equilibrium
  - coplanar
  - definitions of matter, mass, weight, force, density and relative density
  - forces
  - moments of couples
  - parallelogram and triangle of forces
  - pressure
  - scalar and vector quantities
  - vector representation of forces
- joint efficiency factor
- laws of:
  - friction
  - motion
  - momentum
  - motion:
    - action and reaction
    - force, velocity and acceleration
    - linear and angular motion
  - momentum
  - Newton's laws of motion
- pressure vessels
- principle of moments
- principles of dynamics
- relationship between torque and power
- stress and strain:
  - direct stress and strain
  - Hooke's law
  - load extension graphs
  - modulus of elasticity
  - shear stress and strain
- thin cylinder theory
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where intermediate principles of marine mechanics can be applied.

Resources for assessment include access to:

- applicable and relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- appropriate range of relevant operational situations in the workplace
- diagrams, specifications and other information required for performing calculations related to marine mechanics
- technical reference library with current publications on marine mechanics
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL017 Apply intermediate principles of naval architecture

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to perform intermediate calculations related to the seaworthiness of commercial vessels, including those dealing with vessel stability, fuel consumption, power and symmetrical flooding.

This unit applies to the work of a Marine Engineers Class 2 and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Calculate shipboard areas, volumes and displacement**

- |     |  |
|-----|--|
| 1.1 | Simpson's Rules are applied to find typical and non-conforming shipboard areas   |
| 1.2 | Simpson's Rules are applied to calculate water plane areas or transverse sectional areas to determine underwater volumes |

- |  |     |  |
|--|-----|--|
|  | 1.3 | Simpson's Rules are applied to immersed tonnes per centimetre values to determine displacement   |
|  | 1.4 | Tonnes per centimetre is applied to determine change in mean draught due to addition or removal of mass  |
| <b>2 Calculate coefficients of form and changes in draught associated with fluid density</b> | 2.1 | Application of coefficients of form are identified and explained   |
|  | 2.2 | Problems are solved involving coefficients of form   |
|  | 2.3 | Impact of hull modification on hull form coefficients is explained   |
|  | 2.4 | Problems of coefficients of form are solved following change in length by mid body insertion/removal   |
|  | 2.5 | Relationship between underwater volume/draught and fluid density is explained  |
|  | 2.6 | Application of freeboard markings for Load Line Rules is explained   |
|  | 2.7 | Density correction formula is defined  |
|  | 2.8 | Change in mean draught due to change in density is calculated  |
| <b>3 Solve stability problems</b>  | 3.1 | Effects of adding, removing and transferring mass on board or from a vessel are explained  |
|  | 3.2 | Calculations are performed to solve problems involving suspended masses  |
|  | 3.3 | Positive, neutral and negative stability are distinguish from each other   |
|  | 3.4 | How centre of gravity is calculated for redistribution, addition and/or removal of masses is explained, including the use of derricks  |
|  | 3.5 | Problems are solved involving vertical and horizontal movement of masses to calculate KG and GM for typical vessel loaded conditions, together with true shift in vessel centre of gravity between specified conditions and small angle transverse stability |
|  | 3.6 | Vessel righting moment and GZ are explained  |

- |   |      |  |
|---|------|--|
|   | 3.7  | Calculations are performed to solve problems of small angle transverse stability   |
|   | 3.8  | Purpose of an Inclining Experiment is explained  |
|   | 3.9  | Formula for determining initial stability characteristics is applied   |
|   | 3.10 | Calculations are performed to solve problems using Inclining Experiments   |
| <b>4 Calculate loss of transverse stability due to fluid free surface</b> | 4.1  | Principles of liquid free surface are explained  |
|   | 4.2  | Principles of metacentric height are explained   |
|   | 4.3  | Centre of gravity solid is distinguished from centre of gravity fluid  |
|   | 4.4  | Application of the second moment of area using parallel axis theorem to obtain free surface moment of inertia and use of density correction between vessel and free surface fluids is explained        |
|   | 4.5  | Calculations are performed to solve problems of liquid free surface for simple compartments, including correction for free surface on metacentric height [GM] and fluid mass on centre of gravity [KG] |
| <b>5 Calculate centroids and solve problems of hydrostatics</b>           | 5.1  | Importance of area and volume centroids and methods of determining KG, LCF, LCB and bulkhead area centroids is explained   |
|   | 5.2  | Calculations are performed to solve problems related to area and volume centroids  |
|   | 5.3  | Methods of calculating pressures and loads on typical tank structures for different filling rates, accidental flooding or tank testing are explained   |
|   | 5.4  | Use of flat panel stiffeners and shear force reactions applicable to vertical bulkheads is explained   |
|   | 5.5  | Calculations are performed to solve problems in hydrostatics relating to pressure and loads on ship structures, including bulkheads, stiffeners and shear forces                                       |
| <b>6 Solve problems involving propellers</b>                              | 6.1  | Factors that influence the speed of advance are explained  |
|   | 6.2  | Calculations are performed to solve problems of single screw   |

<b>and powering</b>	vessels
	6.3 Relationships between propulsive coefficient, quasi propulsive coefficient and related powers together with typical values of losses for transmission, hull and propeller are explained
	6.4 Components of hull resistance are explained
	6.5 Calculations are performed to show impact of resistance augmentation and thrust deduction factors on powering of full size vessels
	6.6 Causes, effects and methods of reducing cavitation are explained
<b>7 Calculate voyage and daily fuel consumptions</b>	7.1 Admiralty coefficient for fuel consumption is stated taking account of values for ship speed, shaft power and displacement
	7.2 Vessel fuel consumption is calculated using admiralty coefficient
	7.3 Calculations are performed to show relationship between fuel consumption and displacement
	7.4 Calculations are performed to show relationship between daily fuel consumption and speed
	7.5 Calculations are performed to show relationship between voyage consumption, speed and distance travelled
	7.6 Voyage and daily fuel consumption are calculated taking into account propulsion, domestic loads and fuel reserve requirements
<b>8 Solve problems related to symmetrical flooding</b>	8.1 Volume lost-volume gained relationship for flooded compartments is explained
	8.2 Modified volume lost by compartment subdivision is explained using a horizontal flat
	8.3 Modified volume lost by compartment permeability is explained, including consideration of cargo stowage factor and relative density details
	8.4 Problems of symmetrical flooding of simple box-shaped and standard hull forms involving flooding above and below horizontal subdivisions and different permeabilities are solved

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Shipboard areas include one or more of the following:	<ul style="list-style-type: none"><li>• bulkheads</li><li>• elemental areas</li><li>• water planes</li></ul>
Coefficients of form include one or more of the following:	<ul style="list-style-type: none"><li>• block coefficient</li><li>• midship section area coefficient</li><li>• prismatic coefficient</li><li>• waterplane area coefficient</li></ul>
Centre of gravity must include:	<ul style="list-style-type: none"><li>• centre of gravity (KG)</li><li>• longitudinal centre of gravity (LCG)</li><li>• vertical centre of gravity (VCG)</li></ul>
Speed of advance must include:	<ul style="list-style-type: none"><li>• apparent and true slips</li><li>• Taylor wake fraction</li><li>• theoretical, apparent and true speeds</li><li>• wake speed</li></ul>
Related powers must include:	<ul style="list-style-type: none"><li>• delivered</li><li>• effective</li><li>• indicated</li><li>• shaft</li><li>• thrust</li></ul>
Hull resistance must include:	<ul style="list-style-type: none"><li>• frictional</li><li>• residuary</li><li>• total</li></ul>

Shipboard areas include  
one or more of the  
following:

- bulkheads
- elemental areas
- water planes

## Unit Mapping Information

This unit replaces and is equivalent to MARL6004A Apply intermediate principles of naval architecture.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL017 Apply intermediate principles of naval architecture**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve problems related to speed, fuel consumption and stability of commercial vessels
- identifying and interpreting numerical and graphical information, and performing mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed and fuel consumption
- identifying, collating and processing information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- imparting knowledge and ideas through oral, written and visual means
- reading and interpreting written information needed to perform calculations related to the seaworthiness of commercial vessels
- solving problems using appropriate laws and principles
- using calculators in performing accurate and reliable mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- admiralty and fuel coefficients
- buoyancy
- centre of gravity:
  - KG, VCG and LCG
  - calculations
- density correction formula
- displacement
- draught alterations
- fuel consumption calculations
- hydrostatic pressure
- intermediate principles of naval architecture
- metacentre
- principle of displacement
- propellers and powering
- ship:
  - displacement
  - measurements
  - stability
  - stability calculations
- shipboard areas
- shipboard volumes
- Simpson's Rules
- structural members of a ship and the proper names of various parts
- symmetrical flooding
- tonnes per centimetre immersion (TPC)
- traverse stability
- trim and stress tables, diagrams and stress calculating equipment
- vessel speed calculations
- watertight integrity
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where intermediate principles of naval architecture can be applied.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- appropriate range of relevant operational situations in the workplace
- technical reference library with current publications on naval architecture
- tools, equipment, materials and personal protective equipment currently used in industry
- vessel diagrams and specifications and other information required for mathematical calculations related to shipboard areas and volumes, vessel displacement, centre of gravity, vessel speed, fuel consumption, vessel stability, power and symmetrical flooding.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL018 Apply advanced principles of marine electrotechnology

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to explain advanced marine electrotechnology principles and to perform advanced electrical calculations.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Analyse circuits incorporating resistance, inductance and capacitive elements**

- 1.1 Mathematical problems involving resistor inductor (RL) and resistor capacitor (RC) combinations in direct current (DC) circuits are solved
- 1.2 Mathematical problems involving resistive, inductive and capacitive reactance and overall circuit impedance in

alternating current (AC) circuits are solved

1.3 Why large power factors are desirable in AC circuits is explained

1.4 Mathematical problems related to power factor correction mechanisms are solved

1.5 Conditions for resonance in series and parallel RLC circuit combinations are analysed

1.6 Mathematical problems involving resonance in series and parallel RLC circuit combinations are solved

1.7 Differing consequences of resonance to both RLC series and RLC parallel circuit are illustrated

## **2 Apply complex number theory to analyse AC circuit performance**

2.1 J operator is explained

2.2 Rectangular notation of j operator is related to comparable trigonometric and polar notations

2.3 J operator is used in the addition and subtraction of phasors, applying the most appropriate notation to the solution of phasor problems involving current, voltage and impedance

2.4 Conductance, admittance and susceptance are distinguished from each other in terms of resistance, impedance and the j operator

2.5 Problems involving RL and C elements in different circuit combinations using j operator theory are solved

2.6 Power in AC circuit applications using j operator theory is calculated

## **3 Analyse operating principles of electrical instrumentation**

3.1 Mathematical calculations are performed to demonstrate how moving coil and moving iron instruments may have their ranges changed

3.2 Mathematical calculations are performed to demonstrate how dynamometer type wattmeters may have their measuring ranges extended

3.3 Construction, operating principles and functions of electrical meters are outlined

3.4 Principal methods and instruments used in resistance measurement are detailed

- 3.5 Resistance measurements are conducted and verified using appropriate electrical instrumentation
- 4 Analyse operating principles of DC generators**
- 4.1 EMF equation is applied to solve problems related to DC generators
- 4.2 Losses that may occur in DC generators are analysed
- 4.3 Appropriate parametric relationships for DC generator losses, together with expressions for output power and efficiency are derived and associated numerical problems are solved
- 4.4 Basic principles of DC armature winding techniques are explained
- 4.5 Generator armature reaction is explained
- 4.6 Expression for armature EMF is derived and applied to solve problems related to DC generators
- 4.7 Commutator arcing and how this might be minimised or eliminated is explained
- 4.8 Open circuit and load characteristic curves for separately excited, shunt, and compound wound DC generators are derived
- 5 Analyse operating principles of DC motors**
- 5.1 DC torque equation is applied to solve problems related to DC motors
- 5.2 Losses that may occur in DC motors are analysed
- 5.3 Appropriate parametric relationships for DC motor losses, together with expressions for output power and efficiency are derived and associated numerical problems are solved
- 5.4 Speed equation for a DC motor is derived and corresponding characteristics for different winding configurations are sketched
- 5.5 Speed equation and characteristics of different DC motor configurations are applied to explain how DC motor speed may be controlled
- 5.6 Reasons for armature reaction and methods of compensating for its effects are identified
- 5.7 Why DC motors need variable starting resistors are explained

- |  |     |  |
|--|-----|--|
| <b>6 Compare operation of synchronous motors and generators</b>              | 6.1 | Marine applications of synchronous motors and generators are identified  |
|  | 6.2 | Mathematical expression for the magnitude and rotational speed of the magnetic field produced by a three-phase supply is derived           |
|  | 6.3 | Operating principle of synchronous motors is explained   |
|  | 6.4 | Operation of synchronous motors and generators are compared and contrasted   |
|  | 6.5 | Problems using phasor diagrams and mathematical expressions involving the effects of loads and excitation on synchronous motors are solved |
|  | 6.6 | Advantages and disadvantages of AC synchronous motors and generators are analysed  |
| <b>7 Analyse operation of single and three phase transformers</b>            | 7.1 | Basic transformation ratio and EMF equation for an ideal transformer is derived  |
|  | 7.2 | No load and on load phasor diagrams for an ideal transformer are constructed, with negligible voltage drop through its windings            |
|  | 7.3 | Causes of actual transformer losses are explained and relationships associated with the transformer equivalent circuit are derived         |
|  | 7.4 | Open circuit and short circuit tests are applied to calculate transformer efficiency and voltage regulation                                |
|  | 7.5 | Problems related to the operation of auto-transformers are solved  |
| <b>8 Analyse requirements for parallel operation of AC and DC generators</b> | 8.1 | Conditions required for shunt, series and compound wound DC generators to operate in parallel are identified                               |
|  | 8.2 | Numerical problems related to parallel operation of shunt, series and compound wound DC generators are solved                              |
|  | 8.3 | Conditions required for AC generators to operate in parallel are identified  |
|  | 8.4 | Numerical problems related to parallel operation of AC generators are solved   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Electrical meters include one or more of the following:

- energy meters
- frequency meters
- induction disc watt meters
- power factor meters

Problems include one or more of the following:

- tapping point
- turns
- voltages

## Unit Mapping Information

This unit replaces and is equivalent to MARL6005A Apply advanced principles of marine electrotechnology.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL018 Apply advanced principles of marine electrotechnology**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve complex problems related to marine electrotechnology
- identifying and interpreting numerical and graphical information, and performing mathematical calculations to perform tasks such as using phasor diagrams and mathematical expressions to explain the effects of loads and excitation on synchronous motors
- identifying, collating and processing information required to perform complex calculations related to marine electrotechnology
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform complex electrical calculations
- solving problems using appropriate laws and principles
- using calculators to perform complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- 
- AC principles
  - advanced principles of marine electrotechnology
  - circuits:
    - resistance
    - inductance
    - capacitance
  - complex number theory
  - DC generators
  - DC motors
  - difference between AC and DC
  - electrical:
    - circuits
    - current
    - power
    - safety
    - units of measurement
  - electromagnetic:
    - force
    - induction
  - electrical meters:
    - energy meters
    - frequency meters
    - induction disc watt meters
    - power factor meters
  - Ohm's Law
  - operating principles of:
    - DC generators
    - DC motors
    - electrical instrumentation
    - parallel circuits
  - parallel operation of AC and DC generators
  - power factor
  - power factor correction mechanisms
  - resistance
  - single and three-phase transformers
  - synchronous motors and generators
  - WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced principles of marine electrotechnology can be applied.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- electrical diagrams, specifications and other information required for performing advanced electrical calculations
- relevant regulatory and equipment documentation that impacts on work activities
- technical reference library with current publications on marine electrotechnology
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL019 Apply advanced principles of marine engineering thermodynamics

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to apply advanced principles of marine engineering thermodynamics to perform calculations and to explain the operation of marine machinery, including internal combustion and gas turbine engines, air compressors, steam condensers and refrigeration units.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Calculate heat energy with and

1.1 Enthalpy is applied to heat mixture calculations with or without phase change

<b>without phase change</b>	1.2	Enthalpy is applied to calculate resultant conditions of hot wells involving multiple returns
	1.3	Steam conditions in a system when using throttling devices and separators are calculated
	1.4	Entropy is distinguished from enthalpy
	1.5	Entropy values are determined from standard tables
<b>2 Analyse change of phase and state diagrams</b>	2.1	Tables and/or diagrams are used to find enthalpy and entropy values for liquid, part liquid-part vapour and vapour states
	2.2	Carnot cycle is outlined
	2.3	Rankine cycle is outlined
	2.4	Isentropic efficiency is explained
	2.5	Problems are solved involving the efficiency of steam turbines operating in the Rankine cycle
<b>3 Apply Dalton's law of partial pressures to steam condensers</b>	3.1	Dalton's Law is applied to calculate air and condensate extraction from condensers
	3.2	Problems are solved involving cooling water mass flow and cooling water pump work
<b>4 Apply chemical equations for complete and incomplete combustion</b>	4.1	Atomic and molecular weights and kilogram-mol are explained
	4.2	Calorific value of a fuel is calculated by chemical formula
	4.3	Mass of air required for stoichiometric combustion is calculated by gravimetric and volumetric analysis
	4.4	Air fuel ratio is determined when supplied with composition of fuel and exhaust gas analysis
<b>5 Apply gas laws to analyse internal combustion engine efficiencies</b>	5.1	Universal gas constant from AVOGADRO'S hypothesis is determined
	5.2	Heat transfer is calculated for constant volume and constant pressure processes
	5.3	First law of thermodynamics is applied to thermodynamic processes in a closed system
	5.4	Second law of thermodynamics is applied to find thermal efficiency of Carnot cycle

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|---|-----|--|
|   | 5.5 | Mathematical formula is applied to solve problems related to ideal constant volume air standard cycle              |
|   | 5.6 | Mathematical formula is applied to solve problems related to diesel and dual cycles                                |
| <b>6 Calculate performance of internal combustion and gas turbine engines</b> | 6.1 | P/V and out of phase engine indicator diagrams are analysed  |
|   | 6.2 | Work, power, mean effective pressure and thermal efficiency of internal combustion engine cycles is calculated     |
|   | 6.3 | Heat transfer to jacket cooling systems is calculated  |
|   | 6.4 | Open and closed systems for gas turbines are outlined  |
|   | 6.5 | Temperature/entropy diagrams are applied to illustrate gas turbine cycles  |
|   | 6.6 | Power, isentropic efficiencies, thermal efficiency, work and fuel consumption for gas turbine cycles is calculated |
|   | 6.7 | Methods to increase efficiency of gas turbines are specified   |
|   | 6.8 | Reheaters and intercoolers and how they improve efficiency is explained  |
| <b>7 Analyse air compressor performance</b>                                   | 7.1 | Compressor types are classified  |
|   | 7.2 | Volumetric efficiency at free air conditions is explained  |
|   | 7.3 | Work is calculated for isothermal and adiabatic compression, and effect of clearance for reciprocating compressor  |
|   | 7.4 | Pressure ratio for compressor types is analysed  |
|   | 7.5 | Problems are solved relating to multi-staging and intercooling   |
|   | 7.6 | Heat transfer to air or cooling water from an air compressor is calculated   |
|   | 7.7 | Formula to calculate work and efficiency of centrifugal compressors is derived                                     |
| <b>8 Analyse vapour compression refrigeration cycles</b>                      | 8.1 | Design parameters for a vapour compression cycle are explained   |
|   | 8.2 | Pressure/enthalpy diagram is prepared for a refrigeration cycle  |

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|-----------|--|---|
|           | 8.3  | Heat rejected, work done and coefficient of performance (COP) for a basic cycle is calculated |
|           | 8.4  | Effect of sub cooling and superheating is shown on a temperature/entropy diagram              |
|           | 8.5  | COP is calculated with evaporators operating at two different pressures                       |
| <b>9</b>  | <b>Apply psychrometric principles to solve air conditioning problems</b> |   |
|           | 9.1  | Comfort conditions for air conditioning systems are defined                                   |
|           | 9.2  | Key parameters used in defining air condition are illustrated on a psychrometric chart        |
|           | 9.3  | Cooling loads are calculated  |
|           | 9.4  | Problems associated with air delivering and distribution methods are analysed                 |
|           | 9.5  | Methods of controlling noise and vibration in air conditioning systems are analysed           |
| <b>10</b> | <b>Analyse different methods of heat transfer</b>                        |   |
|           | 10.1   | Heat flow through composite divisions is calculated   |
|           | 10.2   | Insulation dimensions and interface temperatures are determined                               |
|           | 10.3   | Problems relating to radiated energy are solved by applying Stefan-Boltzmann Law              |
|           | 10.4   | Problems in heat exchangers are solved by applying log mean temperature difference            |
|           | 10.5   | Relative efficiency of contra-flow heat exchange is determined                                |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

Tables and/or diagrams include one or more of the following:

- pressure–enthalpy
- pressure–specific volume
- specific enthalpy–specific entropy
- temperature–pressure
- temperature–specific enthalpy
- temperature–specific entropy

Thermodynamic processes include one or more of the following:

- adiabatic
- isobaric
- isochoric
- isothermal
- polytropic

Parameters include one or more of the following:

- adiabatic saturation or constant enthalpy
- humidifying or dehumidifying
- latent heat
- sensible heat

Methods include one or more of the following:

- duct attenuators
- duct lining
- lined duct splitters
- lined plenums
- natural attenuation
- sound absorbing materials/placement
- vibration isolators
- white noise

## Unit Mapping Information

This unit replaces and is equivalent to MARL6006A Apply advanced principles of marine engineering thermodynamics.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL019 Apply advanced principles of marine engineering thermodynamics**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining advanced principles of marine engineering thermodynamics
- identifying and applying relevant mathematical formulas and techniques to solve advanced problems related to marine engineering thermodynamics
- identifying and interpreting numerical and graphical information, and performing advanced mathematical calculations related to marine engineering thermodynamics, such as calculation of power, isentropic efficiencies, thermal efficiency, work and fuel consumption for gas turbine cycles
- identifying, collating and processing information required to perform advanced calculations related to marine engineering thermodynamics
- imparting knowledge and ideas through verbal, written and visual means
- using calculators to perform accurate, reliable and complex mathematical calculations
- reading and interpreting written information needed to perform complex calculations related to marine engineering thermodynamics
- solving problems using appropriate laws and principles.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- atomic and molecular weights and the kilogram-mol
- Dalton's Law of partial pressures
- enthalpy
- gas laws
- gas turbines
- heat transfer:
  - methods
  - principles
- internal combustion engine cycles
- Laws of Thermodynamics
- noise and vibration control:
  - fundamentals of sound
  - noise and vibration problems
  - methods of control
  - operating cycle of reciprocating air compressors
- operating principles of two-stroke and four-stroke internal combustion engines
- principles of refrigeration
- Rankine cycle
- System International (SI) units
- thermal efficiency calculations
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced principles of marine engineering thermodynamics can be applied.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information required for performing advanced calculations related to marine engineering thermodynamics
- technical reference library with current publications on marine thermodynamics
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL020 Apply advanced principles of marine mechanics

## Modification History

Not applicable.

## Application

This unit involves the skills and knowledge required to apply advanced principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |     |   |     |  |     |   |
|--|---|-----|---|-----|--|-----|---|
| <b>1 Apply principle of statics to determine forces in structures, connections, support systems, and trusses</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Bows notation is applied to solve problems related to trusses</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Individual loads are computed using method of sections</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Forces in three-dimensional structures are calculated</td></tr></table> | 1.1 | Bows notation is applied to solve problems related to trusses | 1.2 | Individual loads are computed using method of sections | 1.3 | Forces in three-dimensional structures are calculated |
| 1.1  | Bows notation is applied to solve problems related to trusses   |     |   |     |  |     |   |
| 1.2  | Individual loads are computed using method of sections  |     |   |     |  |     |   |
| 1.3  | Forces in three-dimensional structures are calculated   |     |   |     |  |     |   |

**in two and three dimensions**

- |  |     |   |
|--|-----|---|
| <b>2 Calculate friction torque in plate and cone clutches</b>  | 2.1 | Laws of friction are applied to develop formulae, using uniform wear, to find the torque in a plate and cone clutch                             |
|  | 2.2 | Laws of friction are applied to develop formulae, using uniform pressure, to find the torque in plate and cone clutches                         |
|  | 2.3 | Power to overcome friction in plate and cone clutches using uniform wear and uniform pressure formulae is computed                              |
| <b>3 Calculate displacement, velocity and acceleration in cams, engine mechanisms and gear systems</b> | 3.1 | Velocity and acceleration diagrams are applied to illustrate relative velocity and acceleration   |
|  | 3.2 | Output of epicyclic gears is calculated by applying relative velocity and acceleration theory   |
|  | 3.3 | Inertia loads are calculated using piston velocity and acceleration equations   |
| <b>4 Analyse forces and couples to balance reciprocating machinery</b>                                 | 4.1 | How primary force balance is obtained is graphically illustrated  |
|  | 4.2 | Relationship between complete balance and dynamic balance is explained  |
|  | 4.3 | Reciprocating piston acceleration formula is applied to differentiate between primary and secondary forces                                      |
|  | 4.4 | Complete balance for a multicylinder reciprocating engine or machine is illustrated graphically using vector diagrams and computed analytically |
| <b>5 Apply simple harmonic motion principles to solve problems in free and forced vibration</b>        | 5.1 | Differences in the terms amplitude, frequency and period are explained  |
|  | 5.2 | Simple harmonic motion (SHM) equations are derived from the scotch yoke mechanism   |
|  | 5.3 | Equations for displacement, velocity, acceleration and frequency in SHM are developed   |
|  | 5.4 | Displacement, velocity, acceleration and frequency in SHM in a vibrating spring-mass system are determined                                      |
|  | 5.5 | Spring constant (k) for springs in series and parallel is calculated  |

	5.6	Forced vibration caused by an out-of-balance rotating mass is analysed to derive an expression for amplitude of forced vibration
	5.7	Dangers of resonance are explained
<b>6 Calculate hoop stresses in rotating rings and stresses in compound bars</b>	6.1	How rotational stress is generated by centrifugal force is explained
	6.2	Formula for hoop stress in a rotating ring is applied to calculate hoop stress and/or limiting speed of rotation
	6.3	Stresses in compound bars subject to axial loads and/or temperature change are determined
<b>7 Apply strain energy and resilience theory to determine stresses caused by impact or suddenly applied loads</b>	7.1	Equation is derived to calculate strain energy in a deformed material
	7.2	Stress in a material due to impact or dynamic loads is determined using energy equation
	7.3	Equation to calculate stress caused by suddenly applied loads is derived
<b>8 Calculate beam deflection</b>	8.1	Macaulay's method is applied to calculate beam deflection
	8.2	Deflection of cantilever and simply supported beams is calculated using standard deflection formulae for different loads
<b>9 Apply Euler's formula to find buckling load of a column</b>	9.1	Effective length of a column with various end restraints is determined
	9.2	Slenderness ratio is applied to determine the strength of columns
	9.3	Relationship between slenderness ratio and buckling is explained
	9.4	How buckling load for a slender column is applied (including a factor of safety) is explained
<b>10 Calculate stresses</b>	10.1	How to combine stress formula and calculate stress with combined loading is explained
	10.2	Superposition is used to describe stress due to combined axial and bending stress
	10.3	Mohr's Circle is employed to illustrate normal and shear

		stress
	10.4	Principal stress formulae are applied to explain how maximum combined normal and shear stress can be obtained
<b>11 Apply thick shell formulae</b>	11.1	Tangential stress distribution caused by internal and external pressure is analysed
	11.2	Lame's theorem is applied to describe stress in thick cylinders due to internal and external pressure
<b>12 Apply continuity equation to determine changes in fluid velocity</b>	12.1	Conservation of energy theory is applied to calculate pressure, head and velocity of fluids flowing through orifices
	12.2	Volumetric and mass flow through a venturi meter is calculated
	12.3	Forces exerted by flowing fluids either free (jet) or contained are determined, including coefficients of velocity, contraction of area and discharge
<b>13 Determine changes in fluid flows through pipe systems and centrifugal pumps</b>	13.1	Difference between steady and unsteady flow is clarified
	13.2	Viscosity of fluids is analysed and difference between dynamic and kinematic viscosity is explained
	13.3	Significance of Reynolds number in fluid mechanics is explained
	13.4	Importance of critical Reynolds number is explained
	13.5	Flow losses in pipes and fittings are calculated
	13.6	Changes of velocity of liquids in a centrifugal pump are analysed and entry and exit vane angles are determined

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

Dangers include one or more of the following:

- catastrophic failure due to physical limitations of machines being exceeded as determined by their susceptibility and resistance to vibrations
- violent swaying motions

Different loads include one or more of the following:

- combined
- concentrated
- distributed

## Unit Mapping Information

This unit replaces and is equivalent to MARL6007A Apply advanced principles of marine mechanics.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL020 Apply advanced principles of marine mechanics**

## **Modification History**

Not applicable.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve advanced problems related to marine mechanics
- identifying and interpreting numerical and graphical information, and performing complex mathematical calculations such as determining hoop stresses in rotating rings and stresses in compound bars
- identifying, collating and processing information required to perform complex calculations related to marine mechanics
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform complex calculations in marine mechanics
- solving problems using appropriate laws and principles
- using calculators to perform accurate, reliable and complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- advanced principles of marine mechanics
- angular and linear motion
- Bows notation
- centre of gravity
- conservation of energy theorem
- factor of safety
- force
- inertia force
- joint efficiency factor
- laws of friction
- laws of motion
- momentum
- nature and laws of friction
- polygon of forces
- pressure vessels
- reactions
- simple harmonic motion
- stress and strain
- thin cylinder theory
- turning moment
- vector diagrams
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced principles of marine mechanics can be applied

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information required for performing advance calculations related to marine mechanics
- relevant regulatory and equipment documentation that impacts on work activities
- technical reference library with current publications on advanced marine mechanics
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL021 Apply advanced principles of naval architecture

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to perform complex calculations related to the seaworthiness of commercial vessels, including those dealing with vessel stability, trim, fuel consumption, buoyancy, vessel strength and vibration.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Apply Simpson's First and Second Rules to calculate areas, volumes and displacement of ship**

- |     |  |
|-----|--|
| 1.1 | Simpson's (Mid-Ordinate) First Rule and Second Rule, with typical applications, using half and full ordinates is explained |
| 1.2 | Areas of water planes, bulkheads and elemental areas are calculated  |

<b>shapes using TPC values</b>	1.3	Problems of immersed hull volume, appendage volumes and non-standard tank volumes are solved
	1.4	Archimedes Principles of buoyancy are explained
	1.5	TPC with application of Simpson's Rules to find displacement is explained
	1.6	Change in draught with mass addition and removal using TPC to give parallel sinkage or rise is explained
	1.7	Problems of vessel displacement given water plane areas or TPC values are solved
	1.8	TPC curves and displacement curves for given values are constructed
<b>2 Apply ship form coefficients</b>	2.1	Ship form coefficients and their uses are defined
	2.2	Coefficients are calculated given underwater form particulars
	2.3	Problems of ship form coefficients following change in length and draught are solved
<b>3 Calculate changes in draft due to fluid density</b>	3.1	Load line freeboard measurement and markings required for change in fluid density are explained
	3.2	Formula for change in mean draft due to change in density is derived
	3.3	Change in draft between fluids of two densities are calculated
	3.4	Formula to derive fresh water allowance is applied
	3.5	Changes in mean draft due to changes in density and loading are calculated
<b>4 Solve stability problems</b>	4.1	Calculations are performed to solve problems associated with adding, removing and transferring masses on ships
	4.2	Centre of gravity of a suspended mass is explained
	4.3	Calculations are performed to solve problems associated with suspended masses
	4.4	How KG and LCG can be obtained from stability information is explained
	4.5	Creation of overturning moments by mass addition, removal

- or transfer transversely, including cargo shift or loss is explained
- 4.6 Calculations are performed to solve problems of small angle transverse stability
- 4.7 Purpose of inclining experiments, weighing tests and roll period tests to determine stability characteristics are explained
- 4.8 Calculations are performed to solve problems associated with inclining experiments and roll period tests
- 5 Calculate loss of transverse stability due to fluid free surface**
- 5.1 Principles of free surface loss of GM are explained
- 5.2 KG solid is differentiated from KG fluid
- 5.3 Second moment of area is applied to obtain free surface moment of inertia and is related to stability criteria for standard conditions
- 5.4 Problems of liquid free surface for simple and complex geometry compartments including variation in filling rates are solved
- 5.5 Wall-sided formula and factors that lead to negative GM creating an angle of loll are explained
- 5.6 Problems involving correction of loll angle are solved
- 6 Calculate large angle transverse static and dynamical stability**
- 6.1 How GZ and KN righting levers are obtained from cross curves of stability is explained
- 6.2 KN values are converted to GZ
- 6.3 Dynamical stability is explained
- 6.4 IMO requirements for intact and damaged stability cases as well as different vessel types, using typical values from stability files are applied
- 6.5 Problems of large angle transverse stability, including changes due to redistribution of mass on board are solved and results against IMO requirements are evaluated
- 6.6 Graphical solutions to large angle transverse stability problems identifying key points are prepared
- 7 Solve problems of**
- 7.1 Importance of area and volume centroids is explained

<b>hydrostatics</b>	7.2	Methods of determining KB, LCB, LCF and bulkhead area centroids are explained
	7.3	Calculations are performed to determine centroids of shipboard areas and volumes
	7.4	Impact of hydrostatic pressure and load on vertical and horizontal surfaces is explained
	7.5	Methods of calculating pressure, load, shear force and bending moment diagrams for typical tank structures are applied
	7.6	Problems are solved in hydrostatics relating to pressure and loads on ship structures, including graphical solution of shear force diagrams of rectangular bulkheads and their elemental stiffeners
	7.7	Effective weld area of bulkhead attachment is calculated
	7.7	Effective weld area of bulkhead attachment is calculated
<b>8 Perform trim and draft calculations</b>	8.1	Meaning of trim and how trim occurs is explained
	8.2	Standard trimming moments resulting from mass addition, removal, transfer, flooding or combinations of these factors are explained
	8.3	Change of trim is calculated using MCT1cm, GML and BML
	8.4	Problems of applied trimming moments to determine final vessel draughts are solved
	8.5	True mean draft is differentiated from apparent mean draft by applying correction for layer
	8.6	Calculations are performed to solve problems associated with true mean draft
	8.7	Problems of combined trim and transverse stability from typical fluid transfer in both a longitudinal and transverse direction are solved
<b>9 Calculate voyage and daily fuel consumption</b>	9.1	Problems of fuel consumption are solved using the admiralty coefficient for various speed indexes
	9.2	Optimum vessel speed for combined propulsive and auxiliary fuel consumptions is determined
	9.3	Calculations are performed to show relationships between fuel consumption and displacement

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|  | 9.4  | Calculations are performed to show relationships between daily fuel consumption and speed  |
|  | 9.5  | Calculations are performed to show relationships between voyage consumption, speed and distance travelled  |
| <b>10 Apply principles of loading to ship structures to determine strength characteristics</b> | 10.1 | Distribution of concentrated and point masses, buoyancy, load, shear force and bending moments are explained using simple loaded beam principles   |
|  | 10.2 | Calculations and diagrams are used to solve problems involving loaded conditions of simple box-shaped vessels, identifying location and value of maximum shear force and bending moments |
|  | 10.3 | Empirical formula is applied to solve problems involving bending and direct stress in beams  |
| <b>11 Apply empirical formula to solve vibration problems</b>                                  | 11.1 | Causes and adverse effects of ship vibration are explained   |
|  | 11.2 | Natural hull vibration is explained  |
|  | 11.3 | Schlick formula is applied to determine natural frequency of ship hull vibrations  |
|  | 11.4 | Ways of preventing or reducing local vibration are identified  |
| <b>12 Solve buoyancy problems</b>  | 12.1 | Calculations are performed to solve problems of lost buoyancy and sinkage into homogeneous mud due to tide fall with insufficient under keel clearance                                   |
|  | 12.2 | Calculations are performed to solve problems of simple box-shaped and standard hull forms involving change in trim due to flooding end compartments                                      |
| <b>13 Perform rudder calculations</b>  | 13.1 | Types of rudders in use on ships are outlined  |
|  | 13.2 | Reasons for using balanced rudders are identified  |
|  | 13.3 | Application of force acting normal to a rudder surface ( $F_n$ ), its components and the influence of Propeller Race Effect is explained   |
|  | 13.4 | Rudder Centre of Effort for ahead and astern conditions is obtained to determine torque on rudder stock for conventional rudders or equivalent twisting moment (ETM) for spade rudders   |
|  | 13.5 | Calculations are performed involving simple and complex rudder shapes to calculate speed limitations ahead and astern  |



for stated safety factor and material properties

- 13.6 Calculations are performed involving simple and complex rudder shapes to determine rudder stock and coupling bolt diameters

#### **14 Perform rudder calculations**

- 14.1 Frictional resistance to motion of a vessel given the empirical formulae for frictional coefficient 'f' of the form is determined
- 14.2 Froudes Laws of Comparison is explained
- 14.3 Meaning of the term 'corresponding speed' is explained
- 14.4 Law of comparison is applied to determine residuary resistance of a ship if residuary resistance of a scale model of vessel is known or can be determined
- 14.5 Differentiation is made between effective power (naked), effective power and ship correlation factor
- 14.6 Effective power requirements of a full sized ship given total resistance to motion measured on a scale model of vessel towed at corresponding speed is calculated
- 14.7 Problems of resistance and powering for full size vessels and models are solved

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Ship form coefficients include one or more of the following:
- block coefficient
  - midship section area coefficient
  - prismatic coefficient
  - waterplane area coefficient

- Key points include one or more of the following:
- maximum GZ value and angle of occurrence
  - points of vanishing stability
  - range of positive stability
- Causes include one or more of the following:
- action of the sea
  - fluctuating forces on propeller
  - operation of deck machinery
  - out-of-balance forces in main or auxiliary machinery
  - propeller-hull interaction
- Adverse effects include one or more of the following:
- discomfort to passengers and crew
  - failure of equipment
  - structural failure

## Unit Mapping Information

This unit replaces and is equivalent to MARL6008A Apply advanced principles of naval architecture.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL021 Apply advanced principles of naval architecture**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve complex problems related to speed, fuel consumption and stability of commercial vessels
- identifying and interpreting numerical and graphical information, and performing mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure
- identifying, collating and processing information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform calculations related to seaworthiness of commercial vessels
- solving problems using appropriate laws and principles
- using calculators to perform accurate, reliable and complex mathematical calculations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- advanced principles of naval architecture
- buoyancy
- centre of gravity – KG, VCG and LCG
- centre of gravity calculations
- density correction formula
- dynamical stability
- fuel consumption calculations
- hydrostatic pressure
- principle of displacement
- principle structural members of a ship and the proper names of the various parts
- rudders
- ship:
  - displacement
  - measurements
  - resistance
  - stability
  - stability calculations
- shipboard:
  - areas
  - volumes
- ship form coefficients
- Simpson's Rules
- stability problems
- tonnes per centimetre immersion (TPC)
- trim and stress tables, diagrams and stress calculating equipment
- vessel speed calculations
- vibration
- work health and safety/occupational health and safety (WHS/OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in an industry-approved marine operations site where advanced principles of naval architecture can be applied.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- relevant regulatory and equipment documentation that impacts on work activities
- technical reference library with current publications on naval architecture
- tools, equipment and personal protective equipment currently used in industry
- vessel diagrams and specifications and other information required for mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure.

Performance is demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL022 Demonstrate basic knowledge of ship construction

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to explain the basic principles of ship construction.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Outline size, shape and structural components of vessels**

- |     |   |
|-----|---|
| 1.1 | Correct terms to describe size and shape of vessels are used                  |
| 1.2 | Correct terms to describe structural components of vessels are used           |
| 1.3 | Correct terms to describe size or cargo carrying capacity of vessels are used |

	1.4	Online and other sources of information on size, shape and structural components of vessels are accessed
<b>2 Explain static and dynamic forces and moments exerted on hull of a vessel</b>	2.1	Correct terms to describe effects of forces exerted on hull are used
	2.2	Various forces acting on the vessel are analysed
	2.3	Stresses on various components of the hull are compared as a result of these forces
	2.4	Typical weight, load, shear force curves and bending moment diagram are sketched
<b>3 Explain how vessel structure is designed to resist distortion</b>	3.1	Scantlings are defined
	3.2	Classification society rules for determining scantling sizes are identified
	3.3	Main strength members of vessel hull are identified
	3.4	Importance of maintaining integrity of principal strength members is explained
<b>4 Identify materials used in hull construction</b>	4.1	Types of materials used in hull construction are identified
	4.2	Properties of high tensile steel are defined
	4.3	Types of steel used in hull construction are identified
	4.4	Use of forged, rolled and cast components in hull construction is explained
<b>5 Explain methods of joining shipbuilding materials</b>	5.1	Different methods and applications of welding used in shipbuilding and repair are outlined
	5.2	How materials are joined so that the strength of components is not impaired is confirmed
	5.3	Different methods used to connect aluminium to steel are outlined
<b>6 Explain bottom structure, forepeak and afterpeak of vessels</b>	6.1	Differentiation is made between different types of keel construction
	6.2	Advantages and disadvantage of duct keel in relation to ship strength are explained
	6.3	How safe access to the duct keel is obtained, is outlined

- 6.4 Longitudinally framed double bottom construction is distinguished from a transversely framed double bottom construction
- 6.5 Differentiation is made between bracket floors and plate floors
- 6.6 Structural requirements for supporting different types of main engines are outlined
- 6.7 Classification society rules for construction of forepeak and afterpeak sections are explained
- 7 Explain deck and frame construction**
  - 7.1 Longitudinal, transverse and combined framing are compared and contrasted in relation to ship strength
  - 7.2 Position, purpose and construction of a deep frame are explained
  - 7.3 Transition methods from one frame type to another are outlined
  - 7.4 How the strength of frames is maintained when connecting to deck beams and other strength members is explained
  - 7.5 How stress raisers are reduced around hatchways, door openings, forecastle, bridge structure, watertight doors and gastight doors is explained
  - 7.6 Bilge keels structure with particular reference to fitment to hull is outlined and purpose for this type of fitting is explained
  - 7.7 Classification requirements and restrictions of sheer strake, keel strake and garboard strake are examined
  - 7.8 Requirements for use of suction and discharge valves and fittings in the shell above and below the waterline are outlined
  - 7.9 Strength members required for deck machinery are outlined
- 8 Explain construction of watertight bulkheads**
  - 8.1 Purpose of bulkheads is stated
  - 8.2 Minimum number of bulkheads and their locations are determined
  - 8.3 Bulkhead is sketched showing construction and attachment to hull



- |  |      |   |
|--|------|---|
|  | 8.4  | Purpose, construction and location of collision bulkheads is outlined                     |
|  | 8.5  | Test procedures for bulkheads are clarified   |
|  | 8.6  | How strength is maintained in openings is explained                                       |
|  | 8.7  | Requirements for penetration of collision bulkhead are stated                             |
|  | 8.8  | Situations in which non-watertight bulkheads are fitted are identified                    |
| <b>9 Explain bow and stern forces</b>                            | 9.1  | Differentiation is made between panting and pounding forces                               |
|  | 9.2  | How forepeak sections are strengthened to resist panting and pounding forces is explained |
|  | 9.3  | Anchor and cable arrangements in forepeak tank are explained                              |
|  | 9.4  | Strength members in afterpeak sections are outlined                                       |
|  | 9.5  | Different rudder support arrangements are clarified                                       |
| <b>10 Outline vessel ventilation systems</b>                     | 10.1 | Different types of ventilation systems are clarified                                      |
|  | 10.2 | Why ventilator cowls are required is explained  |
| <b>11 Explain damage criteria</b>                                | 11.1 | How unsymmetrical flooding is minimised is explained                                      |
|  | 11.2 | Damage control measures are outlined  |
|  | 11.3 | How damage criteria are applied is explained  |
| <b>12 Explain use of stabilisers to reduce effect of rolling</b> | 12.1 | Use of stabilisers is explained   |
|  | 12.2 | Bilge keels and fin type stabilisers are compared and contrasted                          |
|  | 12.3 | How stabilisers are attached to the hull is explained                                     |
|  | 12.4 | Hull stiffening requirements for fin and bilge keel types is explained                    |
| <b>13 Explain weather tight and watertight integrity</b>         | 13.1 | Weather tight integrity is distinguished from watertight integrity                        |
|  | 13.2 | How the position of load line is determined is explained                                  |
|  | 13.3 | Design criteria imposed by Conditions of Assignment of                                    |

	Load Lines is explained
	13.4 How watertight integrity of weather deck is maintained and tested is explained
	13.5 Different types of tank air vents and their closing devices are compared and contrasted
<b>14 Outline processes involved in painting a vessel</b>	14.1 Surface preparation required prior to painting steel is outlined
	14.2 Hazards and safety measures to be taken during surface preparations are identified
	14.3 Properties of paints required for different areas of vessels are specified
	14.4 Procedures required for successful application of paints are clarified
	14.5 Precautions required when handling and applying paint are examined
	14.6 Action of self-polishing and non-polishing anti fouling paints is compared and outcomes documented
	14.7 Reasons for using cathodic protection systems are clarified

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Terms to describe size and shape of vessels include one or more of the following:

- breadth
- camber
- draught
- flare
- length
- rake

	<ul style="list-style-type: none"><li>• rise of floor</li><li>• sheer</li></ul>
Terms to describe size or cargo carrying capacity of vessels include one or more of the following:	<ul style="list-style-type: none"><li>• deadweight</li><li>• gross register tonnage</li><li>• gross tonnage</li><li>• net register tonnage</li><li>• net tonnage</li></ul>
Terms to describe effects of forces exerted on hull include one or more of the following:	<ul style="list-style-type: none"><li>• hogging</li><li>• racking</li><li>• sagging</li><li>• still water bending moment</li></ul>
Openings include one or more of the following:	<ul style="list-style-type: none"><li>• cables</li><li>• piping</li><li>• trunking</li><li>• watertight door</li></ul>
Surface preparation includes one or more of the following:	<ul style="list-style-type: none"><li>• degreasing</li><li>• sand blasting</li><li>• shot blasting</li><li>• ultra high pressure water jetting</li><li>• wet blasting</li></ul>
Areas include one or more of the following:	<ul style="list-style-type: none"><li>• ballast tanks</li><li>• cargo tanks</li><li>• freshwater tanks</li><li>• superstructures</li><li>• underwater areas</li><li>• weather decks</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARL6009A Demonstrate basic knowledge of ship construction.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL022 Demonstrate basic knowledge of ship construction**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing online information on ship construction
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and determining appropriate ways of responding to problems associated with ship construction
- identifying relevant methods and procedures such as procedures for painting commercial vessels
- identifying, interpreting and processing numerical and graphical information related to ship construction
- imparting knowledge and ideas through verbal, written and visual means
- providing accurate and reliable information and appropriate level of detail
- reading and interpreting technical guides, manuals and information relevant to ship construction.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- bottom structure and the forepeak and afterpeak of vessels
- bow and stern forces
- basic concepts of ship construction
- construction of watertight bulkheads
- damage criteria
- deck and frame construction
- materials used in the construction of ship hull

- methods of joining shipbuilding materials
- processes involved in painting a vessel
- stabilisers to reduce the effect of rolling
- static and dynamic forces and moments exerted on hull of vessel
- terms used to describe size, shape and structural components of vessels
- types of ships and key features of ships
- vessel ventilation systems
- watertight integrity
- weather tight integrity
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where basic knowledge of ship construction can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- appropriate range of relevant operational situations in the workplace
- technical reference library with current publications on commercial shipping
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL023 Demonstrate basic knowledge of ship operation and maintenance

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to ensure that vessels comply with regulatory and survey requirements as well as maintenance and repair procedures associated with satisfying maintenance of Class.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Identify regulatory environment for shipping operations**

1.1 Function of the International Maritime Organization (IMO) is outlined, how recommendations are adopted through maritime legislation is explained and areas of exemption for local and international shipping are identified

- 1.2 International maritime law embodied in international agreements and conventions is identified
  - 1.3 Application of the International Labour Organization (ILO) Convention to dockyard and shipboard practices is explained
  - 1.4 Flag State responsibilities are explained
  - 1.5 Purpose of the Navigation Act, Marine Notices, Marine Orders, Port State Control and other methods of implementing international agreements and conventions is clarified
  - 1.6 Purpose of insurance underwriters and Protection and Indemnity (P & I) Clubs is clarified
  - 1.7 Function of Classification Societies and their involvement with Flag States with Memorandum of Agreement is outlined
  - 1.8 ISM Code is applied to ship operation and maintenance
  - 1.9 Requirement for crew training for emergency response, administration, operation and maintenance to Standards of Training Certification and Watchkeeping (STCW) requirements is explained
- 2 Prepare for surveys**
- 2.1 Areas covered by classification surveys are identified
  - 2.2 Reasons for class withdrawal are clarified and condition of class are explained
  - 2.3 Continuous, alternative and special surveys, terms of survey and survey frequency are outlined
  - 2.4 Differentiation is made between planned maintenance and condition monitoring for machinery
  - 2.5 Safe practices for preparing compartments for survey, including pressure testing are identified
  - 2.6 Tail shaft surveys are outlined and planned
  - 2.7 Pressure vessels and boiler surveys outlined and planned
  - 2.8 Machinery and hull layup methods are specified
- 3 Explain survey requirements**
- 3.1 Statutory survey requirements for convention and non-convention vessels are identified
  - 3.2 Documentation and records essential for compliance with



statutory surveys, legislation and measures are identified to ensure protection of the marine environment and safety of life at sea

- 3.3 Load line measurements and freeboard assignment are explained
- 3.4 Conditions of freeboard assignment, tests, common faults and repairs are identified
- 3.5 Maintenance and repair responsibilities are identified to satisfy safety construction surveys
- 3.6 Common defects, tests and preparations are identified to satisfy safety equipment surveys
- 3.7 International Convention for the Prevention of Pollution from Ships (MARPOL) survey requirements, including precautions to be taken to prevent pollution of the marine environment are clarified and how compliance with MARPOL is fully observed is explained
- 3.8 Survey requirements for cargo ship safety construction, safety equipment and safety radio certificates; passenger ship safety certificates; chemical tanker and gas carrier certificates of fitness are clarified
- 3.9 Port State Control is explained
- 3.10 Substandard ship and factors causing ship detention are identified

#### **4 Assess influences on vessel stability**

- 4.1 Basic theories and factors affecting trim and stability as well as measures necessary to preserve trim and stability are explained
- 4.2 IMO recommendations concerning ship stability are identified
- 4.3 Influences causing change of centre of gravity are explained and action to be taken in the event of partial loss of intact buoyancy, free surface and Angle of Loll is specified
- 4.4 Consequences of cargo movement, including bulk and deck cargo is outlined
- 4.5 Stability documentation required for different ship types to satisfy safety of life at sea (SOLAS) is identified
- 4.6 Intact and damage stability criteria are explained

- |   |     |  |
|---|-----|--|
|   | 4.7 | Damage control procedures and assessment following collision or grounding are specified to ensure watertight integrity of a ship is according to accepted practice |
|   | 4.8 | Stability requirements for routine dry-docking are identified  |
| <b>5 Outline procedures for maintenance and repairs of hull, pumping systems, propellers, machinery and other items satisfying maintenance of Class</b> | 5.1 | Properties and repair techniques are identified for ordinary and high tensile hull grades of steel including underwater repair work                                |
|   | 5.2 | Means of minimising and controlling both internal and external hull corrosion are identified   |
|   | 5.3 | Repair techniques for various propeller materials are outlined   |
|   | 5.4 | Drainage arrangements and connections to other systems of spaces outside the engine room are explained   |
|   | 5.5 | Ballast main connections to fore and after peak tanks are outlined and procedure for filling and emptying tanks is clarified                                       |
|   | 5.6 | Means of testing performance of shipboard pumping systems is identified  |
|   | 5.7 | Common faults and ways of assessing condition of shipboard pumping systems are determined  |
|   | 5.8 | Machinery condition monitoring and planned maintenance systems are identified  |
|   | 5.9 | Hull life extension surveys and enhanced survey requirements for tankers and bulkships are outlined  |
| <b>6 Explain function of International Maritime Dangerous Goods (IMDG) Code</b>   | 6.1 | IMDG Code is applied to prepare action plans for emergency situations  |
|   | 6.2 | Common hazards of shipboard enclosed spaces are identified and suitable strategies, including compartment re-entry, following extinction of fire, are planned      |
|   | 6.3 | Methods of testing enclosed space atmospheres are identified and limits of exposure to common hazards confirmed  |
|   | 6.4 | Requirements of ordering and taking bunkers as well as discharging to shore side reception facilities, are specified   |
| <b>7 Outline dry-dock and in-water bottom</b>   | 7.1 | Procedures for planning and implementing dry-docking and in-water bottom surveys are clarified   |

<b>survey responsibilities of engineering staff</b>	7.2	Responsibilities for engineering personnel associated with planning and implementing dry-docking and in-water bottom surveys are detailed
	7.3	Dry-dock and in-water hull cleaning methods are compared and contrasted
	7.4	Dry-dock refloating criteria and responsibilities of engineering staff are outlined
	7.5	Preservation and maintenance requirements for extended layup of vessel, and inspection and tests required on reactivation are outlined
<b>8 Outline maintenance, repair and safe working practices associated with lifting and life saving equipment</b>	8.1	Safe working practices applicable to cranes, chain blocks, items of loose gear and other lifting equipment are identified
	8.2	Safety and protective devices used in conjunction with lifting gear are identified
	8.3	Means of testing and adjusting lifting gear are confirmed
	8.4	Legislative and regulatory requirements for inspection, storage and maintenance of lifting gear are outlined
	8.5	Purposes and procedures involved in annual and quadrennial surveys of cargo gear are clarified
	8.6	Procedures for safe working load (SWL) and proof load tests, including lifeboat launching gear are clarified
	8.7	Safe working practices applicable to rigging and lifting heavy items during maintenance and repair are identified
	8.8	Installation, operation, maintenance of lifesaving appliances and launching equipment is outlined
	8.9	Safety and protective devices associated with lifesaving appliances and launching equipment are confirmed
<b>9 Outline operation of an inert gas system for a tanker</b>	9.1	Construction, operation and maintenance of individual components of inert gas system (IGS) are explained
	9.2	Mandatory controls, alarms and cut-outs are identified
<b>10 Apply leadership and management skills</b>	10.1	Shipboard personnel management and training requirements are explained in relation to engineering operations
	10.2	Procedures for managing personal and crew workload in

relation to marine engineering functions are clarified

- 10.3 Effectiveness of resource management in relation to engineering functions is assessed
- 10.4 Decision-making techniques appropriate to engineering functions are explained
- 10.5 Processes for developing, implementing and maintaining standard operating procedures relevant to marine engineering functions are explained

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

International maritime law includes one or more of the following:

- ASM Code
- certificates and other documents to be carried on board ships by international conventions
- International Convention for the Prevention of Pollution from Ships
- International Convention for the Safety of Life at Sea 1974
- International Convention on Load Lines 1966
- International Health Regulations
- international instruments affecting safety of ships, passengers, crew or cargo
- STCW

Areas covered by classification surveys include one or more of the following:

- automation
- boilers/pressure vessels
- cargo gear
- hull
- machinery
- specific notations
- tail shaft

Minimising and

- cathodic protection

controlling both internal and external hull corrosion includes one or more of the following:

- coating systems
- surface preparation techniques

Other systems of spaces outside the engine room include one or more of the following:

- holds
- pump rooms
- spaces forward of the collision bulkhead

Shipboard pumping systems include one or more of the following:

- ballast systems
- bilge systems

Heavy items include one or more of the following:

- hatches
- stern doors
- other large movable structures

## Unit Mapping Information

This unit replaces and is equivalent to MARL6010A Demonstrate basic knowledge of ship operation and maintenance.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL023 Demonstrate basic knowledge of ship operation and maintenance**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information required to undertake duties in routine and emergency situations
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- ensuring currency of relevant legislative and regulatory knowledge
- identifying and determining appropriate ways of responding to malfunctions and emergency situations in daily operations
- identifying methods and procedures needed to implement dry-docking and other duties on commercial vessels
- identifying, interpreting and processing numerical and graphical information required to undertake duties in routine and emergency situations
- imparting knowledge and ideas through verbal, written and visual means
- planning and organising resources needed to establish and maintain safety management systems on a tanker or gas carrier
- reading and interpreting written instructions, procedures and information relevant to duties of a Marine Engineer Class 2.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- centre of gravity
- classification societies
- dry-dock and in-water bottom surveys
- enclosed spaces
- flag State responsibilities
- IMDG code
- inert gas system for tankers
- key international and Australian standards relating to shipping
- key shipping authorities and organisations
- maintenance and repairs of lifting and life saving equipment
- maintenance and repairs of hull, pumping systems, propellers, machinery and other items satisfying maintenance of class
- maintenance, repair and safe working practices associated with lifting and life saving equipment
- maritime communication techniques
- Port State Control
- regulatory environment for shipping operations
- relevant sections of maritime regulations, codes and conventions related to tankers and gas carriers
- safety of life at sea (SOLAS)
- survey requirements
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- types of ships and key features of ships
- vessel stability
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where basic knowledge of ship operation and maintenance can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- appropriate range of relevant operational situations in the workplace
- technical reference library with current publications on ship operation and maintenance
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARL024 Demonstrate intermediate knowledge of marine auxiliary boilers

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel. This includes analysing the responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel, the design of marine auxiliary boilers, the operation of thermal fluid heating plants, the layout of marine stem systems and components, and procedures for inspecting marine auxiliary boilers and associated plant.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Outline responsibilities of an

1.1 Commonwealth, state/territory and local legislation and regulations that relate to marine boilers and steam plant in

<b>Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel</b>		terms of safety, repairs and pollution, including implementation, is identified
	1.2	Safe operating practices for all steam plant are examined and standing orders as to their operation are prepared or modified
	1.3	Procedure for establishing engine room staff who are fully conversant with safe practices for boiler operation is outlined
<b>2 Evaluate design and construction of marine auxiliary boilers</b>	2.1	Typical boiler types illustrating cross section, attachments and location of all fittings, mountings, scantlings and method of achieving circulation are examined
	2.2	Material requirements for boiler components are identified
	2.3	Construction of different types of boilers is analysed and difference recorded
<b>3 Evaluate design and operation of thermal fluid heating plants</b>	3.1	Different gauge glass types are compared
	3.2	Typical thermal fluid heating plant is explained and advantages and limitations of the system are identified
	3.3	Locations and functions of all fittings and safety devices in a typical thermal fluid system are explained
	3.4	Properties of thermal fluid, effects of contamination and methods of testing fluid are analysed
<b>4 Evaluate layout and design of marine steam systems and components</b>	4.1	Thermal fluid heating is compared to conventional steam plant
	4.2	Typical steam system layout showing location of all components on feed and heating side is detailed
	4.3	Material requirements for steam system components are identified
	4.4	Reasons for operating plant and systems at nominated temperatures and pressures, and effects of departing from these parameters are explained
<b>5 Outline procedure for inspecting marine auxiliary boilers and associated plant</b>	5.1	Symptoms of faults in steam traps, hot wells, de-aerators, condensers, evaporators and requirements for contamination prevention between systems, are analysed
	5.2	Procedure for shutting down, isolating and opening up a boiler for inspection or during an emergency is clarified
	5.3	Possible defects that may occur in a boiler, fire and water

- side, their location and effects are analysed
- 5.4 Repair procedures commonly employed for damaged boilers are examined and limitations of such repairs are explained
- 5.5 Procedures for leak detecting in boilers and steam equipment are clarified and remedial actions are explained
- 5.6 Mechanism of economiser fires are analysed
- 6 Differentiate between safety valves types**
- 6.1 Procedure for detecting economiser fires, actions for controlling after occurrence and preventative measures are clarified
- 6.2 Common types of boiler safety valves are analysed and sketched, and how they are classified in terms of valve lift is explained
- 6.3 Materials used in safety valves are identified and operational problems that can occur are analysed
- 6.4 Procedure for setting valve lift pressure is established and precautions necessary when testing valve on fired and non-fired boilers are examined
- 7 Evaluate problems associated with feed and boiler water**
- 7.1 Defects that may be found when dismantling a safety valve for survey are analysed
- 7.2 Causes of scaling and corrosion of water side of a boiler and how these can be minimised are analysed
- 7.3 Acceptable operational range and effects of contamination on boiler chemical reserves are identified
- 7.4 Reliability of boiler water test results are analysed in relation to sampling procedure, testing equipment and shelving of test chemicals
- 7.5 Different tests carried out on boiler water are explained and implications of out-of-range results are interpreted
- 7.6 Use of different chemicals to treat and condition boiler water is assessed
- 8 Evaluate marine fuel systems**
- 8.1 Procedure to be adopted when boiler is severely contaminated from different sources is outlined
- 8.2 Boiler fuel system, its components and maintenance procedure are detailed

- 8.3 Combustion process, its monitoring system and requirements for good combustion are analysed
- 8.4 Different types of burners are compared and contrasted and how atomisation is achieved is explained
- 8.5 Operation of a burner management system that incorporates pressure and level control is explained

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Marine boilers and steam plant include one or more of the following:
- condensers
  - economiser
  - feed pumps
  - fired
  - high pressure
  - low pressure
  - medium pressure
  - steam – steam generators
  - unfired

## Unit Mapping Information

This unit replaces and is equivalent to MARL6011A Demonstrate intermediate knowledge of marine auxiliary boilers.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL024 Demonstrate intermediate knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information related to marine auxiliary boilers
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions for addressing problems associated with marine auxiliary boilers
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, maintaining and repairing marine auxiliary boilers
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine auxiliary boilers.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles of operation of boilers and steam systems
- combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- common boiler defects and repair procedures
- fittings mounted on boilers
- fuel oil system for an auxiliary boiler
- hazards associated with running boiler plant
- intermediate operation of marine auxiliary boilers
- marine boiler inspection procedures
- operating principles relating to steam generation in fired and unfired boilers
- principles of boiler operation in normal and emergency situations
- procedures for maintaining water level in boilers
- purpose of alarms and shut downs in marine boilers
- safety valves
- treatment, sampling and testing of feed and boiler water
- types of auxiliary boilers, and typical operating pressures and temperatures
- typical feed systems for marine boilers
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where intermediate knowledge of marine auxiliary boilers can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information related to marine auxiliary boilers

- technical reference library with current publications on basic marine auxiliary boilers
- tools, equipment, materials and personal protective equipment currently used in industry required to operate and maintain marine auxiliary boilers.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL025 Demonstrate intermediate knowledge of marine auxiliary machinery and systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel. This includes analysing the responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel, the design of marine auxiliary boilers, the operation of thermal fluid heating plants, the layout of marine stem systems and components, and procedures for inspecting marine auxiliary boilers and associated plant.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Determine responsibilities of an**

**1.1** Commonwealth, state/territory and local legislation and regulations, which relate to auxiliary machines and systems



<b>Engineer Class 2 in relation to auxiliary machinery of a vessel</b>		in terms of safety, repairs and pollution, including implementation, is identified
	1.2	Safe operating practices for all steam plant are examined and standing orders as to their operation are prepared or modified
	1.3	Procedures for establishing engine room staff who are fully conversant with safe practices for operation and maintenance of auxiliary machines and systems are outlined
<b>2 Assess material properties and their application to engine room situations</b>	2.1	Properties of materials and how these can be determined by simple tests are explained
	2.2	Common methods for non-destructive testing (NDT) and their application to auxiliary machinery and components are outlined
	2.3	Common non-metallic materials used in the marine industry are assessed and their properties, applications and restrictions on usage are explained
	2.4	Common metallic materials used in marine industry, their applications, failure mechanisms and methods to limit or reduce failures are assessed
<b>3 Outline procedure for sampling and carrying out onboard and laboratory tests on fuel and lubricants</b>	3.1	Importance and implications of continual monitoring of quality of fuel oils and lubricants in efficient operation of machinery are explained
	3.2	Procedures for onboard testing for fuels and lubricants are clarified
	3.3	Laboratory tests that may be conducted on fuels and lubricants and how results can be interpreted and utilised as part of a maintenance program are detailed
<b>4 Explain pre-treatment of residual fuel and servicing of contaminated fuel and lubricants</b>	4.1	Operation of centrifugal separators is outlined and factors that affect optimum separation are analysed
	4.2	Procedures for dealing with contamination of oils by water, fuel or solid debris including recognition of dangerous levels and possible consequences, are clarified
	4.3	Symptoms, causes, effects and methods of treatment of oils that have become infected by bacteria are identified
	4.4	Function and operation for onboard fuel blender and alternative fuel treatments are explained
<b>5 Assess operational</b>	5.1	Procedure for evaluating pump or pumping system, including

<b>problems with pumps and pumping systems handling sea water</b>		heat exchangers and methods of locating cause of problems that affect output and performance, is clarified
	5.2	Operation of a self-priming system used on bilge, ballast or cargo pumping arrangements is explained
	5.3	Different types of distillation plants used on ships are compared and contrasted taking into account operation, performance, problems and applications
	5.4	Main reasons for corrosion in sea water systems and regions most affected are explained
	5.5	Operation of corrosion prevention systems fitted to pumping systems is assessed
<b>6 Apply fault-finding procedures for air compressors and compressed air systems</b>	6.1	Effects of common faults on operation of single and multi-stage compressors are interpreted
	6.2	Reasons for and effects of high levels of oil or water in compressed air are explained
	6.3	Effects of operating air compressors on synthetic lubricating oils are explained with regards to carbon formation and water contamination of the oil
	6.4	Procedures for inspecting and maintaining air receivers and associated fittings are clarified
<b>7 Outline construction, installation and operation of steering gears, stabilisers and bow thrusters</b>	7.1	Construction, installation and operation of hydraulic steering gear is explained
	7.2	Construction and operation of stabilisers is explained
	7.3	Construction and operation of bow thrusters is explained
	7.4	Normal alarms and safety devices fitted to steering gears for all classes of vessel are identified
	7.5	Auto and manual changeover procedures are analysed in the event of faults occurring in a steering gear
	7.6	Oil changing and air purging procedures for a steering gear are clarified
	7.7	Fault finding procedures for steering gear are clarified
	7.8	Procedures for change over to alternative systems of power or control of steering gear are clarified

- |  |      |  |
|--|------|--|
| <b>8 Assess common faults in refrigeration and air conditioning systems</b>  | 8.1  | Symptoms, effects and remedial action for common faults in refrigeration and air conditioning systems are assessed   |
|  | 8.2  | Pumping down, leak test, gas charge and oil charge procedures are clarified  |
|  | 8.3  | Functions and operation of all components of refrigeration and air conditioning plant are analysed   |
|  | 8.4  | Correct procedures for recovery of refrigerants from refrigeration systems are implemented   |
| <b>9 Outline pollution prevention regulations and operation of equipment</b> | 9.1  | International Convention for the Prevention of Pollution from Ships (MARPOL) regulations are identified and their implications for marine engineers and ship operators are explained |
|  | 9.2  | Operation of modern oily water separators, oil content monitors and how they comply with MARPOL regulations are explained  |
|  | 9.3  | Operation of typical sewage plants and regulations controlling their usage are explained   |
|  | 9.4  | Operation of incinerators, material that may legally be burned and monitoring devices is explained   |
| <b>10 Explain basic operation of marine gas turbines</b>                     | 10.1 | Basic flow of air and gas through a simple cycle marine gas turbine is outlined  |
|  | 10.2 | Materials and construction of compressor, combustion system and turbine in a single and two-shaft design turbine are outlined  |
|  | 10.3 | Basic controls required for control and protection of plant are outlined   |
|  | 10.4 | Accessories necessary for safe operation are identified  |
| <b>11 Explain shafting arrangement of vessel</b>                             | 11.1 | Different shafting arrangements found on vessels from main engine to propeller are outlined  |
|  | 11.2 | Performance of different couplings and coupling bolts is assessed  |
|  | 11.3 | Arrangement of a stern tube is completed   |
|  | 11.4 | Procedure to mount and unmount propeller on tail shaft is clarified  |

	11.5	Different shaft bearings, couplings, sealing and lubrication arrangements of transmission system are identified
<b>12 Explain types, operation, and maintenance requirements of steam turbine machinery found in larger vessels</b>	12.1	Types of steam turbines, their location, and typical operating conditions of temperature and pressure are explained
	12.2	Common operational problems associated with steam turbine plants, symptoms and effects of these problems and possible remedies are outlined
	12.3	Process of warming-through and shutting down turbine plant is explained
	12.4	Maintenance requirements for achieving optimum performance of an auxiliary steam turbine plant are outlined

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Auxiliary machines and systems include one or more of the following:	<ul style="list-style-type: none"> <li>• boiler</li> <li>• cargo handling equipment</li> <li>• compressors</li> <li>• deck machinery</li> <li>• diesel generator</li> <li>• evaporators</li> <li>• pumps</li> <li>• refrigerating installation</li> <li>• separators</li> </ul>
Testing includes one or more of the following:	<ul style="list-style-type: none"> <li>• density</li> <li>• fuel in lubricating oil</li> <li>• pour point</li> <li>• viscosity</li> <li>• water contamination</li> </ul>
Corrosion prevention	<ul style="list-style-type: none"> <li>• anodes</li> </ul>

systems include one or more of the following:

- chemical injection
- impressed current
- marine growth inhibiting systems
- special coatings
- 

Components of refrigeration and air conditioning plant must include:

- all fittings
- safety devices

Accessories include one or more of the following:

- accessory gear
- lube oil:
  - coolers
  - pump
  - filter
- starting device
- lubrication circuit

Arrangement of a stern tube includes one or more of the following:

- shaft sealing
- tail shaft bearing

## Unit Mapping Information

This unit replaces and is equivalent to MARL6012A Demonstrate intermediate knowledge of marine auxiliary machinery and systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL025 Demonstrate intermediate knowledge of marine auxiliary machinery and systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information and sketching diagrams to interpret and explain testing requirements related to operating marine auxiliary machines
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and interpreting numerical and graphical information related to starting up and shutting down marine auxiliary machines on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- corrosion causes and prevention
- fuels and basic principles of fuel systems
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- nature and causes of typical start up and shut down malfunctions of main and auxiliary machinery, and associated systems and available methods for their detection and rectification
- non-destructive testing procedures and standards
- operational characteristics and performance specifications for the different types of auxiliary machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators
- pollution prevention regulations
- principles and procedures of machinery lubrication
- procedures for carrying out the start up and shut down of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- properties of metallic and non-metallic materials
- purpose and content of safety data sheets/material safety data sheets
- responsibilities of an Engineer Class 2 in relation to auxiliary machinery of a vessel
- safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine auxiliary machinery and associated systems
- types of auxiliary machinery and components
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where intermediate knowledge of marine auxiliary boilers can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information related to marine auxiliary boilers
- technical reference library with current publications on basic marine auxiliary boilers
- tools, equipment, materials and personal protective equipment currently used in industry required to operate and maintain marine auxiliary boilers.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARL026 Demonstrate intermediate knowledge of marine control systems and automation**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate control systems on board a commercial vessel.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Analyse open and closed loop systems**

1.1 Open loop systems are distinguished from closed loop systems

1.2 Closed loop manual, time based automatic open loop and feed forward open loop are explained

- |  |   |
|--|---|
| <b>2 Explain principles and operation of pneumatic control element and systems</b> | <p>2.1 Operation of a nozzle flapper and pneumatic amplifier unit is analysed and applied to transmitters, basic controllers and valve positioners</p> <p>2.2 Control air supply system is defined</p> <p>2.3 Principle of operation of direct and reverse acting pneumatic relays and application is clarified</p> <p>2.4 Application of computing relays is analysed</p>  |
| <b>3 Compare temperature transmitters</b>  | <p>3.1 Pneumatic temperature transmitter is defined</p> <p>3.2 Effect of changes in ambient temperature on thermocouples and resistance temperature detectors (RTD) is explained</p> <p>3.3 Testing procedures and methods of simulation for both RTDs and thermocouples are explained</p> <p>3.4 Characteristics and application of thermistors are outlined</p>   |
| <b>4 Analyse application of differential pressure transmitters</b>                 | <p>4.1 Application of differential pressure transmitters on board ships is confirmed</p> <p>4.2 Arrangements of differential pressure transmitters for measurement of liquid levels in both closed and open tanks are explained</p> <p>4.3 Mechanics for viscosity measurement using a differential pressure transmitter are analysed</p> <p>4.4 Principle of using a differential pressure transmitter for flow measurement and the need for a square root extractor is explained</p> <p>4.5 Use of a differential pressure transmitter for flow measurement is compared and contrasted with other types of meters</p> |
| <b>5 Explain engine room monitoring systems</b>                                    | <p>5.1 Application of different speed sensing systems is analysed</p> <p>5.2 Operating principles of torque monitoring systems applied to propeller shafting are explained</p> <p>5.3 Arrangements of shaft power and indicated power monitoring are compared</p> <p>5.4 Horizontal and vertical float level systems are compared with other tank level monitoring system in common use</p>   |

	5.5	Operating principle of oil-water interface sensor is explained
	5.6	Methods of bearing temperature monitoring applied to diesel engine rotating parts are outlined
	5.7	Machinery space monitoring and alarm system from a central control room are outlined
<b>6 Explain procedure for transmitter calibration</b>	6.1	Procedure for transmitter calibration for both pneumatic and electronic transmitters is applied
	6.2	Test equipment is used for transmitter calibration
	6.3	Relationship between process variables and output signals is demonstrated in a graph
	6.4	Effects of transmitter dead band are defined
<b>7 Explain operation of pneumatic 3 term controller and controller adjustment procedures</b>	7.1	Common controller actions and applications are outlined
	7.2	Operating principle of pneumatic 3 term controllers is outlined
	7.3	Procedure for adjusting 3 term pneumatic controllers is applied and effects if incorrectly adjustment are explained
	7.4	Typical controller settings for a PID controller are detailed
	7.5	Integrated hand/auto station and 3 term controller are outlined and bumpless transfer is demonstrated
<b>8 Explain actuators and control valves</b>	8.1	Arrangements to provide fail safe requirements are outlined
	8.2	Control valve and actuator are explained
	8.3	Different types of actuators are identified
	8.4	Operating principle of pneumatic valve positioners is explained
<b>9 Analyse operation of hydraulic governors</b>	9.1	Operating principle of proportional action hydraulic governors is explained
	9.2	Importance of spring stiffness in relation to response is clarified
	9.3	Purpose of an isochronous governor is outlined
	9.4	Principle of operation of an isochronous hydraulic governor is outlined

	9.5	Governor droop and its requirements for stable load sharing and engine stability is explained
<b>10 Interpret electronic systems circuit diagrams</b>	10.1	Electrical symbols commonly used in electronic circuits and sub-circuits are defined
	10.2	Printed and colour codes used in electronic circuits are defined
	10.3	Operation and maintenance manuals commonly used in the fault finding electronic circuits are used correctly
<b>11 Explain basic operation of programmable logic controllers</b>	11.1	Principles and operation of integrated circuit gates are explained
	11.2	Operational function of input/output devices connected to a digital programmable logic controller is detailed
	11.3	Methods of operation of flip flops, adders, counters, multiplexers and decoders are outlined
	11.4	Methods employed when changing set point values in a digital programmable logic controller are outlined
<b>12 Explain typical machinery space control loops and unmanned machinery spaces requirements</b>	12.1	Fuel oil heating, LO cooling and JW cooling loop showing cascade and split range systems are outlined
	12.2	Fuel oil viscosity control loop is outlined
	12.3	Common methods of boiler water control and simple combustion control with burner management for an auxiliary boiler are outlined
	12.4	Requirements and system arrangements for bridge control of main propulsion machinery including change over from local to bridge are explained
	12.5	Common pressure control loops found in a ship's engine room are identified
	12.6	Unmanned machinery spaces (UMS) requirements are outlined
	12.7	Troubleshooting procedures associated with control systems are outlined
	12.8	Procedures for software version control are outlined

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Meters must include:

- area meter
- rotometer
- target meter

Types of actuators may include one or more of the following:

- electric
- hydraulic
- pneumatic

## Unit Mapping Information

This unit replaces and is equivalent to MARL6013A Demonstrate intermediate knowledge of marine control systems and automation.

MARL6013A replaces and is equivalent to TDMMB4207A Test, detect faults and maintain and restore electronic control equipment to operating condition on vessels over 750 kW propulsion power.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL026 Demonstrate intermediate knowledge of marine control systems and automation**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information and sketch diagrams to interpret and explain testing requirements related to control systems on commercial vessels
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining principles of marine automation and process control
- identifying and interpreting numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in control systems on commercial vessels
- identifying methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information related to operate control systems on commercial vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- actuators and control valves
- Australian standards for drawing symbols/layouts for schematic diagrams
- bridge control systems
- concepts of unmanned machinery spaces (UMS), and automated monitoring and control of machinery
- control and monitoring of ship machinery
- differential pressure transmitters
- electronic systems circuit diagrams
- engine room monitoring systems
- machinery space control loops and UMS requirements
- mechanical and electrical sensors
- open and closed loop systems
- operation of hydraulic governors
- operation of pneumatic 3-term controller and controller adjustment procedures
- operation of programmable logic controllers
- pneumatic and electrical instrumentation transmitters
- principles and operation of pneumatic control element and systems
- principles of basic pneumatic systems and action of pneumatic instruments
- principles of process control
- temperature transmitters
- tests and procedures required to meet UMS requirements
- total bridge control
- transmitter calibration
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in an industry-approved marine operations site where intermediate knowledge of marine control systems and automation can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on automation and process control
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARL027 Demonstrate intermediate knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and maintain marine diesel engines and systems on a commercial vessel. This includes evaluating diesel fuel systems, methods of diesel engine cooling, diesel engine lubrication requirements, propulsion methods and faults using combustion diagnostic equipment.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                                       |  |
|---------------------------------------|--|
| <b>1 Evaluate diesel fuel systems</b> | <b>1.1</b> Why atomisation and penetration of fuel and air turbulence are essential to optimum combustion is explained |
|---------------------------------------|--|

- 1.2 Typical injection pressures and viscosities for different grades of fuel are documented and compared
  - 1.3 Design modifications of pumps, camshafts and injectors for fuel types are outlined
  - 1.4 Difference between constant and variable injection fuel pump timing, showing materials, principal parts, method of operation and adjustments of common pump types is compared and explained
  - 1.5 Injection requirements for slow speed and high speed diesel engines are compared, including pilot injection and pre-combustion chambers
  - 1.6 Common service faults, symptoms and causes of diesel fuel injection problems are identified, specifying appropriate adjustments, including methods of fuel pump timing
  - 1.7 Work health and safety/occupational health and safety (WHS/OHS) requirements for handling and testing fuel injection systems are explained
  - 1.8 Normal operating pressures and temperatures for fuel valve cooling arrangements, and uni-fuel and dual-fuel systems, including both high/medium viscosity fuel types are explained
- 2 Evaluate different methods of diesel engine cooling**
  - 2.1 Importance of maintaining diesel engine thermal efficiency and evaluate thermal loads on engine components is outlined
  - 2.2 Cooling media selection is justified, and advantages and disadvantages of different diesel cooling methods are outlined
  - 2.3 Appropriate action to be taken with common faults in cooling systems is explained and different cooling water treatments are compared
  - 2.4 How cooling systems are commissioned, stored during idle periods and restored after contamination is confirmed
  - 2.5 Methods of load-dependent cooling of diesel alternators on heavy fuels are evaluated
  - 2.6 Normal operation temperatures, pressures, and methods of cooling medium and slow speed diesel engine pistons, exhaust valves, cylinders, turbochargers and cylinder heads are identified

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|---|---|
| <b>3 Evaluate diesel engine lubrication requirements</b>                | <ul style="list-style-type: none"><li>3.1 Principles of engine lubrication are outlined</li><li>3.2 Lubricant types, physical and chemical properties and applications are assessed</li><li>3.3 Sources of diesel lubricant contamination and deterioration are identified</li><li>3.4 Ways of testing for diesel lubricant contamination and deterioration, interpreting test results and identifying appropriate action to be taken are outlined</li><li>3.5 Distribution of lubricating oil to guides, top-end, bottom-end and main bearings of diesel engines, showing direction of flow, typical clearances and stating normal operating temperatures and pressure is explained</li><li>3.6 Principles of bearing lubrication are outlined</li><li>3.7 Materials used in bearing construction are identified</li><li>3.8 Bearing faults are evaluated and remedies to prevent them from occurring are determined</li></ul> |
| <b>4 Compare different propulsion, manoeuvring and starting methods</b> | <ul style="list-style-type: none"><li>4.1 Starting procedures of diesel engines for power generation, propulsion, and emergency use are clarified</li><li>4.2 Starting and manoeuvring requirements/sequences for direct-coupled reversible and geared propulsion diesels, including CPP applications are explained</li><li>4.3 Common faults are analysed and appropriate action to be taken with typical diesel starting and manoeuvring systems is identified</li><li>4.4 Manoeuvring and reversing systems of propulsion diesel engines are outlined</li><li>4.5 Different methods of achieving reversing capability with direct-coupled propulsion diesels are compared</li><li>4.6 Layout of a diesel-electric drive is compared and contrasted with the layout of a turbo electric drive</li></ul>   |
| <b>5 Analyse materials used in constructing diesel engines</b>          | <ul style="list-style-type: none"><li>5.1 Common materials used in diesel engine construction are assessed, selection is justified, and typical compositions and physical properties of components are specified</li><li>5.2 Dynamic stresses and loads are interpreted, service limitations are identified and different methods of component</li></ul>  |

fabrication are evaluated

- 5.3 Two-stroke and four-stroke operating cycle forces, couples and moments, relating to design principles of crankshafts, bedplates, foundations and crossheads are outlined
- 5.4 Out-of-balance gas and inertia forces, couples and moments are related to flywheels, balance weights and first/second order balancing
- 5.5 Factors contributing to torsional vibration are explained and methods of minimising or eliminating harmful effects of critical speeds are clarified
- 5.6 Pistons, liners, piston rings, bearings and crankshafts are calibrated to identify wear patterns, limits and means of correction
- 5.7 Alignment and adjustment criteria of crankshafts, chain-drives, integral thrust bearings and crossheads are specified
- 5.8 Specified working clearances and limits of all bearings, sliding surfaces and interference fits of typical diesel engines are compiled using engine builder manuals

**6 Explain uptake and scavenge fires and air line, gearbox and crankcase explosions**

- 6.1 Design and operational factors that contribute to fires in waste heat units are explained and methods of extinguishing and/or containing soot and hydrogen fires are specified
- 6.2 Routine cleaning procedures, inspection criteria, symptoms of fire and risks of isolation in service associated with waste heat units are identified
- 6.3 Operational factors that contribute to scavenge fires are identified, symptoms are outlined, methods of extinguishing are evaluated and routine inspection criteria of scavenge spaces are stated
- 6.4 Principles of explosive mixtures are clarified and how a starting airline explosion can occur is explained
- 6.5 How risk of scavenge fires may be minimised in service by protective devices and routine evaluation of starting air systems is clarified
- 6.6 Causes of gearbox and crankcase explosions in propulsion and auxiliary drives are outlined

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|--|-----|--|
|  | 6.7 | How risks of gearbox and crankcase explosions may be minimised in service are explained and correct procedures to be taken in the event of warning of a hazardous atmosphere in both oil and dual-fuel engines are clarified |
|  | 6.8 | Operating principles of an oil-mist detector, crankcase breather and explosion relief doors are explained  |
|  | 6.9 | Function of a piston rod scraper box is outlined, and causes of wear and appropriate adjustments are identified  |
| <b>7 Explain correct working practices associated with diesel engine operation, maintenance and repair</b> | 7.1 | Safe working practices associated with isolating main and propulsion diesels under all emergency and routine situations are explained, including use of protective devices, interlocks and evaluation of their status        |
|  | 7.2 | Safe working practices associated with working in crankcases and other enclosed spaces are explained   |
|  | 7.3 | Safe working practices associated with safe handling of hydraulic tools and dangers of lifting/isolating heavy components both unaided and with lifting gear are explained   |
|  | 7.4 | Hazards of working with flammable liquids under pressure, chemicals, acids and hydrocarbons as well as selection criteria for appropriate protective clothing are explained  |
|  | 7.5 | Safe working strategies for diesel engine maintenance are planned using engine manufacturer instruction manuals and product data safety sheets   |
| <b>8 Analyse faults using combustion diagnostic equipment</b>  | 8.1 | Two-stroke and four-stroke theoretical cycle diagrams are compared with results recorded using diagnostic tools  |
|  | 8.2 | Combustion faults from typical diagrams are evaluated and corrective adjustments are specified   |
|  | 8.3 | Service combustion values are compared with trials or test bed figures   |
|  | 8.4 | Common faults associated with pressure charging and fuel injection systems are outlined  |
|  | 8.5 | Methods of pressure charging diesel engines are compared, and materials of construction, design features, operational maintenance and emergency procedures are correctly identified  |
|  | 8.6 | Causes of efficiency loss and surge are explained  |

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|--|-----|--|
|  | 8.7 | Scavenging systems and gas/air flow paths through a turbocharger, under normal and emergency operation modes are explained using relevant diagrams |
| <b>9 Analyse construction and operation of marine gas turbines</b> | 9.1 | Flow of air and gas through a simple cycle marine gas turbine is analysed  |
|  | 9.2 | Materials and construction of compressor, combustion system and turbine in single and two shaft designs are outlined                               |
|  | 9.3 | Controls required for control and protection of marine gas turbines are detailed   |
|  | 9.4 | Function of accessories necessary for safe operation of marine gas turbines are explained  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| Methods of component fabrication include one or more of the following: | <ul style="list-style-type: none"> <li>• ceramics</li> <li>• composite</li> <li>• forged</li> <li>• laser-hardening</li> <li>• plasma-spraying</li> <li>• welded</li> </ul> |
| Accessories include one or more of the following:                      | <ul style="list-style-type: none"> <li>• accessory gear</li> <li>• lube oil</li> <li>• cooler</li> <li>• pump</li> <li>• filter</li> <li>• starting devices</li> </ul>      |

## Unit Mapping Information

This unit replaces and is equivalent to MARL6014A Demonstrate intermediate knowledge of marine diesel engines and systems.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL027 Demonstrate intermediate knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing diagnostic information related to marine diesel engines and systems
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining operation of marine diesel engines and systems
- identifying and applying relevant solutions for addressing problems associated with marine diesel engines and systems
- identifying and interpreting diagnostic information, and performing mathematical calculations related to operating, maintaining and repairing marine diesel engines and systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine diesel engines and systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- chemical and physical properties of fuels and lubricants
- components of diesel engines
- crankcase and air-line explosions, scavenge and uptake fires
- diesel engine lubrication systems
- diesel engine propulsion and power generation



- manoeuvring systems of diesel engines
- pressure charging diesel engines, including common service faults, actions to rectify faults, emergency operation and isolation procedures
- principles of diesel engine operation
- properties and characteristics of fires
- safe working practices associated with diesel engines during operation, repair and maintenance
- starting methods of diesel engines
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where intermediate knowledge of marine diesel engines and systems can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information required for performing basic calculations related to marine diesel engines and systems
- technical reference library with current publications on marine diesel engines and systems
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL028 Demonstrate intermediate knowledge of marine electrical systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to analyse complex switchboards, perform fault finding on electrical circuits, maintain circuit breakers, synchronise alternators and maintain emergency battery systems to ensure supply of shipboard electrical power on board a commercial vessel.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Analyse common faults in shipboard

1.1 Effects and ways of detecting earth on 3 wire insulated and 4 wire earthed neutral systems are explained

<b>electrical machinery</b>	1.2	Effects of short circuits and operation of discrimination protection are explained
	1.3	Symptoms and effects of 'light' and 'heavy' short circuits on components and circuits are compared
	1.4	Effects of open circuits on systems and components transformers are analysed
	1.5	Causes and effects of 'hot spots' in circuits are identified
	1.6	Cause and effects of static electricity on shafting and when cleaning tanks are identified
<b>2 Perform fault-finding on electrical circuits</b>	2.1	Safe procedure for determining insulation resistance of a 3-phase motor or alternator including protection of solid-state components and selection of suitable minimum insulation for the component is applied
	2.2	Procedure for safely drying out an electrical machine with a low IR is outlined
	2.3	Open circuit in a 3-phase motor is safely tested
	2.4	Procedure for testing internal short circuit in a 3-phase motor is clarified
<b>3 Analyse complex shipboard switchboard layouts</b>	3.1	Switchboard layouts are interpreted
	3.2	The effects and indications of earths on the system including intermittent and multi earths are explained
	3.3	Safe procedure for locating earths on main and low voltage circuits including 24 V system is outlined
	3.4	Operation of preferential tripping arrangements for overload protection is explained
	3.5	Relationship between main and emergency switchboards is explained
	3.6	Different methods of start up after black outs are outlined
<b>4 Explain electrical safety procedures for ship and shore personnel</b>	4.1	Potential problems associated with shore maintenance personnel working on ship electrical equipment are identified
	4.2	Safe procedure of isolating electrical machinery for repair or maintenance is applied
	4.3	Safe method of working on live electrical circuitry for

- purpose of repair or maintenance is explained
- 4.4 Problems associated with shipboard electrical fires are explained
- 4.5 Safe procedures for fighting shipboard electrical fires including fires in switchboards are clarified
- 5 Synchronise, parallel and load share alternators on manual and auto modes**
- 5.1 Process of manually synchronising alternator and sharing kW and kVAR loading under all loading conditions is explained
- 5.2 Process of starting, testing and where applicable, of transferring emergency generator power on to main board, is explained
- 5.3 Operation of synchronising lights, synchroscope and all meters associated with synchronising is outlined
- 5.4 Operation of AVR and prime mover governor with respect to synchronising is outlined and how these can be adjusted at set points is explained
- 6 Examine operation, construction and maintenance of circuit breakers**
- 6.1 Features and applications of different types of circuit breakers are differentiated
- 6.2 Closing and opening systems of circuit breakers are explained
- 6.3 Arc extinguishing systems are explained
- 6.4 Method for accessing an air circuit breaker for inspection is analysed
- 6.5 Function and operation of protection devices associated with air circuit breaker and molded case circuit breaker are examined
- 7 Analyse function of emergency battery systems**
- 7.1 Different types and characteristics of batteries used for emergency supplies are identified
- 7.2 Methods of battery charging and ways in which charge condition of the battery can be determined are explained
- 7.3 Requirements of emergency supply and how transfer can occur without adversely affecting solid state components are explained
- 7.4 Safety hazards associated with batteries, and procedures to be adopted to minimise explosion and short circuits are appraised

**8 Explain hazards associated with marine high voltage installations**

- 8.1 Functional and operational requirements for a marine high voltage system are outlined
- 8.2 High voltage marine installations are identified
- 8.3 Design features of high voltage installations are explained
- 8.4 Risks and safety procedures associated with working in high voltage environments are identified
- 8.5 Procedure for assisting suitably qualified personnel to carry out maintenance and repair of high voltage installation is outlined

**Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

**Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Systems and components include one or more of the following:

- motors
- transformers

Switchboard layouts include one or more of the following:

- DC systems
- dedicated power supplies
- dual supply for steering gear
- feed back and feed forward arrangements
- interconnection with low voltage

Problems include one or more of the following:

- electric shock
- enclosed space work
- noncompliance with safe working procedures
- unfamiliar with marine electrical systems
- using equipment beyond safe working limits
- working at heights

## Unit Mapping Information

This unit replaces and is equivalent to MARL6015A Demonstrate intermediate knowledge of marine electrical systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL028 Demonstrate intermediate knowledge of marine electrical systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining intermediate principles of electrical circuits, switchboards, alternators and circuit breakers
- identifying and interpreting numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- identifying and suggesting ways of rectifying electrical hazards and emergency situations on a vessel
- identifying methods, procedures and materials needed for testing marine electrical systems
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information related to electrical circuitry and components on commercial vessels
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- alternating current (AC)/direct current (DC) voltage
- alternators – construction, characteristics, synchronised operation
- batteries
- circuit breakers
- circuits
- earthing
- electrical measuring and testing instruments
- electrical safe working practices
- electrical symbols, basic electrical diagrams/circuits
- emergency battery systems
- fault-finding procedures
- isolation procedures
- phase angle, power factor and current flow
- procedures for dealing with hazards and emergencies
- regulations of relevant state/territory maritime and electrical licensing authorities
- resistance, inductance and capacitance
- risks and safety procedures associated with working in high voltage environments
- safety, environmental and hazard control precautions and procedures relevant to marine electrical systems
- switchboards and protection – purpose, testing and maintenance, equipment removal
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where intermediate knowledge of marine electrical systems can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on marine electrical systems
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARL029 Demonstrate intermediate knowledge of marine steam turbines and main boilers**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel.

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

L – Marine Engineering

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Evaluate energy balance of steam turbine plant**

- 1.1 Heat losses in a turbine and turbine system are analysed
- 1.2 An enthalpy/entropy diagram is used to show how steam properties change through a turbine
- 1.3 The affect air heaters and economisers have on turbine plant

- efficiency is explained
- 1.4 Practical methods of verifying energy losses are detailed
- 2 Explain construction and operation of feed system**
- 2.1 Operation and components of the complete feed system are outlined
- 2.2 Construction, operating principles and maintenance requirements of a regenerative condenser are explained
- 2.3 Causes of loss of vacuum are identified
- 2.4 Construction and operation of air ejectors, vacuums and extraction pumps are explained
- 2.5 Construction and operation of gland condensers, low-pressure heaters, drain coolers and high-pressure heaters are explained
- 2.6 General arrangement and construction of turbo-feed pumps is outlined
- 2.7 Governor control is explained
- 2.8 Operating principles and construction details of de-aerators are explained
- 3 Explain construction, operation and repair of high-pressure water tube boilers**
- 3.1 Operating principles of high-pressure boilers, including water and gas flow circulation are explained
- 3.2 Drum, internal fittings and support and expansion arrangements are outlined
- 3.3 Procedures for repairing a membrane wall furnace are clarified
- 3.4 Operating principles and construction methods of integral and external superheaters are explained
- 3.5 Construction and operation of economisers and air heaters is explained
- 3.6 Chemistry of combustion is explained
- 3.7 Typical burner register arrangements are outlined
- 3.8 Construction, operation and maintenance of boiler gauge glasses and safety valves is explained
- 3.9 Operation of boiler control and soot blowing system is

		detailed
	3.10	Blow-down procedure for a high pressure boiler is prepared
<b>4 Explain requirements for feed water treatment for high-pressure water tube boilers</b>	4.1	How salts are precipitated and how metal is corroded in the boiler and feed system is explained and method of prevention is outlined
	4.2	How oxygen is eliminated in high-pressure boilers is shown
	4.3	How pH is measured and controlled is explained
	4.4	Normal and maximum operating limits for boiler feed water treatment are identified and procedure to follow if these limits are exceeded is clarified
	4.5	Purpose and procedure for different types of tests of boiler water chemistry are explained
<b>5 Explain construction and operation of high-pressure turbines</b>	5.1	Flow of steam through nozzles is analysed, and pressure and velocity compounding are illustrated
	5.2	Construction of blades, bearings, glands, rotors and casings is explained
	5.3	Warming-through procedure prior to start up is explained
	5.4	Routine checks during operation are detailed
	5.5	Emergency operation of plant with one turbine inoperative is outlined
	5.6	Turbine shutdown procedure is clarified
	5.7	Routine checks carried out at a turbine plant survey are detailed
	5.8	Precautions necessary when turbine and gearing casings are open are explained and any repairs or adjustments that may be required are identified
	5.9	Performance of steam plant by routine observations of pressure temperature speed and vibration of turbine, gearing and associated systems is analysed
<b>6 Explain turbine gearing arrangements</b>	6.1	Single and double reduction gearing systems are outlined
	6.2	Use of double helical involute gear teeth is explained
	6.3	Advantages and disadvantages of single and double locked

		tandem gearboxes are detailed
	6.4	Purpose of fitting a nodal drive in gearing system is clarified
	6.5	Construction and reason for installing flexible couplings in gearing system is explained
	6.6	Layout of a turbo-electric drive is detailed
<b>7 Analyse flow of air and gas through a simple cycle marine gas turbine</b>	7.1	Construction of compressor, combustion system and single and two shaft turbines is explained
	7.2	Necessary controls required for control and protection of plant are confirmed
	7.3	Accessories necessary for safe operation of simple cycle marine gas turbines are listed

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Accessories must include:
- accessory gear
  - lube oil:
    - coolers
    - filters
    - pumps
  - starting devices

## Unit Mapping Information

This unit replaces and is equivalent to MARL6016A Demonstrate intermediate knowledge of marine steam turbines and main boilers.

MARL6016A replaces and is equivalent to TDMMR5807A Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels over 750 kW propulsion power.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL029 Demonstrate intermediate knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing diagnostic information related to marine steam turbines
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions to problems that can occur during operation of steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting diagnostic information, and perform mathematical calculations related to operating, maintaining and repairing marine steam turbines
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine steam turbines.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
  - methods of turbine control, including safety devices
  - symptoms, causes and effects of defects of auxiliary steam turbines and actions to be taken
  - construction and operation of main and auxiliary steam turbines



- procedures for emergency operation of a steam turbine
- construction and operation of feed system
- construction and operation of high-pressure turbines
- construction, operation and repair of high-pressure water tube boilers
- energy balance for a steam turbine plant
- established engineering practice and procedures for operation of shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start up, normal running, emergency and shut down situations
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur during operation of steam propulsion plant and associated systems, and appropriate preventative and remedial action
- methods of lubricating principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- procedures for reading and interpreting readings and indications of performance of steam propulsion plant and associated systems
- requirements for feed water treatment for high-pressure water tube boilers
- simple cycle marine gas turbine
- turbine gearing arrangements
- types, properties, tests, applications and treatment of fuels, lubricants and solvents/chemicals used on board a steam vessel, including working principles, construction, maintenance and safe operation of centrifuges, filters, and other treatment devices
- typical operating precautions for steam propulsion plant and associated systems to ensure operational performance complies with bridge orders, technical specifications, survey requirements, and established safety and anti-pollution rules and regulations
- units of measurement
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in an industry-approved marine operations site where intermediate knowledge of marine steam turbines and main boilers can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information related to marine steam turbines
- technical reference library with current publications on basic marine steam turbines
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL030 Demonstrate advanced knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and maintenance of marine auxiliary boilers on a commercial vessel. It includes evaluating steam plant efficiency, interpreting steam plant cycles, evaluating repairs required for boilers and steam plants, outlining survey procedures, and explaining operating steam plant under different conditions.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                               |            |  |
|-------------------------------|------------|--|
| <b>1 Evaluate steam plant</b> | <b>1.1</b> | Combustion efficiency from flue gas constituents is assessed |
|-------------------------------|------------|--|

<b>efficiency</b>	1.2	Steam and fuel consumption to obtain heating efficiency is analysed
	1.3	Causes of loss of steam plant efficiency are evaluated and recorded
	1.4	Requirements of inert gas generation of boiler plant are determined
<b>2 Interpret complex steam plant cycles</b>	2.1	Operation, function and efficiency of dual pressure cycles and steam/steam generators are compared and contrasted
	2.2	Operation of dual pressure and pass in/out turbines is explained
<b>3 Evaluate boiler and steam plant repairs</b>	3.1	Types and properties of materials used in boilers and steam plant are identified
	3.2	Common component failures in boilers and steam plant are explained and reported
	3.3	Appropriate repairs for failed components in boilers and steam plant are determined
	3.4	Constraints on engineering staff engaged in repairing boilers and steam plant are explained
	3.5	Requirements to report defects in pressurised components of boilers are identified
<b>4 Explain methods of auxiliary steam plant operation and control under variable conditions</b>	4.1	Methods of steam pressure control while manoeuvring and possible adverse impacts are analysed
	4.2	How dew point can be reached when operating at reduced power is examined
	4.3	How low powers can limit steam production by exceeding pinch point is explained
<b>5 Outline procedures surveying for boilers</b>	5.1	Procedure for preparing a boiler for survey is documented and explained
	5.2	Boiler inspection procedure that would cover all possible problem areas is planned
	5.3	Purpose and procedure for carrying out hydrostatic/hydraulic pressure tests and non destructive tests on auxiliary boilers are explained

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|---|-----|---|
| <b>6 Analyse procedures for protecting steam plant during off load conditions</b>             | 6.1 | Procedures for decommissioning and laying up a boiler for short and long intervals are compared   |
|   | 6.2 | Processes for cleaning boilers are evaluated  |
|   | 6.3 | Procedures for re-commissioning steam plant are explained   |
|   | 6.4 | Chief Engineer responsibilities for setting lifting pressure of safety valves are outlined  |
| <b>7 Assess hazards of operating steam plant under adverse or faulty operating conditions</b> | 7.1 | Potential hazards of boiler operation with contaminated feed water are assessed   |
|   | 7.2 | Procedure for continuing boiler operation when contamination has exceeded acceptable limits is explained                                      |
|   | 7.3 | Effects of operating boiler with insufficient water level are explained and actions to be taken under loss of water conditions are identified |
|   | 7.4 | Causes, consequences and relevant preventative measures associated with furnace explosions are analysed                                       |
|   | 7.5 | Operating conditions that can lead to an economiser fire and actions that can be taken to prevent and control such fires are evaluated        |
|   | 7.6 | Alternative methods for maintaining heating if a boiler or economiser has to be shut down are determined                                      |
| <b>8 Explain operation and maintenance of heat transfer oil systems</b>                       | 8.1 | Operating procedures of heat transfer oil systems are explained   |
|   | 8.2 | Hazards associated with heat transfer oil systems are analysed  |
|   | 8.3 | Routine maintenance procedures associated with heat oil transfer systems are outlined   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Causes of loss of steam plant efficiency include one or more of the following:

- conduction-heat loss (such as fouled tubes)
- high flue-gas temperature
- low combustion-air supply temperature
- low feed-water supply temperature
- low quality fuel
- operation at low or cyclic loads
- poor:
  - combustion
  - controls/instrumentation
  - water treatment
  - radiant-heat loss
- too much excess air (i.e. high oxygen [O<sub>2</sub>])

Boilers and steam plant include one or more of the following:

- condensers
- economiser
- feed pumps
- fired
- high pressure
- low pressure
- medium pressure
- steam – steam generators
- unfired

Failures include one or more of the following :

- acid dew point corrosion
- caustic gouging
- corrosion fatigue
- distortion
- erosion
- fatigue
- hydrogen damage
- maintenance damage
- material flaws
- over temperature
- pitting
- stress:
  - corrosion cracking
  - rupture
  - thermal fatigue
- vibration
- welding flaws

Constraints include one or more of the following:

- class requirements
- location
- reliability
- time
- type of materials

Safety valves include one or more of the following:

- boiler drum
- economiser
- superheater
- WHU

## Unit Mapping Information

This unit replaces and is equivalent to MARL6017A Demonstrate advanced knowledge of marine auxiliary boilers.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL030 Demonstrate advanced knowledge of marine auxiliary boilers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information related to marine auxiliary boilers
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions for addressing complex problems associated with marine auxiliary boilers, such as maintaining the operation of marine auxiliary boilers under adverse conditions
- identifying and interpreting diagnostic information and performing complex mathematical calculations related to operating, repairing and maintaining marine auxiliary boilers
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, repairing and maintaining marine auxiliary boilers.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- basic principles of operation of boilers and steam systems
- boiler and steam plant repairs
- combustion efficiency
- combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- common boiler defects and repair procedures
- fittings mounted on boilers
- fuel oil system for an auxiliary boiler
- hazards:
  - associated with running boilers and steam plant
  - of operating steam plant under adverse or faulty operating conditions
- heat transfer oil systems
- methods of auxiliary steam plant operation and control under variable conditions
- operating principles relating to steam generation in fired and unfired boilers
- operation of marine auxiliary boilers
- principles of boiler operation in normal and emergency situations
- procedures for:
  - maintaining water level in boilers
  - protecting steam plant during off load conditions
  - surveying boilers
- purpose of alarms and shut downs in marine boilers
- steam plant:
  - efficiency
  - cycles
- types of auxiliary boilers and typical operating pressures and temperatures
- typical feed systems for marine boilers
- treatment, sampling and testing of boiler water
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of marine auxiliary boilers can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information required for performing advanced calculations related to marine auxiliary boilers
- technical reference library with current publications on marine auxiliary boilers and steam plant
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL031 Demonstrate advanced knowledge of marine auxiliary machinery and systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems on board a commercial vessel. This includes evaluating ship systems, assessing lubricants and lubricant contamination, and analysing the operation of major items of marine auxiliary machinery.

This unit applies to the work of a Marine Engineer Class 1 and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Evaluate ship systems**

1.1 Conventional systems are analysed from ship layout drawings and performance data

- 1.2 Viability and potential problems of new systems and advanced specialist vessels are evaluated
- 1.3 Suitable modifications are devised for systems that are not performing satisfactorily or recommendations are made on alternative systems
- 1.4 Manufacturer claims about new products and their suitability for use in existing conditions are evaluated
- 1.5 Performance of different pumps and heat exchangers is assessed and their applications are compared for different purposes
- 1.6 Performance of shipboard pollution control equipment is evaluated
- 2 Assess materials failure**
  - 2.1 Type of materials failure that impact on marine auxiliary components is analysed
  - 2.2 Type and properties of metallic and non-metallic materials used in the marine field are evaluated
  - 2.3 Ideal properties of materials required for components of auxiliary machinery are analysed
  - 2.4 Repair methods used for auxiliary machines and constraints on engineering staff engaged in repairing auxiliary machinery are analysed
  - 2.5 Type and purpose of destructive and non-destructive testing of materials are compared
- 3 Analyse lubrication**
  - 3.1 Mechanism of lubrication between two surfaces is explained
  - 3.2 Factors influencing good lubrication are identified and evaluated
  - 3.3 Different types of lubrication applied to marine machinery are compared and contrasted
  - 3.4 Relative advantages of synthetic lubricants and mineral oils are assessed
  - 3.5 Methods of assuring quality of lubrication are identified
- 4 Analyse fuel and lubricating oil**
  - 4.1 Symptoms, effects and possible remedial actions for different types of contaminants in fuel are evaluated

<b>contaminants</b>	4.2	Types of contaminants that affect lubricants and remedial actions required for different forms of contamination are identified
	4.3	Products used to counter poor quality fuels and to improve properties of lubricating oils are assessed
	4.4	Safety measures to be applied when fuels are found to be outside class requirements are identified
<b>5 Analyse shafting systems, bearings, couplings, clutches and shaft seals that form transmission system</b>	5.1	Different types and methods of checking alignment and wear of shafting, shaft bearings and thrust blocks are identified
	5.2	Assembly and dismantling procedures for muff and flange type couplings are compared and contrasted
	5.3	Different types, methods of operation and maintenance requirements of clutches are compared
	5.4	Different types, maintenance requirements and operation of stern tubes, tail shaft seals and stern bearing lubrication systems under adverse conditions are evaluated
<b>6 Analyse steering gears and controllable pitch propeller systems</b>	6.1	Regulatory requirements for steering gears of different types of vessels are identified
	6.2	Operation of various types of steering gear arrangements are analysed
	6.3	Operation and performance of controllable pitch propeller (CPP) and fixed pitch systems are compared and contrasted
	6.4	Modes of operation of CPP systems are explained
	6.5	Effects and countermeasures, in the event of failure in the control system or seals of a CPP system, are identified
<b>7 Analyse marine transmission systems</b>	7.1	Operation and performance of different marine transmission systems are compared and contrasted
	7.2	Procedure for inspecting a set of reduction gears from a propulsion system is analysed
	7.3	Types and locations of faults that may occur in gearing systems and repair options available are analysed
<b>8 Analyse marine air compressors</b>	8.1	Procedures for assessing performance of reciprocating and rotary compressors by output and condition monitoring techniques are explained

- |   |      |  |
|---|------|--|
|   | 8.2  | Effects of multi staging, inter-cooling and clearance volume are explained   |
|   | 8.3  | Importance of all fittings and safety devices in compressed air system is explained  |
|   | 8.4  | Full automatic operation of starting air compressors is explained  |
| <b>9 Evaluate shipboard refrigeration and air conditioning systems</b>        | 9.1  | Principle of air conditioning systems is explained and how ideal conditions are achieved in conditioned space is analysed                        |
|   | 9.2  | Automatic operation of a typical marine provision fridge plant capable of maintaining different temperatures in different cold rooms is analysed |
|   | 9.3  | Hazards associated with CFCs and HCFCs, and regulations controlling their production and usage are analysed                                      |
|   | 9.4  | Procedure for evacuation and recovery of refrigerants from the system is outlined  |
| <b>10 Evaluate operation of inert gas systems on crude oil tankers</b>        | 10.1 | Location and functions of all components, fittings and safety devices in an inert gas system are identified                                      |
|   | 10.2 | Operation of a typical inert gas system found on crude oil tankers is analysed   |
|   | 10.3 | Operation and maintenance requirements of inert gas systems are explained  |
| <b>11 Evaluate plant efficiency and relate problems in a turbo alternator</b> | 11.1 | Operating parameters and associated protections for turbo alternator systems are analysed  |
|   | 11.2 | Procedure for assessing efficiency of auxiliary steam turbines is explained by analysing measured parameters                                     |
|   | 11.3 | Methods of steam and air leak detection in turbo alternator systems are compared   |
|   | 11.4 | Effects of fouling of condenser and changes in sea water temperature in turbo alternator systems are analysed                                    |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |  |
|--|--|
| Auxiliary machinery includes one or more of the following:                 | <ul style="list-style-type: none"><li>• boiler</li><li>• compressors</li><li>• deck machinery</li><li>• diesel generator</li><li>• evaporators</li><li>• pumps</li><li>• refrigerating installation</li><li>• separators</li><li>• turbo alternators</li></ul> |
| Constraints include one or more of the following:                          | <ul style="list-style-type: none"><li>• class requirements</li><li>• location</li><li>• reliability</li><li>• time</li></ul>   |
| Factors influencing good lubrication include one or more of the following: | <ul style="list-style-type: none"><li>• alignment</li><li>• condition of bearing surfaces</li><li>• flow rate</li><li>• load</li><li>• purity of lubricant</li><li>• running clearances</li><li>• speed</li><li>• temperature</li><li>• viscosity</li></ul>    |
| Contaminants include one or more of the following:                         | <ul style="list-style-type: none"><li>• air entrainment</li><li>• incompatible fluids</li><li>• moisture</li><li>• particulate</li></ul>   |
| Protections include one or more of the following:                          | <ul style="list-style-type: none"><li>• axial displacement</li><li>• condenser condition</li><li>• expansion</li><li>• high air temperature</li><li>• high oil temperature</li><li>• loss of vacuum</li></ul>  |

- low oil pressure
- overspeed:
- electrical
- mechanical
- pressure
- steam
- steam condition
- temperature
- vibration

## Unit Mapping Information

This unit replaces and is equivalent to MARL6018A Demonstrate advanced knowledge of marine auxiliary machinery and systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL031 Demonstrate advanced knowledge of marine auxiliary machinery and systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information and sketch diagrams to interpret and explain testing requirements related to the operation of marine auxiliary machines
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining principles of marine auxiliary machines
- identifying and interpreting complex numerical and graphical information related to operating, maintaining and repairing marine auxiliary machines on commercial vessels
- identifying and rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting complex written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- fuel and lubricating oil contaminants
- fuels and basic principles of fuel systems
- inert gas systems
- lubrication
- marine air compressors
- marine transmission systems
- materials failure
- nature and causes of typical start up and shut down malfunctions of main and auxiliary machinery and associated systems, and available methods for their detection and rectification
- operational characteristics and performance specifications for the different types of auxiliary machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators
- plant efficiency
- principles and procedures of machinery lubrication
- procedures for carrying out start up and shut down of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- purpose and content of safety data sheets/material safety data sheets
- safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine auxiliary machinery and associated systems
- shafting systems, bearings, couplings, clutches and shaft seals that form the transmission system
- ship systems
- shipboard refrigeration and air conditioning systems
- steering gears and controllable pitch propeller systems
- turbo alternators
- types of auxiliary machinery and components
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of marine auxiliary machinery and systems can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- appropriate range of relevant operational situations in the workplace
- relevant regulatory and equipment documentation that impacts on work activities
- technical reference library with current publications on auxiliary machinery
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL032 Demonstrate advanced knowledge of marine control systems and automation**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate control systems on board a commercial vessel. It includes basic knowledge of control theory and knowledge required to analyse the operation and performance of signal transmissions systems, electronic transmitters, final control element arrangements, electronic temperature sensors and transmitters, governors, PID electronic controllers, machinery space monitoring alarm and control systems.

It also includes knowledge of fault finding techniques for control systems, measurement and test equipment used for fault finding electronic apparatus, operational applications of analogue and digital programmable logic controllers, and procedures for programming, operating, and maintaining PLC controlled systems.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| <b>1 Explain control theory</b>  | 1.1 Time lag is distinguished from time constant<br>1.2 Effect resistance and capacitance has on process system response is demonstrated<br>1.3 Transfer function is established and defined<br>1.4 Effect of variations in undamped natural frequency on control systems is illustrated   |
| <b>2 Analyse signal transmissions systems used for monitoring, controlling and shutting down machinery</b> | 2.1 Methods and limitations of different signal transmissions systems are compared<br>2.2 Standard pneumatic system and standard analogue 4-20 mA system of signal transmission are compared and contrasted<br>2.3 System of a communications bus using digital signal transmission with optical and electronic systems is explained<br>2.4 Limitations and advantages of a communications bus system are analysed   |
| <b>3 Analyse electronic transmitters</b>   | 3.1 Principles of operation of a typical 4-20 mA transmitter are explained<br>3.2 Application of strain gauges and changes in capacitance as sensors for pressure and differential pressure transmitters are outlined<br>3.3 Methods of testing transmitter outputs are recorded explained<br>3.4 Application of differential pressure transmitters to liquid level sensing is analysed<br>3.5 Use of a differential pressure transmitter to measure flow is analysed and compared with non-restrictive electronic systems |
| <b>4 Evaluate final control element arrangements</b>   | 4.1 Pneumatic, electric and hydraulic actuation are compared and contrasted<br>4.2 Arrangements for locking pneumatic control valves in their last position on air failure are outlined<br>4.3 Control valve trim characteristics are explained  |

	4.4	Control valve selection for machinery space duties are analysed
<b>5 Evaluate electronic temperature sensors and transmitters</b>	5.1	Colour coding of tails and compensating cables for thermo couple types are identified
	5.2	Temperature/mV outputs and application of common thermo couple types are illustrated
	5.3	Relationship between resistance and temperature for PT100 resistance temperature device and method of testing three wire arrangements is explained
	5.4	Arrangements of interfacing thermo couples and RTDs with 4-20ma systems and 1-5 volt interface cards are analysed
<b>6 Analyse PID electronic controllers</b>	6.1	Principle of operation of an electronic analogue 3-term controller and how adjustments are made is explained
	6.2	Open loop response and PID controller testing and calibration is demonstrated
	6.3	Application of modern single loop digital controller is explained
	6.4	Programming requirements for manual and auto tuning when adjusting digital controllers are demonstrated
<b>7 Evaluate performance of machinery space monitoring alarm and control systems</b>	7.1	Capacitance sensing and float level monitoring systems are compared
	7.2	Single, two and three element boiler water level control systems involving feedwater and cascade systems are analysed
	7.3	Requirements and systems to provide advanced combustion control systems and sequential control for burner management are outlined
	7.4	Concepts and arrangements for central cooling and load dependent cooling control systems are explained
	7.5	Main engine control arrangements for fixed pitch propeller and CPP systems requiring sequential control are analysed
	7.6	Tests and procedures to meet UMS requirements are explained, and alarm and monitoring systems involving data loggers, alarm print outers, and trend analysis are evaluated

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|---|------|--|
| <b>8 Explain fault-finding techniques for control systems</b>                               | 8.1  | Governor adjustments are demonstrated and effect of incorrect adjustments is explained   |
|   | 8.2  | Common defects in mechanical and electronic governors are itemised   |
|   | 8.3  | Indication of faults and procedures of fault finding in 4-20mA loops are explained   |
|   | 8.4  | Fault-finding techniques in pneumatic control systems and their respective components are analysed   |
|   | 8.5  | Fault-finding flow diagram is illustrated  |
|   | 8.6  | Off limit performance, fault detection and principles of rectifications for common engine room control systems are evaluated   |
| <b>9 Analyse measurement and test equipment used for fault-finding electronic apparatus</b> | 9.1  | Principles of operation of cathode ray oscilloscope are explained  |
|   | 9.2  | Need for pulse shaping in electronics is examined  |
|   | 9.3  | Different methods of testing common alarms systems are compared  |
|   | 9.4  | Methods used in stabilisation, surveillance and monitoring of control power supplies are demonstrated  |
| <b>10 Analyse governors</b>   | 10.1 | Governor faults are diagnosed and interpreted, identifying and evaluating appropriate adjustments and maintenance to be made   |
|   | 10.2 | Specific governor applications requiring torque limitation, critical speed range avoidance are outlined  |
|   | 10.3 | Typical electronic governors are explained using labelled diagrams to indicate major components and features   |
|   | 10.4 | Governor adjustments to allow operation of propulsion and power generation diesels in both shared load and standalone applications are specified   |
|   | 10.5 | Response of a diesel engine governor on change in engine load using both feedback and feed forward control is explained using labelled diagrams to indicate major components and adjustments |
| <b>11 Explain operational</b>   | 11.1 | Methods of programming PLCs are assessed   |

<b>applications of analogue and digital programmable logic controllers (PLC)</b>	11.2	Memory applications of PLCs are outlined
	11.3	Input devices used with analogue PLCs are identified
	11.4	Fibre optic data transmission systems are explained
	11.5	Methods used for storing binary data and operating registers are explained
<b>12 Document procedures for programming, operating and maintaining PLC controlled systems</b>	12.1	Procedure for identifying required control system functions are explained
	12.2	Procedure for connecting PLC to system control elements is outlined
	12.3	System operating procedure is outlined
	12.4	Procedure for modifying system and program as necessary to provide adequate and appropriate safety requirements, is outlined
	12.5	Maintenance and fault-finding procedures are outlined
	12.6	Required documentation is prepared and accuracy is verified

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Methods of testing transmitter outputs include one or more of the following:

- MA test point
- MV test point
- no test points

Faults must include:

- earths
- electronic component failure



- high resistance joints
  - open circuits
  - power supply faults
  - short circuits
  - mismatching between prime mover types and responses
- Governor adjustments must include:

## Unit Mapping Information

This unit replaces and is equivalent to MARL6019A Demonstrate advanced knowledge of marine control systems and automation.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL032 Demonstrate advanced knowledge of marine control systems and automation**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information and sketching diagrams, and interpreting and explaining testing requirements related to control systems on commercial vessels
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining advance principles of marine automation and process control, and imparting knowledge and ideas verbally, in writing and visually
- identifying and interpreting numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- identifying and suggesting ways of rectifying faults and malfunctions in control systems on commercial vessels
- identifying methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- reading and interpreting written information related to operating control systems on commercial vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- analogue and digital programmable logic controllers
- Australian Standards for drawing symbols/layouts for schematic diagrams
- characteristics and functions of temperature, pressure and viscosity of fuel
- concept of 'fail safe' philosophy
- concepts of unmanned machinery spaces (UMS), and automated monitoring and control of machinery

- control and monitoring of ship machinery
- control:
  - loops
  - theory
- electronic:
  - temperature sensors and transmitters
  - transmitters
- fault-finding techniques for control systems
- final control element arrangements
- governors
- instrument process and control terms
- machinery space monitoring alarm and control systems
- measurement and test equipment used for fault-finding electronic apparatus
- mechanical and electrical sensors
- PID electronic controllers
- pneumatic and electrical instrumentation transmitters
- principles of:
  - basic electronic circuits
  - basic pneumatic systems and action of pneumatic instruments
  - process control
- safety devices, alarms and monitoring systems
- sensing and transmitting elements
- signal transmissions systems used for monitoring, controlling and shutting down machinery
- tests and procedures required to meet UMS requirements
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of marine control systems and automation can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- appropriate range of relevant operational situations in the workplace
- technical reference library with current publications on automation and process control
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL033 Demonstrate advanced knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to analyse the operation and maintenance of marine diesel engines and systems on a commercial vessel. This includes evaluating fuel, cooling and lubrication systems; analysing starting, manoeuvring and reversing systems; analysing causes of vibration, scavenge fires and explosions; and interpreting combustion diagnostic equipment faults.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|-------------------------------|--|
| <b>1 Evaluate diesel fuel</b> | 1.1 Optimum combustion parameters, means of adjustment and legislation requirements limiting exhaust emissions are |
|-------------------------------|--|

<b>systems</b>	<b>analysed</b>
	1.2 Design modifications of pumps, camshafts and injectors for standard fuel types are evaluated
	1.3 Variable injection timing and fuel quality adjustments in service are justified, specifying common methods of adjustment
	1.4 Injection requirements for common diesel engine types, including combustion modifications for changes in engine service rating, are compared
	1.5 Faults and symptoms of common diesel fuel injection problems are analysed and appropriate adjustment is explained
	1.6 Work health and safety (WHS)/occupational health and safety (OHS) aspects of testing and handling fuel injection systems are explained
	1.7 Operation and normal operating pressures and temperatures of fuel systems are analysed
<b>2 Analyse cooling systems for main and auxiliary diesel engines</b>	2.1 Thermal efficiency optimisation of diesel engines and causes of thermal loads on engine components are explained
	2.2 Cooling media selection is justified and various diesel-cooling methods are evaluated
	2.3 Requirements of a coolant are identified and recorded
	2.4 Corrosion principles and combustion side corrosion problems are explained
	2.5 Appropriate action to be taken with common cooling system faults is established and evaluated
	2.6 How cooling systems are commissioned, monitored and stored during idle periods is explained
	2.7 Reasons for load-dependant cooling of diesel alternators on heavy fuels is explained
	2.8 Use of additives in cooling water is explained
	2.9 Normal operating temperatures, pressures and flow paths of typical methods of cooling medium and slow speed diesel engine pistons, exhaust valves, cylinders, turbochargers and cylinder heads are specified

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| <b>3 Evaluate diesel engine lubrication requirements</b> | <ul style="list-style-type: none"><li>3.1 Principles of engine lubrication are explained</li><li>3.2 Different lubrication systems and demands each puts on oil are explained</li><li>3.3 Methods for lubricating marine diesel engine components are specified and common faults are interpreted</li><li>3.4 Conventional and synthetic lubricant properties and applications are identified</li><li>3.5 Sources of contamination and deterioration of lubricants are analysed, treatment, monitoring and testing methods are explained, results are evaluated and appropriate action to be taken is outlined</li><li>3.6 Diagrams showing direction of flow, typical clearances and stating normal operating temperatures and pressures are used to explain how lubricating oil is distributed to the guides, top-end, bottom-end and main bearings of diesel engines</li><li>3.7 Methods of crosshead lubrication are outlined and compared</li><li>3.8 Methods of medium and slow speed cylinder lubrication are evaluated</li></ul> |
| <b>4 Analyse diesel engine starting and manoeuvring</b>  | <ul style="list-style-type: none"><li>4.1 Starting procedures for diesel engines for power generation, propulsion and emergency use are specified</li><li>4.2 Starting and manoeuvring sequences/requirements for direct-coupled reversible and geared propulsion diesels, including CPP applications, are specified</li><li>4.3 Common faults are analysed and appropriate action to be taken with diesel starting and manoeuvring systems is specified</li><li>4.4 Major components of a propulsion diesel engine typical manoeuvring and reversing system are outlined using labelled diagrams, explaining how remote, local and emergency manoeuvring is achieved</li><li>4.5 Methods of achieving reversing capability with direct-coupled propulsion diesels are evaluated</li></ul>   |
| <b>5 Analyse causes of vibration</b>                     | <ul style="list-style-type: none"><li>5.1 Common materials used in diesel engine construction are identified, justifying selection and specifying typical compositions and physical properties of components</li></ul>   |

- 5.2 Dynamic loads and stresses are summarised, identifying service limitations, and different methods of component fabrication and reclamation are evaluated
  - 5.3 Two- and four-stroke operating cycle forces, couples and moments, relating to design principles of crankshafts, bedplates, foundations and crossheads are analysed
  - 5.4 Out-of-balance gas and inertia forces, couples and moments, and their relationship with flywheels, balance weights, first/second order balancing and hull vibration are explained
  - 5.5 Factors contributing to torsional vibration are specified and methods of minimising or eliminating harmful effects of critical speeds are outlined
  - 5.6 Torsional vibration dampers/detuners are explained using labelled diagrams, indicating construction features and operating principles
  - 5.7 Calibration is applied to identify wear patterns, limits and means of restoring working clearances and limits of pistons, liners, piston rings, bearings and crankshafts, sliding surfaces and interference fits of typical diesel engines
  - 5.8 Alignment and adjustment criteria of crankshafts, chain-drives, integral thrust bearings and crossheads are specified
  - 5.9 Crankshaft deflection measurements are prepared and evaluated, alignment diagrams are constructed, and realignment procedures including restoration of crankshaft shrink-fit slippage, are proposed
- 6 Analyse scavenge and uptake fires, air-line, crankcase and gearbox explosions**
- 6.1 Operational and design factors contributing to waste heat unit fires are assessed
  - 6.2 Appropriate strategies for extinguishing/containing soot and hydrogen fires are selected
  - 6.3 Hazard reduction, inspection and isolation in service procedures are established
  - 6.4 Operational factors that may contribute to scavenge fires are identified and hazard reduction is planned
  - 6.5 Factors contributing to explosive mixtures are analysed and hazard reduction procedures for starting airlines are proposed and evaluated



- 6.6 Inspection and test intervals are specified
- 6.7 Causes of gearbox and crankcase explosions in propulsion and auxiliary drives are revised
- 6.8 How risks may be minimised in service by hazard reduction is specified
- 6.9 Procedures to be implemented for hazardous atmosphere warning in oil and dual-fuel engines are evaluated
- 6.10 Relevant diagrams are used to identify operating principles of oil-mist detectors, crankcase breathers and explosion relief doors
- 6.11 Maintenance strategies are developed and criteria for piston rod scraper box inspection and maintenance intervals are specified
- 7 Plan safe working practices associated with diesel engine maintenance, operation and repair**
  - 7.1 Safe working practices for isolating main and propulsion diesels under all operational contingencies are planned
  - 7.2 Safe working practices for machinery in enclosed spaces are planned
  - 7.3 Hazard reduction procedures for safe working with flammable liquids under pressure, chemicals, acids and hydrocarbons associated with engine overhaul and maintenance are planned
  - 7.4 Safe working strategies for diesel engine maintenance are planned according to manufacturer instruction manuals and product data safety sheets
- 8 Interpret combustion diagnostic equipment faults and relate to fuel injection and pressure charging systems**
  - 8.1 Two- and four-stroke theoretical cycle diagrams are produced and discrepancies with results recorded by diagnostic tools are accounted for
  - 8.2 Combustion faults related to fuel injection and pressure charging systems are diagnosed, corrective action is specified and service values with trials or test bed figures are analysed
  - 8.3 Methods of pressure charging diesel engines are evaluated, efficiencies are determined from records, efficiency losses are accounted for and means of correction are identified
  - 8.4 Maintenance and emergency procedures for turbochargers and charge air coolers are planned

- 8.5 Design features of turbochargers and charge air coolers are evaluated
- 8.6 Relevant diagrams are applied to evaluate diesel scavenging systems, under normal and emergency operation modes

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

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|--|--|
| <p>Fuel systems include one or more of the following:</p>  | <ul style="list-style-type: none"> <li>• conventional, low-inertia and dual-fuel (oil fuel/gas) injectors</li> <li>• fuel line pulsation damping devices</li> <li>• leakage protection</li> <li>• uni-fuel and dual-fuel systems (high/medium viscosity fuel types)</li> </ul> |
| <p>Appropriate action to be taken with common cooling includes one or more of the following:</p>     | <ul style="list-style-type: none"> <li>• contamination</li> <li>• different cooling water treatments</li> </ul>  |
| <p>Normal operating temperatures, pressures and flow paths include one or more of the following:</p> | <ul style="list-style-type: none"> <li>• bore cooling techniques</li> <li>• honeycomb techniques</li> <li>• strong-back techniques</li> </ul>  |
| <p>Sources of contamination must include:</p>  | <ul style="list-style-type: none"> <li>• bacterial infection</li> </ul>  |
| <p>Methods of medium and slow speed cylinder lubrication include one or more of the following:</p>   | <ul style="list-style-type: none"> <li>• optimisation</li> <li>• running-in requirements</li> <li>• speed and load-dependant lubrication</li> </ul>  |
| <p>Methods of component fabrication and</p>  | <ul style="list-style-type: none"> <li>• ceramics</li> <li>• composite</li> </ul>  |

reclamation include one or more of the following:

- forged
- laser-hardening
- plasma-spraying
- welded

Hazards include one or more of the following:

- acids
- chemicals
- defective or bypassed machinery protective devices
- defective or inappropriately adjusted exhaust systems
- enclosed spaces
- flammable liquids under pressure
- hydrocarbons
- leaking oil and fuel
- lifting heavy components both unaided and with lifting gear

Safe working practices for isolating main and propulsion diesels must include:

- identifying hazards
- minimising hazards

Safe working practices for machinery in enclosed spaces must include:

- handling heavy components
- using hydraulic tools

Design features of turbochargers and charge air coolers must include:

- bearing types
- materials

Relevant diagrams must include:

- light spring diagrams

## Unit Mapping Information

This unit replaces and is equivalent to MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL033 Demonstrate advanced knowledge of marine diesel engines and systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing diagnostic information related to marine diesel engines and systems
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining operation of marine diesel engines and systems, and imparting complex information and ideas verbally, in writing and visually
- identifying and applying relevant solutions for addressing problems associated with marine diesel engines and systems
- identifying and interpreting complex diagnostic information and performing mathematical calculations related to operating, repairing and maintaining marine diesel engines and systems
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- reading and interpreting manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, repairing and maintaining marine diesel engines and systems.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles of diesel engine operation
- causes of vibration
- combustion diagnostic equipment faults
- components of diesel engines
- cooling systems for main and auxiliary diesel engines
- crankcase and air-line explosions, scavenge and uptake fires
- diesel engine:
  - components
  - lubrication requirements
  - lubrication systems
  - propulsion and power generation
  - starting and manoeuvring
- diesel fuel systems
- fuel injection and pressure charging systems
- manoeuvring systems of diesel engines
- pressure charging diesel engines, including common service faults, actions to rectify faults, emergency operation and isolation procedures
- properties and characteristics of fires
- safe working practices associated with diesel engine maintenance, operation and repair
- scavenge and uptake fires, air-line, crankcase and gearbox explosions
- starting methods of diesel engines
- turbocharger operation
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of marine diesel engines and systems can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information required for performing basic calculations related to marine diesel engines and systems
- technical reference library with current publications on marine diesel engines and systems
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARL034 Demonstrate advanced knowledge of marine electrical systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to supply shipboard electrical power on board a commercial vessel. It includes analysing electrical layout systems, alternators, marine motors, lighting systems, power management and uninterruptable power systems (UPS), shipboard electrical equipment and high voltage power systems.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L – Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Evaluate advanced electrical layout

1.1 Effects of power factor changes on prime mover, alternator and electrical system are analysed



<b>systems</b>	1.2	Methods of altering load power factor by means of capacitors or synchronous machines are explained
	1.3	Methods of obtaining constant frequency from a variable frequency output such as a main engine driven alternator and/or variable speed drives for a self discharging equipment are explained
	1.4	Protecting systems available for shaft driven alternators are evaluated
<b>2 Analyse construction and principles of operation of different types of marine alternators</b>	2.1	Construction and operating parameters of different types of marine alternators are compared and contrasted
	2.2	Cooling systems, leak detection, monitoring and protection systems in different types of marine alternators are compared and contrasted
	2.3	Procedures for drying out an alternator with a low insulation resistance are explained
	2.4	Excitation systems and methods of flashing alternator after loss of excitation are appraised
	2.5	Systems used for protecting against high winding temperatures, circulating currents, loss of excitation and internal short circuit are evaluated
<b>3 Analyse different types of direct current (DC) and alternating current (AC) marine motors</b>	3.1	Different types and applications of marine motors are compared and contrasted
	3.2	Difference between types of encapsulation is explained and where they should be used is justified
	3.3	Motor ratings and effect of overloading on different types of motor are assessed
	3.4	Possible operational problems associated with marine motors are analysed and appropriate remedial action is devised
	3.5	Procedure for drying out a motor that has become unserviceable due to either long-term storage or immersion in seawater is formulated
	3.6	Effects of operating star connected motors compared with delta connected motors are distinguished and when this may be required is suggested
	3.7	Different types and applications of special motors for deck

- and cargo operation are analysed
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|--|---|
| <b>4 Analyse requirements of motor starters for 3 phase and synchronous motors</b> | <p>4.1 Differentiation is established between different types of motor starters</p> <p>4.2 Different types of starters are evaluated in terms of starting torque and current, and are compared to particular motor applications</p> <p>4.3 Simple starter circuit diagrams are evaluated and operating principles of motor starters are explained</p> <p>4.4 Documentation and circuit and wiring diagrams are used for fault-finding in motor starters</p> <p>4.5 Routine maintenance program for monitoring vibration and insulation resistance levels of motors is designed</p>  |
| <b>5 Analyse lighting systems used on board ships</b>                              | <p>5.1 Common types and applications of lighting systems are evaluated</p> <p>5.2 Distribution layout systems are explained</p> <p>5.3 Fault-finding method for lights and starter systems, including lighting in hazardous areas, is planned using circuit diagrams</p>  |
| <b>6 Evaluate alternator excitation system design</b>                              | <p>6.1 Different types of excitation systems and impact of load changes are compared</p> <p>6.2 Type, location and function of components involved in excitation are examined</p> <p>6.3 Function, cooling, failure mode and procedures for testing and changing diodes are explained</p> <p>6.4 Functions of an Automatic Voltage Regulator (AVR) and how it may be incorporated into an excitation system are explained</p> <p>6.5 Process of fault-finding in an AVR and types, causes and remedies of common problems are explained</p> <p>6.6 The impact excitation systems have on output in normal and adverse circumstances is assessed</p> |
| <b>7 Analyse power management and UPS fitted to vessels</b>                        | <p>7.1 Operational functions of power management systems during high load, overload and short circuit conditions are analysed</p> <p>7.2 Functions and components of UPS systems are evaluated</p>  |

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|  | 7.3  | Limitations of power management and UPS fitted to vessels are analysed   |
|  | 7.4  | System response under possible fault conditions of vessel power management and UPS are determined  |
| <b>8 Analyse vessel cathodic protection system</b>   | 8.1  | Cathodic protection systems and how they interact are analysed   |
|  | 8.2  | Components of cathodic protection systems are identified and life cycle maintenance program is prepared  |
|  | 8.3  | Modifications required for operating parameters of cathodic protection systems when operating alongside an active wharf or another vessel are determined       |
|  | 8.4  | Likely causes of corrosion in relation to size, location or distribution of anodes or current densities are assessed   |
|  | 8.5  | Other corrosion problems in shipboard environment that may be cause of electrical problems are appraised   |
| <b>9 Assess requirements and components associated with electrical systems for hazardous spaces on board vessels</b> | 9.1  | Different types, limitation and nameplate identification of 'E' equipment are compared   |
|  | 9.2  | Requirements of classification societies are distinguished from administrations regarding electrical installations on board vessels                            |
|  | 9.3  | Lighting and power supply requirements of pump rooms are identified  |
|  | 9.4  | Safety requirements for electrical equipment and safety practices on board vessels and how these are extended when alongside a berth are analysed              |
| <b>10 Assess existing electrical shipboard equipment</b>   | 10.1 | Existing and new shipboard electrical equipment and systems are compared to assess future requirements as well as potential problems and preventative measures |
|  | 10.2 | Performance of existing shipboard electrical equipment and systems is analysed and cost effectiveness studies for modifications or improvements are prepared   |
|  | 10.3 | Factors involved in commissioning new electrical plant are evaluated   |
|  | 10.4 | Procedures involved in organising survey of existing plant are outlined  |

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|   | 10.5 | Procedures involved in making recommendations for new systems consistent with modified new ship building requirements are outlined |
| <b>11 Appraise high voltage electrical motor propulsion systems</b> | 11.1 | Safety requirements for working with high voltage systems are identified   |
|   | 11.2 | Use of high voltage systems for propulsion and cargo handling is evaluated   |
|   | 11.3 | Safe maintenance methods for high voltage switchgear and machines are analysed   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

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| Operating parameters include one or more of the following: | <ul style="list-style-type: none"> <li>• excitation current</li> <li>• insulation grade</li> <li>• operating temperature</li> <li>• speed</li> </ul>  |
| Marine motors include one or more of the following:        | <ul style="list-style-type: none"> <li>• polyphase</li> <li>• reduced starting current motors</li> <li>• single</li> <li>• speed changing</li> <li>• synchronous</li> <li>• variable speed</li> </ul> |
| Encapsulation includes one or more of the following:       | <ul style="list-style-type: none"> <li>• drip proof</li> <li>• submersible</li> <li>• TEFC</li> </ul>   |
| Motor ratings must include:                                | <ul style="list-style-type: none"> <li>• continuous</li> <li>• short time</li> </ul>  |

- Operational problems include one or more of the following:
- loss of insulation resistance
  - open circuit
  - overheating
  - short circuit
  - wrong connections
- Motor starters include one or more of the following:
- DOL
  - primary and secondary resistance
  - soft or electronic starters
  - star-Delta
  - transformer starter
- Lighting systems include one or more of the following:
- fluorescent
  - halogen
  - incandescent
  - LED
  - mercury
  - sodium vapour
- Distribution layout systems must include:
- emergency lights
  - safety lights
- How excitation systems impact on output in normal and adverse circumstances must include:
- loss of excitation
  - short circuit
- Safety requirements include one or more of the following:
- company requirements
  - manufacturer requirements
  - statutory requirements

## Unit Mapping Information

This unit replaces and is equivalent to MARL6021A Demonstrate advanced knowledge of marine electrical systems

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL034 Demonstrate advanced knowledge of marine electrical systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- explaining advanced principles of lighting, cathodic protection, high voltage systems and imparting knowledge and ideas verbally, in writing and visually
- identifying and interpreting complex numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- identifying and suggesting ways of rectifying electrical hazards and emergency situations on a vessel
- identifying methods, procedures and materials needed for operating, maintaining and repairing complex marine electrical systems
- reading and interpreting written information related to electrical circuitry and components on commercial vessels
- using electrical measuring and testing instruments.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- alternating current (AC)/direct current (DC) voltage
- AC and DC marine motors
- alternators:
  - alternator excitation system design
  - construction
  - characteristics
  - synchronised operation
  - types
- cathodic protection system
- electrical:
  - layout systems
  - measuring and testing instruments
  - shipboard equipment
  - symbols, basic electrical diagrams/circuits
- high voltage electrical motor propulsion systems
- lighting systems used on board ships
- motor starters for three-phase and synchronous motors
- phase angle, power factor, and current flow
- power management and UPS fitted to vessels
- procedures for dealing with hazards and emergencies
- requirements and components associated with electrical systems for hazardous spaces on board vessels
- resistance, inductance and capacitance
- safe electrical working practices
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.



Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of marine electrical systems can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on marine electrical systems
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL035 Demonstrate advanced knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel. It includes analysing: methods of improving plant efficiency; changes in feed system that occur during fluctuating loads; design and construction of high-pressure water tube boilers and ancillary equipment; operation, maintenance and performance of high-pressure water tube boilers and ancillary equipment; turbine operation, maintenance and performance; and turbine-gearing performance.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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| <b>1 Analyse methods of improving plant efficiency</b>   | <b>1.1</b> | Increase in Rankine efficiency of plant by increasing the pressure and temperature is analysed   |
|  | <b>1.2</b> | How regenerative feed heating and steam reheating increases overall plant efficiency is shown on an enthalpy/entropy diagram   |
|  | <b>1.3</b> | Efficiency calculations and performance evaluation for boilers, turbines, feed systems and total plant are performed   |
| <b>2 Analyse changes in feed system that occur during fluctuating loads</b>                          | <b>2.1</b> | Changes that occur during fluctuating loads are identified, detailing how make up to system and dump from system are performed   |
|  | <b>2.2</b> | Condenser level control methods, how condenser is supported and how expansion stresses are avoided are explained   |
|  | <b>2.3</b> | Loss of efficiency when heat transfer rate is interrupted is explained   |
|  | <b>2.4</b> | Test procedure to identify leaks in a condenser is created   |
|  | <b>2.5</b> | Types, features, common defects and maintenance requirements of two-stage and super cavitating extraction pumps are compared and contrasted  |
|  | <b>2.6</b> | Effects of air leaks in feed system and ineffective air removal in air ejector are explained   |
|  | <b>2.7</b> | Operation of a vacuum pump for air removal from a condenser is explained   |
|  | <b>2.8</b> | Operation of a turbo feed pump differential pressure governor taking into account constant pressure, increasing pressure and decreasing pressure differential governing is explained |
|  | <b>2.9</b> | Alarms, shutdowns, automatic cut-in arrangements and testing of over speed trips for a boiler feed pump are outlined   |
| <b>3 Analyse design and construction of high-pressure water tube boilers and ancillary equipment</b> | <b>3.1</b> | Temperature load relationships and temperature control of superheater are analysed   |
|  | <b>3.2</b> | Operation of superheater with parallel, contra and cross flow of gas/steam flow is predicted   |
|  | <b>3.3</b> | Correct material for high temperature operation of superheater tubes and headers is identified   |

- 3.4 Tube fixing and support arrangements for superheater elements are explained
- 3.5 Burner tip design and operation for steam atomising oil burners are compared
- 3.6 Features of a three-element water level control system and relationship with burner management system are outlined
- 3.7 Operation of a combustion control system fitted with cross limits on air and fuel is explained
- 4 **Analyse operation, maintenance and performance of high-pressure water tube boilers and ancillary equipment**
  - 4.1 Warm through procedure and checks to be carried out before connecting boiler to range are explained
  - 4.2 How boiler is laid up for short and/or long periods is explained
  - 4.3 Actions required after oil or salt water contamination are detailed
  - 4.4 Chemical cleaning procedure to remove scale and oil deposits from internal surfaces of a boiler is explained
  - 4.5 Tube failures are identified and suitable methods of repair are selected
  - 4.6 Defects that can occur in economisers and how they can be repaired are listed
  - 4.7 Maintenance inspection procedures to prevent superheater and economise fires are produced
  - 4.8 Procedure to combat soot and steam/iron fires in generating banks, superheaters and economisers is outlined
  - 4.9 Coordinate and congruent feed water treatment is illustrated on a caustic/phosphate graph
  - 4.10 Different feedwater tests, procedure for each test and appropriate chemical treatments are explained
  - 4.11 Program for an internal and external survey of a water tube boiler is compiled, defects that may be found and repair methods that will enable boiler to be returned to service are listed
  - 4.12 Procedure for setting lift, adjusting blow-down of safety valves and carrying out an accumulation test on a boiler is

- outlined
- 4.13 Operation, desired temperature range and correct cleaning and maintenance requirements for tube and regenerative air heaters are detailed
- 4.14 Preparation and procedure for conducting hydraulic testing of a high pressure water tube boiler is explained
- 5 Analyse turbine operation, maintenance and performance**
- 5.1 Relationship between sequential nozzle operation and bar lift in steam turbines is explained
- 5.2 Principle of operation of different trips and cut-outs is explained
- 5.3 Differentiation is made between resonance and critical speed, and their effect on the turbine operation is explained
- 5.4 Types of turbine vibration and where each type is found in a turbine is analysed
- 5.5 System torsional vibration and effect of operating at critical speeds and in-built design elements required to avoid critical speeds are explained
- 5.6 Back pressure and self-condensing turbo alternators are compared
- 5.7 Governor system is explained
- 5.8 Turbine control systems are explained
- 5.9 Procedure for opening up turbine for survey, routine checks of blades, casings, rotors, bearings, glands, drains and the reassembly of turbine is explained
- 5.10 Procedure for straightening a bowed turbine rotor is outlined
- 6 Evaluate turbine-gearing performance**
- 6.1 Single and double reduction gearing systems are compared and contrasted
- 6.2 Features and applications of double helical involute gear teeth are outlined
- 6.3 Advantages and disadvantages of single and double locked train gearboxes are analysed
- 6.4 Construction and reason for installing flexible couplings in gearing system is explained

- 6.5 Features, functions and applications of star, planetary and solar epicyclic gearing are compared and contrasted
- 6.6 Space savings resulting from use of epicyclic gearing are analysed

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Trips and cut-outs include one or more of the following:

- axial displacement
- bearing high temperature
- high condenser level
- loss of vacuum
- over speed
- vibration

Turbine vibration includes one or more of the following:

- axial
- torsional
- transverse

Turbine control systems include one or more of the following:

- bridge control
- emergency operation
- hydraulic control
- local control

## Unit Mapping Information

This unit replaces and is equivalent to MARL6022A Demonstrate advanced knowledge of marine steam turbines and main boilers.

MARL6022A replaces and is equivalent to TDMMR5707A Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels of unlimited propulsion power.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL035 Demonstrate advanced knowledge of marine steam turbines and main boilers**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing diagnostic information related to marine steam turbines
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant solutions to complex problems that can occur during operating steam propulsion plant and associated systems on a steam vessel
- identifying and interpreting complex diagnostic information and performing complex mathematical calculations related to operating, repairing and maintaining marine steam turbines
- identifying methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- imparting advanced knowledge and ideas verbally, in writing and visually
- reading and interpreting complex manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, repairing and maintaining marine steam turbines
- performing accurate and reliable calculations and producing accurate and reliable information.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:



- boiler operation, maintenance and performance
- changes in feed system that occur during fluctuating loads
- established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm through, manoeuvring, start up, normal running, emergency and shut down situations
- fundamental principles of steam propulsion systems and boilers
- hazards and problems that can occur during operation of steam propulsion plant and associated systems, and appropriate preventative and remedial action
- high-pressure water tube boilers and ancillary equipment
- methods of lubricating principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- operation of marine steam turbines
- operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
  - construction and operation of main and auxiliary steam turbines
  - methods of turbine control, including safety devices
  - procedures for emergency operation of a steam turbine
  - symptoms, causes and effects of defects of auxiliary steam turbines and actions to be taken
- procedures for reading and interpreting readings and indications of performance of steam propulsion plant and associated systems
- turbine operation, maintenance and performance
- turbine-gearing performance
- types, properties, tests, applications and treatment of fuels, lubricants, and solvents/chemicals used on board a steam vessel, including a basic understanding of working principles, construction, maintenance and safe operation of centrifuges, filters and other treatment devices
- typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements and established safety and anti-pollution rules and regulations
- units of measurement
- ways of improving plant efficiency
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of marine steam turbines and main boilers can be demonstrated.

Resources for assessment include access to:

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- diagrams, specifications and other information required for performing complex calculations related to marine steam turbines
- technical reference library with current publications on marine steam turbines
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARL036 Demonstrate advanced knowledge of ship operation and maintenance**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to ensure that vessels comply with regulatory and survey requirements as well as implementing maintenance and repair procedures associated with satisfying maintenance of class. It includes analysing: regulatory framework impacting on commercial shipping operations; maintenance strategies relating to classification surveys; statutory survey requirements; and factors influencing vessel stability.

It also includes analysing repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position; international maritime dangerous goods code requirements; safe working practices in enclosed or confined spaces; dry docking procedures and responsibilities of engineering staff; and shipboard vibration.

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

L – Marine Engineering

## **Unit Sector**

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Analyse regulatory framework impacting on commercial shipping operations**

- 1.1 Functions of International Maritime Organization (IMO), its fields of influence, role of member states, adoption of recommendations through maritime legislation and exemptions are analysed
- 1.2 Role of International Labour Organization (ILO) Convention in relation to shipboard practices is analysed
- 1.3 Key provisions of Australian maritime legislation are analysed
- 1.4 Role of AMSA in relation to maritime safety, protection of marine environment, and aviation and marine search and rescue is explained
- 1.5 Role of Flag State administrations, Port State Control and other methods of implementation and enforcement of international agreements and conventions is analysed
- 1.6 Role of insurance underwriters, Protection and Indemnity (P & I) Clubs and procedures for lodging claims following machinery failure and/or damage are analysed
- 1.7 Role of classification societies, IACS and Memorandum of Agreement with Flag States is analysed
- 1.8 Role of ship owners and ship management companies regarding ISM Code and ship management responsibilities regarding operation and maintenance is analysed
- 1.9 Role of independent inspection agencies and adoption of inspection and maintenance guidelines for different ship types is analysed
- 1.10 Standards of Training Certification and Watchkeeping (STCW) crew training requirements and implications for emergency response, administration, operation and maintenance are analysed
- 1.11 Key provisions of the Code of Safe Working Practice for Australian Seafarers are analysed

### **2 Analyse maintenance**

- 2.1 Common areas covered by classification surveys are analysed

<b>strategies relating to classification surveys</b>	2.2	Survey methods are analysed
	2.3	Terms of periodical, annual, renewal, intermediate and occasional surveys are identified
	2.4	Common defects identified in classification surveys and appropriate remedial actions are analysed
<b>3 Analyse statutory survey requirements</b>	3.1	Areas of vessel covered by statutory surveys are identified
	3.2	Statutory requirements for change of Flag, owner, and term expiry during layup are identified
	3.3	Records and documentation required for statutory surveys are identified
	3.4	Load line measurements and conditions of freeboard assignment are analysed
	3.5	Key areas of maintenance and testing of load line items and actions for addressing identified maintenance requirements and defects are identified
	3.6	Areas covered by safety construction surveys and associated faults, maintenance and repairs are identified
	3.7	Procedures for planning safety equipment surveys and actions for addressing identified maintenance requirements and defects are analysed
	3.8	Requirements for survey preparation under the International Convention for the Prevention of Pollution from Ships (MARPOL) are analysed
	3.9	Survey requirements for cargo ship safety construction, safety equipment and safety radio certificates; passenger ship safety certificates; chemical tanker and gas carrier certificates of fitness are analysed
	3.10	Application of Port State Control surveys, Flag State jurisdiction and IMO guidelines in relation to vessel detention and identification of substandard ships are analysed
<b>4 Analyse factors influencing vessel stability</b>	4.1	Loss of GM due to addition, removal or shift of mass on board is calculated
	4.2	Action to be taken with partial loss of intact buoyancy is specified

- 4.3 Angle of Loll is explained
  - 4.4 Causes of vessel instability during ballasting, bunkering, cargo pumping and other daily routines and possible corrective and avoidance measures are assessed
  - 4.5 Risks associated with carrying thixotropic bulk cargo, deck cargo or grain and consequences of cargo movement or loss are outlined
  - 4.6 Damage and intact stability requirements for merchant ships, countermeasures for ro-ro vessels and damage control assessment following collision or grounding is assessed
  - 4.7 Operational procedures to minimise and control flooding are prepared
  - 4.8 Stability requirements for routine and emergency dry docking, including stability assessment for the docking duration, are specified
  - 4.9 Factors causing ship squat and other influences on vessel manoeuvrability are assessed
- 5 Maintain class certification**
- 5.1 Methods for repair and maintenance are analysed
  - 5.2 Properties of ordinary and high tensile hull grades of steel are analysed
  - 5.3 Processes and materials used in underwater hull repairs are assessed
  - 5.4 Methods of minimising and controlling internal and external hull corrosion, including bacterial corrosion of bilges and fuel tanks, are evaluated
  - 5.5 Examination and repair techniques for fixed pitch and controllable propellers are assessed
  - 5.6 Dismantling, inspection, repair and re-assembly of thrusters and rudders is explained
  - 5.7 Methods of performance testing shipboard pumping systems are evaluated
  - 5.8 Causes of common faults and methods of assessment of shipboard pumping systems are identified
  - 5.9 Condition monitoring of machinery is compared with

		planned maintenance systems
	5.10	Causes of damage to and losses of bulk ships and tankers, and appropriate remedies are explained
	5.11	Types and purpose of special and enhanced surveys are outlined
<b>6 Analyse International Maritime Dangerous Goods (IMDG) Code requirements</b>	6.1	Key principles of IMDG Code are analysed
	6.2	Action plans for managing emergency situations on board a vessel involving dangerous goods are developed
	6.3	Criteria for evaluating effectiveness of action plans for managing emergency situations on board a vessel involving dangerous goods are established
<b>7 Analyse safe working practices in enclosed spaces</b>	7.1	Hazards of shipboard enclosed spaces are analysed
	7.2	Methods and regulatory requirements for testing atmosphere in enclosed spaces are outlined and evaluated
	7.3	Function, status and limitations of chemist certificate of compliance is explained
	7.4	Limits of exposure to common atmospheric hazards are stated
	7.5	Typical safe entry permit for enclosed spaces, covering hot work and cleaning, evacuation procedures, training and contingency evaluation is prepared
	7.6	Dangers of using cleaning solvents and painting in enclosed spaces using product safety data sheets/material safety data sheets and work health and safety/occupational health and safety (WHS/OHS) guidelines are assessed
<b>8 Analyse dry docking procedures and responsibilities of engineering staff</b>	8.1	Dockyard contract, docking specifications and survey requirements are used to plan preparation of vessel for docking, explaining variations required for emergency docking
	8.2	Dock work schedules, responsibilities for engineering personnel and procedures for dock entry, duration and refloating are prepared
	8.3	Inspection and maintenance procedures for hull and machinery items in dock are explained
	8.4	In-water hull cleaning methods and preparation essential for

in-water surveys is evaluated

8.5 Types and application procedures of coatings used to protect ship hulls and tanks are identified

8.6 Procedures for vessel layup to satisfy class, insurance, owner and statutory requirements are prepared

8.7 Inspection and reactivation processes after prolonged layup are outlined

## **9 Analyse shipboard vibration**

9.1 Appropriate terms are applied when describing vibration

9.2 Influence of materials, construction, loading patterns and ship type on natural hull vibration patterns is assessed

9.3 Significance of hull response to excitation by sea state, machinery and propulsion systems is explained

9.4 Methods of prediction and in service assessment of resonant vibration are evaluated

9.5 Vibration related structural and equipment damage and failure is identified

9.6 Solutions to troublesome vibration are proposed

9.7 Acceptable vibration limits using relevant standards are established

## **10 Analyse vessel bunkering requirements**

10.1 Requirements for bunkering orders are analysed

10.2 Procedures for taking bunkers are analysed

10.3 Bunkering guidelines for spills and fire are analysed

10.4 Methods and requirements for sampling fuels are analysed

10.5 Procedures for assessing the quality and quantity of fuels are explained

10.6 Communication requirements and procedures during bunkering operations are analysed

10.7 Methods for monitoring levels and facilitating changeover of tanks are analysed



## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Key provisions of Australian maritime legislation must include:

- AMSA legislation
- levy legislation
- marine pollution legislation
- navigation legislation
- shipping industry legislation
- shipping registration legislation
- other relevant legislation

Key provisions of the Code of Safe Working Practice for Australian Seafarers must include:

- anchoring, docking and mooring
- carriage of dangerous goods
- entering and working in enclosed or confined spaces
- general duties and responsibilities
- general provisions
- manual lifting and carrying
- painting
- permit to work systems
- reporting of accidents
- safe access to ship
- safe movement about the ship
- safety in living accommodation
- shipboard:
  - emergencies and emergency equipment
  - health and safety
  - specific vessel types
  - tools and materials
  - upkeep of wire and fibre ropes
  - welding flame cutting and other hot work
- working:
  - aloft and over the side
  - with electricity and electrical equipment
  - with dangerous and irritating substances and radiations
  - in machinery spaces

Areas covered by classification must include:	<ul style="list-style-type: none"><li>• in galleys, pantries and other food handling areas</li><li>• specific notations for cargo pumping arrangements for tankers</li></ul>
Areas covered by classification include one or more of the following:	<ul style="list-style-type: none"><li>• automation</li><li>• boilers/pressure vessels</li><li>• cargo gear</li><li>• hull</li><li>• machinery</li><li>• tailshaft</li></ul>
Ship types include one or more of the following	<ul style="list-style-type: none"><li>• bulk carrier</li><li>• container</li><li>• general dry cargo</li><li>• passenger</li><li>• ro-ro</li><li>• tanker or gas carrier</li></ul>
Survey methods include one or more of the following:	<ul style="list-style-type: none"><li>• alternative</li><li>• continuous</li><li>• special surveys</li></ul>
Classification surveys must include:	<ul style="list-style-type: none"><li>• hull work</li><li>• machinery</li><li>• pipe work</li><li>• pumping systems</li><li>• propellers</li></ul>
Areas of vessel covered by statutory surveys must include:	<ul style="list-style-type: none"><li>• links with classification society requirements for endorsement of class certificates</li></ul>
Loss of GM must include:	<ul style="list-style-type: none"><li>• derrick hook loads</li><li>• free surface effect</li></ul>
Operational procedures to minimise and control flooding must include:	<ul style="list-style-type: none"><li>• action to ensure watertight integrity of ship</li><li>• rules relating to watertight doors</li></ul>
Stability requirements for routine and emergency dry docking must include:	<ul style="list-style-type: none"><li>• stability assessment for docking duration</li></ul>

- Properties must include:
- repair techniques and limitations
  - weld ability
  - welder qualification tests
- Methods of minimising and controlling internal and external hull corrosion must include:
- bacterial corrosion of bilges and fuel tanks
- Methods of performance testing shipboard pumping systems must include:
- bilge and ballast systems
  - hydraulic deck machinery
- Shipboard pumping systems must include:
- bilge and ballast systems, including predictive health monitoring
  - hydraulic deck machinery
- Planned maintenance systems must include:
- guidelines for classification society approval of substitution for continuous machinery surveys
- Principles of IMDG Code include:
- contains dangerous goods packagings/tanks which are of appropriate strength and which will prevent goods escaping
  - groups dangerous goods together based on hazards they present in transport (classification)
  - lays down principles for ensuring dangerous goods that will react dangerously together are kept apart
  - lays down principles for where to place dangerous goods on board ship to ensure safe transport
  - provides emergency response advice for dangerous goods involved in a fire or spillage on board ship
  - requires standard documentation to be provided when dangerous goods are being transported
  - uses hazard warning labels and other identifying marks to identify dangerous goods in transport
- Emergency situations include one or more of the following:
- dangerous goods
  - disposal of dangerous/toxic materials
  - firefighting
  - first aid
  - hazard reduction
  - reporting

Hazards of shipboard enclosed spaces must include:

- re-entry of compartments after a major fire
- release of a fixed firefighting medium

Hazards of shipboard enclosed spaces must include one or more of the following:

- engulfment
- explosion
- fire
- lack of oxygen
- toxic gases

Inspection and maintenance procedures for hull and machinery items in dock must include:

- hull coating systems
- measurement and evaluation of clearances

Terms must include:

- amplitude
- anti-node
- frequency
- mode
- node
- resonance

Solutions include one or more of the following:

- damping
- detuning
- modification of ship:
- design
- operation

Communication includes one or more of the following:

- checklist
- rate
- safety
- stock method
- two-way radio

## Unit Mapping Information

This unit replaces and is equivalent to MARL6023A Demonstrate advanced knowledge of ship operation and maintenance

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARL036 Demonstrate advanced knowledge of ship operation and maintenance**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information required in routine and emergency situations
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- ensuring currency of relevant legislative and regulatory knowledge
- explaining advanced concepts of ship operation and maintenance, and imparting knowledge and ideas verbally, in writing and visually
- identifying, interpreting and processing complex numerical and graphical information required to analyse marine engineering functions and shipboard engineering related problems
- identifying hazards and risks, and determining appropriate ways of responding to hazards, malfunctions and emergency situations
- identifying methods and procedures needed to perform duties such as preparing for dry-docking and statutory surveys
- planning and organising the resources needed to establish and maintain safety management systems on a tanker or gas carrier
- reading and interpreting legislation and regulations related to maritime operations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- Australian maritime legislation
- classification societies
- dry docking:
  - procedures
  - responsibilities of engineering staff
- enclosed spaces
- flag State responsibilities
- hierarchy and organisational structure of shipboard personnel
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- International Maritime Dangerous Goods (IMDG) Code requirements
- key international and Australian standards relating to shipping
- key shipping authorities and organisations
- maintenance strategies relating to classification surveys
- Port State Control
- regulatory framework impacting on commercial shipping operations
- relevant sections of maritime regulations, codes and conventions related to tankers and gas carriers
- repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position
- safe practices for working with lifting gear
- safe working practices in enclosed or confined spaces
- shipboard vibration
- statutory survey requirements
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- types of ships and key features of ships
- vessel stability
- watertight integrity
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where advanced knowledge of ship operation and maintenance can be demonstrated.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- technical reference library with current publications on commercial shipping
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARL037 Demonstrate knowledge of ships and ship routines

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain a safe engineering watch on a commercial vessel.

This unit applies to people working in the maritime industry as a Marine Engineering Watchkeeper on commercial vessels greater than 750 kW.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

L - Marine Engineering

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |   |     |   |     |   |     |  |
|--|---|-----|---|-----|---|-----|--|
| <b>1 Outline key features of different types of commercial ships</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Annotated sketch of profile and midship section of a range of ship types is constructed</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Terms used to quote size of a ship are used appropriately</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Plate materials and joining methods used in ship construction are detailed</td></tr></table> | 1.1 | Annotated sketch of profile and midship section of a range of ship types is constructed | 1.2 | Terms used to quote size of a ship are used appropriately | 1.3 | Plate materials and joining methods used in ship construction are detailed |
| 1.1  | Annotated sketch of profile and midship section of a range of ship types is constructed   |     |   |     |   |     |  |
| 1.2  | Terms used to quote size of a ship are used appropriately   |     |   |     |   |     |  |
| 1.3  | Plate materials and joining methods used in ship construction are detailed  |     |   |     |   |     |  |

- |   |     |  |
|---|-----|--|
|   | 1.4 | Basic principles of watertight integrity are identified and applied  |
|   | 1.5 | Shipping terms are applied to describe characteristics of commercial vessels   |
| <b>2 Explain dangers associated with entry into engine room spaces</b>          | 2.1 | How atmosphere in engine room spaces may be hazardous is detailed  |
|   | 2.2 | Procedures for obtaining permission to enter engine room spaces are outlined   |
|   | 2.3 | Administrative procedures applying to work in engine room after normal hours are outlined  |
| <b>3 Explain need for standards and other monitoring requirements for ships</b> | 3.1 | International standards relating to construction, equipment and conditions of commercial vessels are outlined  |
|   | 3.2 | National legislation and International Maritime Organization (IMO) conventions concerning safety of life at sea, security and protection of marine environment are outlined  |
|   | 3.3 | Requirements of International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM) Code and safety management system are outlined  |
|   | 3.4 | Qualifications and experience requirements for key personnel on a ship are outlined  |
|   | 3.5 | Personal and ship certificates, and other documents required to be carried on board ship by international conventions, how they are obtained, how they may be verified and period of their legal validity are identified |
|   | 3.6 | Roles and functions of key national and international shipping authorities and organisations are outlined  |
|   | 3.7 | Purpose of surveys and dry-docking of ships are explained  |
| <b>4 Explain responsibilities of personnel on board ship</b>                    | 4.1 | Roles and responsibilities of personnel on board ship are clarified  |
|   | 4.2 | Organisational structure, lines of responsibility and communication on board ship are outlined   |
|   | 4.3 | International maritime conventions, recommendations and national legislation concerning shipboard personnel and training are clarified   |

- |  |      |  |
|--|------|--|
|  | 4.4  | Daily work and shipboard routines relating to engineering watchkeeping are outlined  |
|  | 4.5  | Personal and social responsibilities of personnel on board ship are confirmed  |
| <b>5 Explain engineering watchkeeping procedures</b>                               | 5.1  | Established marine engineering practice and regulatory requirements for conduct, handover and relief of an engineering watch are outlined                            |
|  | 5.2  | Operational procedures and requirements for main propulsion, auxiliary systems and associated controls are outlined  |
|  | 5.3  | Operational procedures and requirements for monitoring the performance of main propulsion, auxiliary systems and associated controls are outlined                    |
|  | 5.4  | Procedures for identifying, rectifying and reporting problems associated with performance of main propulsion, auxiliary systems and associated controls are outlined |
|  | 5.5  | Basic operation, monitoring and maintenance of shafting installations and propeller systems is detailed  |
|  | 5.6  | Engine room resource management principles and procedures required for a safe engineering watch are outlined   |
|  | 5.7  | Safety precautions to be observed during a watch and immediate action to be taken in a fire or incident are clarified  |
|  | 5.8  | Requirements for recording activities and incidents that occur during keeping an engineering watch are detailed  |
|  | 5.9  | Fatigue management strategies for engine room management team are identified   |
|  | 5.10 | Personal task and workload management techniques appropriate for an engineering watchkeeper are outlined   |
| <b>6 Outline procedures and responses to malfunctions and emergency situations</b> | 6.1  | Potential malfunctions and emergencies relating to main propulsion and auxiliary systems are identified  |
|  | 6.2  | Correct response and required action relating to potential malfunctions and emergencies in main propulsion and auxiliary systems are detailed                        |
|  | 6.3  | Regulatory requirements and reporting requirements for incidents and emergency situations outside watchkeeper  |

limits of responsibility are confirmed

## **7 Recognise tanker types and cargo characteristic**

- 7.1 Principal features and layout of various types of tankers and gas carriers are identified and differences between them determined
- 7.2 Terminology relating to the structure, capacities and operations of tankers is correctly used when describing the features of various types of tankers and gas carriers and their differences
- 7.3 Principal features and distinguishing characteristics of various types of tanker cargoes are correctly identified and applied during watchkeeping duties on a tanker or gas carrier

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Ship types include one or more of the following:

- bulk carrier
- container
- general dry cargo
- passenger
- ro-ro
- tanker

Shipping terms include one or more of the following:

- hogging
- panting
- pounding
- racking
- sagging

Key personnel include one or more of the following:

- crew
- master
- officers

- Shipping organisations and authorities include one or more of the following:
- Australian Maritime Safety Authority (AMSA)
  - classification societies
  - IMO
  - National Maritime Safety Committee
  - state and territory marine authorities
- Personal and social responsibilities include one or more of the following:
- alcohol and drug abuse
  - discipline
  - finance
  - health and fitness
  - hygiene
  - relationships
  - safety
- Engine room resource management principles include one or more of the following:
- allocation, assignment and prioritisation of resources
  - assertiveness and leadership
  - considering team experience
  - effective communication
  - obtaining and maintaining situational awareness
- Personal task and workload management techniques include one or more of the following:
- coordination
  - managing resource constraints
  - managing time constraints
  - personnel assignment
  - planning
- Potential malfunctions and emergencies include one or more of the following:
- accidents
  - breakdowns
  - collisions
  - explosion fire
  - flooding
  - groundings

## Unit Mapping Information

No equivalent unit.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARL037 Demonstrate knowledge of ships and ship routines**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing information required to undertake watchkeeping duties in routine and emergency situations
- applying effective decision-making techniques
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- developing, implementing and overseeing standard operating procedures
- identifying and determining appropriate ways of responding to malfunctions and emergency situations in daily watchkeeping operations
- identifying methods and procedures needed to implement watchkeeping duties on commercial vessels
- identifying, interpreting and processing numerical and graphical information required to undertake watchkeeping duties in routine and emergency situations
- reading and interpreting written instructions, procedures and information relevant to watchkeeping duties

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- bridge instrumentation, controls and alarms
- bridge resource management systems
- causes of groundings, collisions and casualties
- composition of bridge/engine room management team
- enclosed spaces
- engineering watchkeeping procedures and practices
- fatigue management principles and techniques
- functions of unmanned machinery space (UMS) controls, alarms and indicators
- general layout of tankers
- hierarchy and organisational structure of shipboard personnel
- key international and Australian Standards relating to shipping
- key shipping authorities and organisations
- maritime communication techniques
- navigational hazards and implications for watchkeeping
- personal and social responsibilities onboard ship
- procedures for dealing with malfunctions and emergencies
- relevant sections of maritime regulations, codes and conventions related to the watchkeeper responsibilities on tankers and gas carriers
- rudder and propeller control and vessel manoeuvring characteristics
- sections of International Maritime Organization (IMO), Standards of Training Certification and Watchkeeping (STCW), Convention and Codes and Australian Maritime Safety Authority (AMSA) Marine Orders dealing with watchkeeping principles, arrangements, procedures, roles and responsibilities
- signs of fatigue
- terminology relating to the structure, capacities and operations of various types of tankers and gas carriers
- types of ships and key features of ships
- watch handover procedures
- WHS/OHS legislation and policies.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.



Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions.

Resources for assessment must include access to:

- relevant documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- technical reference library with current publications on commercial shipping
- tools, equipment, machinery, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARM001 Apply knowledge of safety management system legal framework in the workplace**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to apply an understanding of the safety management system (SMS) legal framework in a maritime workplace. It provides an understanding of obligations on all seafarers to ensure that SMSs for vessel and crew safety are in place and comply with maritime legislation.

It includes accessing relevant legislation and contributing to any actions to ensure compliance with and an understanding of, SMSs is achieved by seafarers, crew and other applicable maritime personnel.

This unit applies to people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

M – Marine Surveying

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |     |  |
|--|-----|--|
| <b>1 Identify and interpret safety management system legal framework</b>   | 1.1 | Current SMS, relevant legislation, standards, and workplace policies and procedures impacting on the maritime industry are identified and accessed   |
|  | 1.2 | Relationship between SMS, relevant legislation, standards, and workplace policies and procedures is accurately interpreted to assist in identifying requirements for a range of different commercial vessel operations |
|  | 1.3 | SMS documentation requirements for a commercial vessel operation are identified  |
|  | 1.4 | Master and crew member legal obligations and duties for training employees are identified  |
|  | 1.5 | Consequences of non-compliance with SMS, relevant legislation, standards, and workplace policies and procedures are clarified  |
| <b>2 Contribute to activity that reflects safety management system legal framework</b>   | 2.1 | Contributions are made to monitoring compliance with SMS, relevant legislation, standards and workplace policies and procedures for size and nature of operation   |
|  | 2.2 | Contributions are made to ensuring all work carried out on board vessel is undertaken in a safe manner according to SMS and relevant legislation, standards, and workplace policies and procedures                     |
|  | 2.3 | Non-compliance with SMS, relevant legislation, standards, workplace policies and procedures is identified and appropriate action is taken  |
|  | 2.4 | Limits of own expertise and legal responsibilities are recognised, and appropriate sources of expertise are accessed as required   |
| <b>3 Maintain up-to-date knowledge of safety management system legal framework and maritime industry requirements for commercial vessels</b> | 3.1 | Sources to access current information covering applicable legislation and guidelines relating to SMS are utilised  |
|  | 3.2 | Knowledge of SMS, relevant legislation, standards, and workplace policies and procedures is regularly updated  |
|  | 3.3 | Relevant information on SMS and SMS requirements is provided to seafarers and crew either on board a vessel or through general enquiry services  |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Safety management system includes one or more of the following:	<ul style="list-style-type: none"><li>• documents related to safety training for crew</li><li>• emergency systems</li><li>• fire procedures</li><li>• manufacturer guidelines for equipment</li><li>• safety manuals, signs and equipment</li><li>• standing orders</li><li>• workplace safety and emergency procedures</li></ul>
Relevant legislation includes one or more of the following:	<ul style="list-style-type: none"><li>• Marine Safety (Domestic Commercial Vessel) National Law</li><li>• National Standard for Commercial Vessels (NSCV), particularly Part E as it applies in a given situation</li><li>• other legislation relevant to commercial vessels for operational systems</li><li>• relevant commonwealth and state/territory work health and safety/occupational health and safety (WHS/OHS) Acts, regulations and codes of practice relating to:<ul style="list-style-type: none"><li>• common law</li><li>• contract law</li><li>• criminal law</li><li>• dangerous goods</li><li>• environmental protection</li><li>• equal opportunity and anti-discrimination law</li><li>• industrial relations law</li><li>• workers' compensation</li></ul></li></ul>
Standards include one or more of the following:	<ul style="list-style-type: none"><li>• Australian Standards</li><li>• guidance notes and instructions to surveyors issued by the Australian Maritime Safety Authority (AMSA)</li><li>• industry standards and codes of practice</li><li>• international standards</li><li>• national standards developed by the national maritime regulator</li><li>• other regulations and standards developed by WHS/OHS regulators</li></ul>

Non-compliance includes one or more of the following:

- inadequate systems of information, instruction training or supervision
- non-compliance with NSCV Part E requirements
- plant equipment or substances not maintained or used or stored in an unsafe condition
- poor consultative practices
- poor design
- workplace hazards not identified or controlled
- workplace systems not in place or inadequate

Appropriate actions include one or more of the following:

- contributing to the identification of noncompliance with safety management requirements for size and nature of operation
- making recommendations about how compliance with SMS requirements could be achieved
- participating and assisting marine surveyors and other maritime regulatory inspectors
- participating in an SMS audit
- participating in an SMS inspection
- providing information on appropriate methods of implementing, monitoring and evaluating actions to ensure SMS compliance
- reporting breaches of compliance to responsible persons or authorities
- where required, making notes or drafting reports related to compliance levels with SMS requirements

Sources include one or more of the following:

- audits
- Australian and international standards
- hazard, incident and investigation reports
- industry bodies
- manufacturer manuals and specifications
- regulators
- regulatory authorities
- SMS specialists
- training, information sessions and forums
- unions
- websites, journals and newsletters
- WHS/OHS professional bodies

## Unit Mapping Information

This unit replaces and is equivalent to MARM3001A Apply knowledge of safety management system legal framework in the workplace.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM001 Apply knowledge of safety management system legal framework in the workplace**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- communicating effectively when contributing to formal and informal enquiries about safety management systems (SMSs)
- ensuring currency of relevant legislative and regulatory knowledge
- preparing simple documents such as summary reports, audit reports and memos for a range of personnel including surveyors, managers, supervisors and seafarers.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- obligations, rights and requirements of seafarers to understand and comply with relevant safety management legislation and common law as it applies to those involved in any safety training or setting up of and applying appropriate SMS
- relevant state/territory and commonwealth WHS/OHS legislation, regulations, codes of practice and standards
- research and data collection methods to obtain evidence of compliance with both SMS and WHS/OHS legislation
- WHS/OHS requirements and safe work practices

## **Assessment Conditions**

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where knowledge of SMS legal framework in the workplace can be applied.

Resources for assessment include access to:

- relevant regulatory and equipment documentation, including workplace procedures, regulations, codes of practice and operation manuals that impact on work activities
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARM002 Apply vessel construction theory to marine survey tasks

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to recognise how the construction and structural issues of commercial vessels relate to marine survey tasks.

This unit applies to people who assist marine surveyors or undertake administration duties in the maritime industry and/or marine surveying sector.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |
|---|--|
| <b>1 Identify major parts of a hull relevant to commercial vessel inspections and surveys</b> | <b>1.1</b> Appropriate nomenclature is used to identify major parts of hull to be inspected as part of commercial vessel marine survey   |
|   | <b>1.2</b> Structure of vessel hull in plan-view, profile, cross-section and perspective are accurately analysed across a range of different plans and drawings of vessels to determine survey |

		requirements
	1.3	Use of plans and drawings in the survey are identified and applied during survey plan development
<b>2 Identify commercial vessel types and their structure</b>	2.1	Basic factors determining design of commercial vessels are outlined
	2.2	Features of vessel designed to ensure its watertight and weather tight integrity are identified and maintained
	2.3	Survey or inspection plan relating to vessel design is identified and implemented
	2.4	Vessel construction methods and materials are identified and used as the basis to determine inspection and survey tasks
<b>3 Interpret basic vessel stability criteria</b>	3.1	Basic stability theory as outlined in the National Standard for Commercial Vessels (NSCV) in relation to construction of a commercial vessel is accurately defined and basic stability calculations are performed
	3.2	Purpose of a vessel stability assessment is correctly explained
	3.3	Documentation and records required by surveyor to assess stability of vessel are identified and confirmed according to the NSCV
<b>4 Apply vessel construction theory to survey</b>	4.1	Different types of vessel materials are identified to determine scope of survey
	4.2	Survey plan appropriate to type of vessel is developed according to survey requirements and discussed with surveyor
	4.3	Feedback on survey plan is sought from others and possible changes or improvements are clarified where required and incorporated

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |   |
|---|---|
| Appropriate nomenclature must include:                        | <ul style="list-style-type: none"> <li>• all of the terms in the NSCV and referenced standards</li> </ul>   |
| Commercial vessels must include:                              | <ul style="list-style-type: none"> <li>• any vessel currently defined as a commercial vessel in Marine Safety (Domestic Commercial Vessel) National Law</li> </ul>  |
| Plans and drawings include one or more of the following:      | <ul style="list-style-type: none"> <li>• any plan as referred to in the NSCV</li> <li>• bilge diagram</li> <li>• cargo arrangement/tank plan</li> <li>• docking plans</li> <li>• fire and evacuation</li> <li>• general arrangement plan</li> <li>• lines plan</li> <li>• sections and views</li> <li>• shell expansion plan</li> <li>• system operating procedures</li> </ul>  |
| Basic factors must include:                                   | <ul style="list-style-type: none"> <li>• Australian and New Zealand Standards</li> <li>• class rules</li> <li>• NSCV</li> <li>• Uniform Shipping Laws (USL) Code</li> </ul>   |
| Basic factors include one or more of the following:           | <ul style="list-style-type: none"> <li>• framing requirements</li> <li>• plating</li> <li>• scantlings</li> </ul>   |
| Basic stability theory includes one or more of the following: | <ul style="list-style-type: none"> <li>• differences between transverse and longitudinal stability and causes of list and trim</li> <li>• effects of density of sea water on draught and freeboard of a small vessel</li> <li>• impact of design and hull shape on stability</li> <li>• relationship between light displacement, loaded displacement and deadweight tonnage</li> <li>• relationship between weight and buoyancy in relation to floating bodies reserve buoyancy equilibrium</li> <li>• stability terms and definitions</li> <li>• any other terms referred to in standard works on small ship naval architecture</li> </ul> |
| Types of vessel materials include one or more of the          | <ul style="list-style-type: none"> <li>• ferrocement</li> <li>• laminated materials and fabrics</li> </ul>  |

following:

- laminated timber
- moulded fibre composites
- riveting
- welded and riveted
- welded metal
- wood
- any other methods relevant to local commercial vessel market referred to in standard works on small craft construction

## **Unit Mapping Information**

This unit replaces and is equivalent to MARM3002A Apply vessel construction theory to marine survey tasks.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM002 Apply vessel construction theory to marine survey tasks**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- calculating vessel stability accurately, using basic stability criteria calculations
- developing and maintaining effective planning documents
- estimating, measuring and calculating time required to complete tasks
- interpreting, applying and conveying information verbally, in writing and diagrammatically
- interpreting numerical data
- reading and interpreting vessel specifications and drawings
- recording and reporting workplace information.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic stability theory, and use and purpose of a vessel stability book
- commercial vessel types and their structure
- nomenclature relevant to vessel construction
- other guidance such as:
  - Marine Orders
  - Marine Safety (Domestic Commercial Vessel) National Law
  - National Standard for Commercial Vessels (NSCV)
- principal design features of small vessels related to stability and watertight integrity
- process of constructing commercial vessels
- WHS/OHS requirements and safe work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions.

Resources for assessment include access to:

- relevant regulatory and equipment documentation including workplace procedures, regulations, codes of practice and operation manuals that impacts on work activities
- tools, equipment, material and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARM003 Identify factors that affect a commercial vessel's fitness for purpose**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to identify the construction and design characteristics that contribute to the watertight integrity and fitness for purpose of a commercial vessel.

This unit applies to people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

M – Marine Surveying

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Plan for vessel survey**

1.1 Range of commercial vessels that may be surveyed or inspected are identified and survey regime for each is accurately documented

1.2 Hull shapes of typical commercial vessels are identified and

		verified for accuracy with surveyor
	1.3	Type of survey to be carried out is accurately identified and basic survey plan is developed
<b>2 Identify and explain structural components and materials</b>	2.1	Types, properties and application of common materials used in construction of typical commercial vessels are identified and noted in survey plan
	2.2	Basic structural components used on typical commercial vessels are correctly identified and noted in survey plan
	2.3	Inspection requirements for materials and components are documented and verified with surveyor
<b>3 Identify issues relating to vessel water and weather tight integrity</b>	3.1	Range and types of deterioration that affect fitness for purpose of a vessel are identified and confirmed with surveyor
	3.2	Preservation and corrosion control methods to maintain fitness for purpose are outlined and confirmed with surveyor
	3.3	Deterioration of vessel hull or structure is accurately identified either in water or on slipway
	3.4	Typical requirements concerning watertight and weather tight structural integrity of vessels are identified and confirmed with surveyor
<b>4 Determine vessel reporting requirements</b>	4.1	Need for vessel to be fit for its intended purpose is outlined and where questionable, is reported to relevant personnel
	4.2	Condition of vessel and related action is communicated clearly and concisely with others
	4.3	Mandatory and regulatory reporting requirements in relation to general work practices are followed

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.



## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Commercial vessels must include: vessels defined as commercial in Marine Safety (Domestic Commercial Vessel) National Law

Common materials include one or more of the following:

- aluminium
- ferro cement
- fibre composites
- fibre reinforced plastic
- plywood
- steel
- timber

Components include one or more of the following:

- bulk heads
- collision bulkheads
- deck
- deck beams
- deck plating
- hatches and hatchways
- hull
- keel
- portholes
- propellers
- rudders
- stem and stern
- stringers
- strakes and chines
- thrusters
- ventilators

Range and types of deterioration include one or more of the following:

- dissimilar metals
- fungal attack
- insect attack
- metal fatigue and corrosion
- osmosis

Preservation and corrosion control methods include one or more of the following:

- design
- earthing and bonding
- fendering and insulation
- impressed current systems
- preservation of metals:

- sacrificial anodes
  - anti-corrosive paints
  - preservation of timber:
    - painting
    - oiling
    - varnishing
  - delegates of the national regulator
  - owners and operators of commercial vessels
- Relevant personnel include one of the following:

## Unit Mapping Information

This unit replaces and is equivalent to MARM3003A Identify factors that affect a commercial vessel's fitness for purpose.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM003 Identify factors that affect a commercial vessel's fitness for purpose**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- communicating effectively verbally and in writing when describing and reporting condition and fitness for purpose of commercial vessels
- developing effective planning documents
- following required:
  - WHS/OHS procedures and precautions when monitoring condition and fitness for purpose of commercial vessels
  - work schedules according to organisational requirements
- providing accurate and reliable information
- providing the required amount of detail in reports
- reading, interpreting and applying instructions, stability book, vessel plans and specifications relevant to inspecting condition and fitness for purpose of commercial vessels
- recognising routine indicators of deterioration when inspecting condition and fitness for purpose of commercial vessels
- using technical terms related to vessel construction, components and material.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable commonwealth, state/territory legislation, regulations, standards, codes of practice and established safe practices relevant to full range of processes for conducting a survey for commercial vessels
- causes and indicators of vessel deterioration
- construction, layout and subdivision requirements of a range of different commercial vessels
- corrosion and deterioration control measures including surface preparation and coatings

- methods for determining fitness for purpose of commercial vessels
- principal stresses that act on structure of commercial vessels
- properties and application of materials used in constructing commercial vessels
- WHS/OHS requirements and safe work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where factors that affect fitness for purpose of a commercial vessel can be identified.

Resources for assessment include access to:

- relevant regulatory and equipment documentation including that impacts on work activities
- tools, equipment, material and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARM004 Work in the marine surveying sector

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to work in the marine surveying sector. It includes identifying and accessing relevant industry standards and regulations for conducting surveys of domestic commercial vessels. It also looks at the role and legal responsibilities of a marine surveyor for domestic commercial vessels, the survey task and the statutory requirements for surveying commercial vessels.

This unit applies to people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

M – Marine Surveying

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |     |  |
|---|-----|--|
| <b>1 Scope framework for marine surveys</b> | 1.1 | International and national authorities that govern the maritime industry are identified                                |
|   | 1.2 | Standards, legislation and regulations applicable to marine surveyor and marine surveying tasks for commercial vessels |

- are identified and accessed
- 1.3 Standards, legislation and regulations applicable to marine environment protection and its relation to marine surveys and inspections are identified and accessed
  - 1.4 Range of clients and stakeholders who would require marine surveyor and/or inspector services are identified and recorded
  - 1.5 Legal standing of marine survey report is explained
  - 1.6 Legal and/or financial implications for inaccurate reporting of marine survey are explained
- 2 Clarify areas of responsibility for marine surveyors**
- 2.1 Range of services provided by marine surveyors is outlined
  - 2.2 International and national conventions, laws and codes of practice that govern and regulate marine surveys of commercial vessels are identified
  - 2.3 Behavioural characteristics, ethics and personal conduct required of a marine surveyor are explained
- 3 Determine requirements for conducting commercial vessel survey**
- 3.1 Different types of marine surveyors and their roles are accurately defined
  - 3.2 Terms 'survey' and 'audit' are accurately explained in relation to commercial vessel survey
  - 3.3 Purpose and range of commercial vessel survey is accurately outlined
- 4 Scope survey process under supervision**
- 4.1 Objectives, principal work activities, costs and constraints are identified and explained
  - 4.2 Relevant standards, legislation and regulations are defined in relation to conducting commercial vessel marine surveys
  - 4.3 Procedures and processes for collecting information when conducting a survey are outlined
  - 4.4 Importance of communicating with others is explained and implemented
  - 4.5 Tools and equipment required to conduct a range of different marine surveys are identified
  - 4.6 Relevant survey and supporting documents related to type of survey are identified and accessed

- |  |     |   |
|--|-----|---|
|  | 4.7 | Process of gathering relevant information through observation is outlined   |
|  | 4.8 | Importance of accurate recording of information and events during and after a survey is explained   |
|  | 4.9 | Requirements for use of verified factual information when making recommendations are identified   |
| <b>5 Identify scope of surveyor behavioural conduct and ethics</b> | 5.1 | Behavioural characteristics and personal conduct required of a marine surveyor are outlined   |
|  | 5.2 | Conflicts of interest and other vested interests that would affect survey outcome and/or report are identified and resolved with surveyor |
|  | 5.3 | Strategies to deal effectively with conflicts of interest are applied   |
|  | 5.4 | Risks related to possible confrontations and need for effective risk management techniques are identified and discussed with surveyor     |
| <b>6 Outline requirements of an effective survey report</b>        | 6.1 | Appropriate formats for a range of different survey reports are identified  |
|  | 6.2 | Means of presenting survey report to a range of stakeholders are explained  |
|  | 6.3 | Reports are reviewed by relevant personnel and achievement of document objectives and requirements are outlined                           |
|  | 6.4 | Security of information and privacy requirements are identified   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

- Authorities must include:
- Australian Maritime Safety Authority (AMSA) and AMSA delegates
  - workplace and/or industry health and safety committees
- Standards include one or more of the following:
- National Standard for the Administration of Marine Safety (NSAMS)
  - NSCV/USL Code
  - work health and safety/occupational health and safety (WHS/OHS) standards
- Legislation includes one or more of the following:
- government legislation and regulations relating to:
    - environmental protection
    - maritime
    - international legislation/codes of behaviour
  - Marine Safety (Domestic Commercial Vessel) National Law
  - Navigation Act
  - WHS/OHS legislation, regulations, codes of practice
- International and national conventions, laws and codes of practice include one or more of the following:
- international convention:
    - collision regulations
    - load lines
    - maritime labour convention (MLC)
    - MARPOL
    - SOLAS
    - Standards of Training Certification and Watchkeeping (STCW)
  - relevant maritime legislation and regulations
  - relevant WHS/OHS legislation and policies
- Types of marine surveyors include one or more of the following:
- classification society (class)
  - government (statutory)
  - independent (private)
  - insurance company
- Purpose and range of commercial vessel survey includes one or more of the following:
- damage or accident, survey or investigation assistance
  - fitness of vessel and/or crew for its purpose
  - MLC
  - vessel related surveys for:
    - compass adjustment
    - radio surveys
    - hull/machinery/safety equipment
    - load line
- Costs include one or more
- associated costs such as travel, accommodation
  - conducting the survey



of the following:

- preparation time for the survey
- writing the survey

Constraints include one or more of the following:

- geographical
- inclement weather
- legal
- timeframes
- WHS/OHS risks

Processes for collecting information include one or more of the following:

- gathering relevant facts
- maintaining case files
- observing
- obtaining linear measurement
- reviewing supporting documentation
- sampling
- specimen collection
- taking photographs

Communicating includes one or more of the following:

- active listening
- constructive feedback
- control of tone of voice
- questioning to clarify and confirm understanding
- using language and concepts appropriate to the individual
- using open and enquiring questions
- using positive, confident and cooperative language
- verbal and non-verbal language

Tools and equipment include one or more of the following:

- business technology, internet connection, sounding tapes
- communication equipment
- drill, hammer/welder's hammer, draft survey hydrometer, screw driver
- entry authority
- hydrometer, thermometers, scraper
- labels, plastic sampling bags, sampling equipment
- mirror, small mallet
- notebook
- personal protective equipment (respirators, gloves, overalls, boots, hearing protection, goggles, masks)
- recording equipment, Dictaphone, camera, mobile phone, pocket calculator
- satellite imagery, photographs
- storage equipment/facilities
- tape measure/measuring wheel

Survey documents include

- checklists

one or more of the following:

- guidelines
- relevant legislation and extracts from standards

Supporting documents include one or more of the following:

- case files/incident reports
- certificates of survey, operation, registration
- commercial documentation
- deck and engine logs
- forms (such as application forms, notification forms)
- nautical charts and publications
- notices (such as seizure notice, infringement notice)
- operating manuals and owner instructions
- plans
- previous surveys
- safety management system
- ship log books and other recordkeeping instruments
- vessel stability book
- voyage details, stow plans and manifest

Relevant personnel must include:

- crew
- manager of private survey company
- owners or owner representatives of vessels and/or charters
- port authorities
- representatives of:
  - classification societies
  - government
  - law firm
  - protection and indemnity clubs
- salvage associations
- stevedores
- work colleagues

## Unit Mapping Information

This unit replaces and is equivalent to MARM3004A Work in the marine surveying sector.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM004 Work in the marine surveying sector**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing current legislation, marine orders, standards and information relevant to marine surveying sector
- accurately completing relevant documentation and reports within own scope of responsibility
- accurately operating technical and electronic equipment
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- communicating effectively verbally and in writing
- developing a rapport with colleagues and people external to the organisation
- effectively liaising with internal and external authorities and/or agencies
- ensuring currency of relevant legislative and regulatory knowledge
- identifying and applying appropriate conduct and ethical behaviour
- resolving conflict
- using a range of communication techniques such as establishing rapport, listening, probing, reflecting, negotiation, conflict resolution.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- domestic commercial vessel operations
- effective listening and communication techniques
- equal employment opportunity, equity and diversity principles
- government legislation and regulations relating to:
  - accepted codes of behaviour/codes of practice
  - combined Uniform Shipping Laws (USL) Code and National Standard for Commercial Vessels (NSCV)
  - environmental protection
  - load lines
  - Marine Safety (Domestic Commercial Vessel) National Law
  - International Convention for the Prevention of Pollution from Ships (MARPOL) and safety of life at sea (SOLAS) and how they apply to survey tasks
  - WHS/OHS
- IMO Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders and how they apply to survey purpose
- industry specific codes of conduct and ethics
- legal requirements relating to recording, security and privacy of information
- organisational policies and guidelines relating to interviews and information gathering prior to and during the survey
- range of different survey types for commercial vessels
- reporting requirements including appropriate format and content
- risks related to marine surveying tasks
- role of surveyor
- statutory survey schedules
- tools required for different survey types.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry when conducting commercial vessel survey

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARM005 Assess compliance with marine environment protection requirements**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to survey a commercial vessel to determine compliance with marine regulations for the protection of the environment.

This unit applies to people working in the maritime industry as a marine surveyor assistant.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

M – Marine Surveying

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare for survey**

- |     |   |
|-----|---|
| 1.1 | Relevant national and state/territory standards and regulatory requirements for preventing pollution to marine environment are identified, reviewed and incorporated into survey plan |
| 1.2 | Sources and types of pollutants common to a range of different commercial vessels are identified and verified with principal surveyor   |

- 1.3 Powers of surveyor relevant to detecting and reporting marine pollution protection compliance in respect to vessel operations are identified and confirmed against regulatory requirements, and organisational policy and procedures
- 1.4 Preventative and remedial anti-pollution procedures are identified according to relevant standards and regulatory requirements
- 1.5 Survey plan is developed and survey schedule is agreed with relevant personnel
- 2 Survey compliance levels**
  - 2.1 Survey is carried out according to agreed schedule, and machinery and equipment are inspected for compliance with marine protection requirements
  - 2.2 Flammable and hazardous materials on board vessel are inspected for compliance with storage and anti-pollution requirements
  - 2.3 Records relevant to preventing pollution on board commercial vessels are reviewed for compliance with relevant national and state/territory legislation and regulatory requirements
  - 2.4 Procedures, systems and measures used to prevent a range of pollution types are reviewed with vessel owner/s or crew
  - 2.5 Management of environmental issues that may not be covered under marine safety regulations are identified and communicated to vessel owner/s and crew during survey
- 3 Finalise survey**
  - 3.1 Measures for treating a range of different pollutants, machinery and equipment identified as non-compliant are discussed with vessel owner/s and crew
  - 3.2 Action plan to rectify this non-compliance is agreed and documented in survey report
  - 3.3 Survey report is finalised and reviewed for completeness before submission to the authority
  - 3.4 Non-compliance relating to protecting marine environment is recorded and reported according to statutory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

National and state/territory standards and regulatory requirements include one or more of the following:

- Australian Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pest Incursions
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- National Plan to Combat the Pollution of the Sea by Oil
- Protection of the Sea (Prevention of Pollution from Ships) Act 1983
- relevant sections of the National Standard for Commercial Vessels (NSCV) relating to protecting marine environment

Sources of pollutants include one or more of the following:

- bilges
- deck equipment
- engines
- food waste
- fuel:
  - containments and transfer systems
  - pumps
- hydraulic pumps
- lubricants, gas, cleaning and coating products
- sewage pumps
- vents, drains, toilets

Types of pollutants include one or more of the following:

- air
- ballast water
- batteries and gasses
- cargo and packaging
- engine:
  - exhaust fumes and ventilation systems
  - noise
- grey water, black water and ventilation
- noise
- oil, sewage, garbage, noxious substances
- unknown fluids



Preventative and remedial anti-pollution procedures include one or more of the following:	<ul style="list-style-type: none"><li>• design and construction features such as save-alls, vents, filling points, combing drains, scuppers, freeing ports, bilges and strum boxes</li><li>• legislative requirements such as garbage disposal at sea guidelines for:<ul style="list-style-type: none"><li>• controlling gas and smoke polluting emissions</li><li>• effectively managing waste, pollution and recycling processes</li><li>• effectively managing ballast operations</li><li>• preventing cargo spillages</li><li>• preventing fuel and oil spillages</li></ul></li><li>• operational procedures such as fuel transfer, ballast operations, cargo operations (including lashing)</li><li>• pollution control signage</li><li>• shipboard housekeeping</li></ul>
Relevant personnel must include:	<ul style="list-style-type: none"><li>• attending surveyor</li><li>• environmental protection agency</li><li>• maritime authorities</li><li>• owner, master or agent of vessel</li><li>• other interested parties</li></ul>
Machinery and equipment include one or more of the following:	<ul style="list-style-type: none"><li>• effective management of ballast operations</li><li>• emission control equipment</li><li>• pollution control instructions</li><li>• pumps</li><li>• shipboard housekeeping</li><li>• valves</li><li>• waste storage and recycling equipment</li><li>• water management equipment, including cooling water, ballast water and bilge systems</li></ul>
Flammable and hazardous materials include one or more of the following:	<ul style="list-style-type: none"><li>• chemicals</li><li>• leaning products</li><li>• LPG cooking gas</li><li>• lubricants</li><li>• spare fuel</li></ul>
Records include one or more of the following:	<ul style="list-style-type: none"><li>• ballast record book</li><li>• deck and engine room log books</li><li>• garbage record books</li><li>• oil record books</li><li>• sewage record books, including test results</li></ul>
Environmental issues that may not be covered under	<ul style="list-style-type: none"><li>• ballast water management</li><li>• damage to sensitive environments through anchoring</li></ul>

- marine safety regulations must include:
- fishing restrictions
  - laying pots/traps/moorings
  - noise

## Unit Mapping Information

This unit replaces and is equivalent to MARM4001A Assess compliance with marine environment protection requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM005 Assess compliance with marine environment protection requirements**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accurately identifying statutory requirements for pollution prevention systems and procedures for commercial vessels
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- communicating effectively verbally and in writing
- completing required documents related to breaches of environmental protection legislation
- developing effective planning documents
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- providing high quality reports
- reading and interpreting instructions and procedures related to environmental considerations
- recognising pollution control problems and hazards that may occur on a commercial vessel and taking appropriate mitigating action
- working safely and collaboratively with others when surveying environmental considerations.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- certificates and other documents required by relevant Australian and/or international legislation, and conventions for protecting marine environment
- effects on marine environment of various possible pollution incidents
- operational characteristics of emission control equipment used on various types and sizes of commercial vessels
- operational requirements of water, fuel, bilge, waste, pollution and recycling management processes used on various types and sizes of commercial vessels
- pollution control problems and related measures to protect marine environment
- powers of surveyors and regulatory authorities in respect to vessel operations related to

- pollution prevention and compliance to standards
- relevant legislation, regulations, codes of practice, policies and procedures to protect marine environment
- requirements under relevant Australian and/or international legislation and conventions for reporting incidents related to breaches of statutory codes and measures for protecting marine environment
- sources of information and documentation, including:
  - certificates and other documents required by regulations for protecting marine environment
  - equipment manufacturer instructions and recommended procedures
  - instructions of relevant maritime authorities
  - operational orders
  - relevant regulations for type of vessel involved
  - relevant standards for protecting marine environment, including guidelines issued under the Australian Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pest Incursions
  - vessel log where relevant
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where assessing compliance with marine environment protection requirements can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry to survey a commercial vessel

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM006 Assist in the survey of commercial vessels

## Modification History

Not applicable.

## Application

This unit involves the skills and knowledge required to assist an accredited surveyor in the survey of commercial vessels. It covers the requirements necessary to effectively plan, monitor and implement a marine survey for a range of commercial vessels. The unit includes evaluating survey and reporting outcomes.

This unit applies to people working in the maritime industry as a marine surveyor assistant.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Plan a marine survey for a commercial vessel**

- 1.1 Applicable work health and safety/occupational health and safety (WHS/OHS), environmental, legislative and organisational requirements are identified and implemented
- 1.2 Environmental awareness issues are considered according to relevant legislation, regulations and site specific requirements

- 1.3 Survey purpose, scope and procedures are identified and checked with appropriate personnel as required
- 1.4 Relevant information and documentation is obtained, interpreted and verified with surveyor for impact on current survey
- 1.5 Survey tools, equipment and personnel requirements are coordinated, scheduled and confirmed with surveyor
- 1.6 Permit or licence requirements are identified and organised according to organisational requirements
- 1.7 Survey is planned, scheduled and communicated to relevant personnel
- 2 Observe and assist with conducting and monitoring survey**
  - 2.1 Survey plan is verified with surveyor
  - 2.2 Consultation with relevant personnel is carried out during survey activity as required
  - 2.3 Survey procedures are monitored to ensure required survey outcome is achieved
  - 2.4 Survey plan is modified as required in response to equipment, personnel, site condition changes and environmental requirements, and is verified with surveyor
  - 2.5 Regular communication with relevant personnel is maintained to ensure continuous workflow and progress
- 3 Finalise survey**
  - 3.1 Relevant personnel are informed of results according to organisational requirements
  - 3.2 Required documentation is completed according to survey plan and is verified by surveyor
  - 3.3 Survey report is prepared in an appropriate format, processed according to organisational requirements and checked for accuracy by surveyor
  - 3.4 Survey results are communicated in an appropriate manner to owner/agent of vessel
  - 3.5 Survey data is archived according to organisational requirements
  - 3.6 Survey outcomes are recorded and reported according to site procedures and organisational requirements

## 4 Review survey

- 4.1 Survey documentation and data are compiled and organised for review, and checked as accurate by surveyor
- 4.2 Evaluation of survey plan and processes is undertaken and documented for use in reviewing and revising future surveys
- 4.3 Improvements or recommended actions arising from survey plan evaluation are signed off by surveyor, and recorded and reported according to organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| WHS/OHS requirements must include:       | <ul style="list-style-type: none"><li>• atmospheric monitoring</li><li>• elimination of hazardous materials and substances</li><li>• fatigue management</li><li>• first aid equipment</li><li>• hazard and risk control</li><li>• manual handling including shifting, lifting and carrying</li><li>• personal protective equipment and clothing</li><li>• safety data sheets/material safety data sheets (SDSs/MSDSs)</li><li>• safety equipment</li><li>• site specific and/or organisational requirements</li></ul> |
| Environmental requirements must include: | <ul style="list-style-type: none"><li>• legislation</li><li>• organisational policies and procedures</li><li>• site specific and/or organisational requirements</li><li>• workplace practices</li></ul>   |
| Legislative requirements must include:   | <ul style="list-style-type: none"><li>• applicable sections of Marine Safety (Domestic Commercial Vessel) National Law</li><li>• National Standard for Commercial Vessels (NSCV)</li><li>• State/Territory legislation, guidelines and handbooks applicable</li></ul>   |



	to safe construction, modification and operation of commercial vessels
Organisational requirements must include:	<ul style="list-style-type: none"><li>• USL Code</li><li>• WHS/OHS Act</li><li>• anti-discrimination</li><li>• award and enterprise agreements</li><li>• code of conduct</li><li>• confidentiality and privacy</li><li>• environment</li><li>• equal opportunity</li><li>• industrial relations</li><li>• professional indemnity and public liability</li><li>• record management systems and archiving</li><li>• relevant industry codes of practice</li><li>• WHS/OHS</li></ul>
Commercial vessels must include:	<ul style="list-style-type: none"><li>• Vessels defined in Marine Safety (Domestic Commercial Vessel) National Law</li></ul>
Environmental awareness issues must include:	<ul style="list-style-type: none"><li>• asbestos</li><li>• bilge</li><li>• blasting</li><li>• coatings</li><li>• fluids identified and otherwise</li><li>• exhaust</li><li>• garbage</li><li>• noise</li><li>• SDSs/MSDSs</li><li>• sewages</li></ul>
Survey purpose must include:	<ul style="list-style-type: none"><li>• initial and periodic surveys of domestic commercial vessels</li></ul>
Survey scope must include:	<ul style="list-style-type: none"><li>• National Standards for Administration of Marine Safety</li></ul>
Survey procedures must include:	<ul style="list-style-type: none"><li>• emergency</li><li>• evacuation</li><li>• handling</li><li>• observation</li><li>• organisational guidelines and code of conduct</li></ul>

Relevant information and documentation include one or more of the following:

- safety
- case files/incident reports
- certificates of survey, operation
- checklists
- deck and engine logs
- details of survey location
- forms (such as application forms, notification forms)
- insurance certificates
- licence or permit requirements
- notices (such as seizure notice, infringement notice)
- operating manuals and owner instructions
- plans and charts
- previous surveys
- safety management system
- ship log books and other recordkeeping instruments
- vessel Stability Book

Survey tools and equipment include one or more of the following:

- barcol hardness tester
- boroscope
- communication equipment:
  - internet connection
  - mobile phone
- drill, hammer/welder's hammer, screwdriver, small mallet
- entry authority
- hydrometer
- ICT equipment
- labels
- light meters
- mirror
- moisture meter
- noise meter
- personal protective equipment (such as respirators, gloves, overalls, boots, hearing protection, goggles, masks)
- photographs
- pocket calculator
- recording equipment:
  - camera
  - dictaphone
  - notebook
- scraper
- silver chloride reference cell
- sounding tapes

Relevant personnel must include:	<ul style="list-style-type: none"><li>• tape measure/measuring wheel</li><li>• thermography</li><li>• thermometers</li><li>• ultrasonics</li><li>• crew</li><li>• manager of private survey company</li><li>• owners or owner representatives of vessels and/or charters</li><li>• port authorities</li><li>• representatives of:<ul style="list-style-type: none"><li>• classification societies</li><li>• government</li><li>• law firm</li><li>• protection and indemnity clubs</li></ul></li><li>• stevedores</li><li>• work colleagues</li><li>• yard personnel</li></ul>
Required documentation must include:	<ul style="list-style-type: none"><li>• consideration of:<ul style="list-style-type: none"><li>• checklists</li><li>• diaries</li><li>• legislative requirements</li><li>• logs</li><li>• organisational requirements</li><li>• survey purpose</li><li>• technical evaluations</li><li>• type of vessel to be surveyed</li></ul></li></ul>
Survey report includes one or more of the following:	<ul style="list-style-type: none"><li>• advice given</li><li>• costs</li><li>• data analysis</li><li>• difficulties or issues faced</li><li>• documents copied</li><li>• measurements recorded</li><li>• photographs</li><li>• recommendations for future work results</li><li>• test results</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM4002A Assist in the survey of commercial

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **Assessment Requirements for MARM006 Assist in the survey of commercial vessels**

### **Modification History**

Not applicable.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to, and satisfy all of the requirements of the elements and performance criteria.

Assisting in the implementation of a survey plan for a commercial vessel should be undertaken in at least three different survey purpose contexts and include:

- accurately interpreting numerical data required as part of survey processes
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- communicating effectively and following safe work practices while assisting with a marine survey
- coordinating and scheduling tools, equipment and personnel requirements appropriate to survey procedures
- developing effective planning documents
- documenting suitable checking and survey procedures
- eliciting information from a variety of sources
- ensuring high level of detail in recordkeeping
- estimating, measuring and calculating time required to complete tasks
- identifying problems and arranging appropriate corrective action
- interpreting and accurately applying information from legislation, regulations and codes of practice
- interpreting, applying and conveying information verbally, in writing and diagrammatically
- maintaining documentation
- observing situations and analysing information
- performing accurate and reliable calculations
- preparing interview documentation using accurate expression and appropriate level of formality in structure and format
- reading and interpreting:
  - plans accurately
  - survey documentation and data
- recording and reporting workplace information
- using and maintaining relevant tools, equipment and materials
- using appropriate communication and interpersonal techniques with colleagues and people external to the organisation

- using computers for word processing and manipulation of statistical data
- using critical analysis, evaluation and deductive reasoning
- working safely and continually reviewing changing work environment
- writing high quality reports using appropriate formats.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable commonwealth, state/territory legislation, regulations, codes of practice, standards, and established safe practices relevant to conducting a survey for commercial vessels
- appropriate mathematical procedures for estimating and measuring, including calculating time to complete tasks
- environmental protection requirements, including safe disposal of waste and compliance with marine environment protection legislation
- established communication channels and protocols
- legal and organisational requirements for documentation
- organisational policy, procedures, guidelines and protocols
- own and others' areas of responsibility
- permit, licensing and certification requirements required by maritime industry authorities
- procedures for recording and reporting information
- purposes of surveys including statutory, trade, insurance, sale and purchase
- research and sampling techniques
- responding to diversity
- responses to non-compliance
- risk management
- security storage of evidence/information
- scope, depth and frequency of marine surveys
- survey procedures
- types of tools and equipment, and procedures for their safe use and maintenance
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where assisting in the survey of commercial vessels can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry to survey a commercial vessel.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM007 Assist in the survey of vessel mechanical features

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to assist in the survey of operational systems. It covers identifying the principal characteristics of vessel propulsion, steering gear system, deck machinery, pumping systems, power generation, refrigeration plant and navigational systems that require periodic surveys for regulatory requirements.

This unit applies to people working in the maritime industry as a marine surveyor assistant.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M - Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Follow requirements for surveying propulsion systems**

- |     |  |
|-----|--|
| 1.1 | Types of propulsion systems used on a range of commercial vessels are accurately identified, and survey requirements are confirmed with surveyor and documented according to organisational requirements |
| 1.2 | Shafting systems operation and maintenance principles are identified and applied to survey plan as necessary   |



- |  |     |  |
|--|-----|--|
|  | 1.3 | Requirements for inspecting propulsion systems and detecting faults are identified and applied during survey   |
| <b>2 Follow requirements for surveying marine engines</b>      | 2.1 | Main components of a four-stroke and two-stroke diesel engine and outboard petrol engines are identified and survey requirements are documented according to organisational requirements   |
|  | 2.2 | Diesel and outboard petrol engine operation terminology and principles are applied during survey, in documentation and in reports  |
|  | 2.3 | Main components of marine diesel engine, with its associated gearing are identified, and survey requirements are confirmed with surveyor and documented according to organisational requirements   |
|  | 2.4 | Engine operating principles are defined and considered in survey task where necessary  |
|  | 2.5 | Inspection tasks related to engines are defined and applied  |
| <b>3 Follow requirements for surveying electrical systems</b>  | 3.1 | Vessel batteries, starter motors and power distribution systems are assessed, and survey requirements are confirmed with surveyor and documented according to organisational requirements  |
|  | 3.2 | Types of power generating plants used on board a range of commercial vessels are identified and survey requirements are documented as necessary  |
|  | 3.3 | Alternating current (AC) and direct current (DC) generator principles of operation and operating procedures are defined and survey requirements are documented   |
|  | 3.4 | Precautions and procedures for electrical safety during inspection of electrical circuitry and equipment are adhered to according to work health and safety/occupational health and safety (WHS/OHS) and other organisational requirements |
| <b>4 Follow requirements for surveying refrigeration plant</b> | 4.1 | Principal features and operating characteristics of refrigeration systems used on commercial vessels are identified and survey requirements are confirmed with surveyor, and documented according to organisational requirements           |
|  | 4.2 | Environmental issues and responsibilities concerning refrigeration systems are accurately identified during survey   |

- |   |     |   |
|---|-----|---|
|   | 4.3 | Maintenance requirements of refrigeration systems used on a range of commercial vessels are confirmed with surveyor and documented according to organisational requirements   |
| <b>5 Follow requirements for surveying vessel pumping systems</b> | 5.1 | Principal features and operating characteristics of typical pumping systems and pumping system components used on a range of commercial vessels are confirmed with surveyor and documented according to organisational requirements       |
|   | 5.2 | Inspection tasks for pumping systems are identified and applied during survey   |
|   | 5.3 | Maintenance requirements for vessel pumping systems used on a range of commercial vessels are confirmed with surveyor and documented according to organisational requirements   |
| <b>6 Follow requirements for surveying steering gear systems</b>  | 6.1 | Principal features and operating characteristics of marine hydraulic systems typical of a range of commercial vessels to be inspected are identified and confirmed with surveyor, and documented according to organisational requirements |
|   | 6.2 | Principal features and operating characteristics of typical steering systems and components to be inspected are identified and confirmed with surveyor, and documented according to organisational requirements                           |
|   | 6.3 | Requirements for inspecting steering systems and detecting faults are applied during survey   |
| <b>7 Follow requirements for surveying deck machinery</b>         | 7.1 | Common types of deck machinery typical to a range of commercial vessels are identified and confirmed with surveyor, and documented according to organisational requirements   |
|   | 7.2 | Requirements for inspecting a range of deck machinery and detecting faults are applied during survey  |
|   | 7.3 | Faults in machinery are detected, confirmed with surveyor and actions to rectify issues are agreed and documented in survey report  |
| <b>8 Follow requirements for surveying navigational systems</b>   | 8.1 | Principal features and operational characteristics of a typical navigational system for size and nature of vessel are accurately identified and confirmed with surveyor, and documented according to organisational requirements          |
|   | 8.2 | Navigational equipment and systems are identified and appropriate inspection techniques are incorporated into   |

		survey plan
	8.3	Faults in navigational equipment and non-conforming equipment are confirmed with surveyor, and actions to rectify issues are identified and documented in survey report
<b>9 Apply risk management practices for surveying fuel systems</b>	9.1	Range of fuel systems and their operational requirements are identified and confirmed with surveyor
	9.2	Typical risks associated with survey tasks for fuel systems are identified and risk minimisation strategies are applied during survey
	9.3	Faults and non-conforming systems are confirmed with surveyor, and actions to rectify issues are identified and documented in survey report

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Propulsion systems include one or more of the following:	<ul style="list-style-type: none"> <li>• inboard and outboard engines</li> <li>• propulsion plant – prime mover (diesel engine), shaft and propellers (fixed and controlled pitch)</li> <li>• Schottel or similar azimuth systems</li> <li>• thrusters</li> <li>• water jet units</li> </ul>
Shafting systems include one or more of the following:	<ul style="list-style-type: none"> <li>• gear box</li> <li>• propeller</li> <li>• shaft: <ul style="list-style-type: none"> <li>• seals</li> <li>• bearings</li> <li>• couplings</li> </ul> </li> <li>• stern bearing</li> <li>• thrust block</li> </ul>

Terminology and main components include one or more of the following:	<ul style="list-style-type: none"><li>• bearings</li><li>• bed plate</li><li>• crankshaft drive</li><li>• cylinder block</li><li>• exhaust:<ul style="list-style-type: none"><li>• system</li><li>• valve</li></ul></li><li>• filters</li><li>• flywheel</li><li>• fuel:</li><li>• injector</li><li>• pump</li><li>• heat exchanger</li><li>• injector</li><li>• inlet valve</li><li>• piston</li><li>• turbo chargers</li></ul>
Engine operating principles include one or more of the following :	<ul style="list-style-type: none"><li>• requirements for diesel engines for:<ul style="list-style-type: none"><li>• propulsion</li><li>• power generation</li><li>• emergency use</li></ul></li></ul>
Power distribution systems include one or more of the following:	<ul style="list-style-type: none"><li>• circuit breakers</li><li>• distribution boards</li><li>• shore power changeover arrangements</li></ul>
Power generating plants include one or more of the following:	<ul style="list-style-type: none"><li>• diesel engine</li><li>• hybrid system</li><li>• solar generation</li><li>• wind generation</li></ul>
Refrigeration systems include one or more of the following:	<ul style="list-style-type: none"><li>• compressors</li><li>• different types of gasses</li><li>• evaporators</li></ul>
Environmental issues include one or more of the following:	<ul style="list-style-type: none"><li>• chlorofluorocarbons (CFCs) used in refrigerants</li><li>• diesel and steam engines to power refrigeration, lights, pumps and other functions</li><li>• ozone depleting substances (ODSs)</li><li>• water treatment chemicals and chemicals from refrigeration equipment</li></ul>

Operating characteristics of typical pumping systems include one or more of the following:	<ul style="list-style-type: none"><li>• back flooding prevention procedures</li><li>• drive systems, belts, clutches and motors</li><li>• fire, bilge and tank circulating systems</li><li>• standard identification markings</li><li>• strainers, strum and mud boxes, and foot valves</li><li>• use of flexible materials and hoses</li><li>• valve types, including their construction and maintenance</li></ul>
Hydraulic systems include one or more of the following:	<ul style="list-style-type: none"><li>• electro hydraulic steering gears</li><li>• emergency operation in electrical or hydraulic failure</li><li>• preventative and remedial maintenance requirements of hydraulic systems</li><li>• simple hydraulic circuits</li></ul>
Steering systems and components include one or more of the following:	<ul style="list-style-type: none"><li>• rudder and stock support bearings</li><li>• rudder construction features</li><li>• rudder types</li><li>• glands, packing and seals</li><li>• requirements for maintaining and testing steering and related hydraulic systems</li><li>• steering operation using hydraulic, cable, rod and gear</li><li>• tiller arm attachment</li></ul>
Deck machinery includes one or more of the following:	<ul style="list-style-type: none"><li>• basic hydraulic systems</li><li>• derricks and booms</li><li>• fishing gear</li><li>• lifting equipment</li><li>• safeguards and protective devices for winches</li><li>• small cranes</li><li>• winches</li><li>• windlasses</li></ul>
Navigational system includes one or more of the following:	<ul style="list-style-type: none"><li>• AIS</li><li>• charts</li><li>• compass</li><li>• GPS</li><li>• plotters</li><li>• radar</li><li>• sounders</li></ul>
Typical risks include one or more of the following:	<ul style="list-style-type: none"><li>• fire</li><li>• inhalation and poisoning</li><li>• injury</li><li>• marine pollution</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM4003A Assist in the survey of vessel mechanical features.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM007 Assist in the survey of vessel mechanical features**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- applying risk management and risk minimisation techniques
- communicating effectively verbally and in writing
- developing effective and detailed planning documents
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- identifying and following all safety procedures and precautions
- providing high quality reports
- reading and interpreting safety data sheets/material safety data sheets (SDSs/MSDSs) accurately
- reading and interpreting:
  - instructions for auxiliary machinery and systems to be tested
  - machinery performance readings and indications
- recognising and reporting:
  - faulty equipment on vessels to be inspected
  - routine problems that relate to auxiliary machinery and systems on domestic commercial vessels.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- battery types, care, maintenance
- commercial vessel classifications and survey requirements for various operational systems, and their components
- compatibility and durability of construction materials
- construction and layout of a typical vessel including layouts for pipework, propulsion system and installed machinery
- environmental controls and regulations for primary, secondary or ancillary systems and their components
- ethical behaviour and industry codes of practice
- features and characteristics of typical faults and signs of deterioration in operational systems and components
- features of different engine types and sizes
- forms, causes and prevention of corrosion in a marine environment
- insurance, liability and professional indemnity requirements for self and others
- interaction of vessel structures and mechanical systems
- maintaining watertight integrity
- National Standard for Commercial Vessels (NSCV) and National Standard for the Administration of Marine Safety (NSAMS)
- operational characteristics and performance specifications for different types of marine internal combustion engines and propulsion machinery usually found on vessels
- principal features of fittings and machinery found on typical vessels and characteristics of engine/plant and ancillary equipment
- procedures for:
  - checking connection, installation and mounting of machinery and components
  - reading and interpreting machinery performance readings and indications
- purpose and content of SDSs/MSDSs
- report writing requirements for a range of different survey tasks
- safety, environmental and hazard control precautions and procedures relevant to checking and basic maintenance of fittings and machinery
- typical problems related to inspecting and maintaining operational and navigational systems
- typical vessel and machinery specifications, operating manuals and specifications
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.



Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions where assisting in the survey of vessels mechanical features can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARM008 Evaluate vessel stability

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to evaluate stability of a commercial vessel for marine survey purposes using available stability information. It covers principles of stability data and calculations, how to calculate stability and role of surveyor in assessing stability information.

This unit applies to people working in the maritime industry as a marine surveyor assistant.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

M – Marine Surveying

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Determine data requirements**

- 1.1 Effect of basic data, information and vessel stability calculations is identified, reviewed and applied to assessment of stability
- 1.2 Basic data requirements for commercial vessels are correctly identified

- |   |     |   |
|---|-----|---|
|   | 1.3 | Importance and function of vessel stability book on survey task is accurately explained   |
| <b>2 Evaluate simplified stability data</b> | 2.1 | Appropriate stability data and information required for size and type of vessel is identified and assessed for compliance against regulatory requirements                           |
|   | 2.2 | Calculated stability data is correlated with the stability criteria set out in stability book and is confirmed as an accurate evaluation of vessel stability condition by surveyor  |
|   | 2.3 | Precautions to rectify operations that may affect stability and watertight integrity of vessel are identified and confirmed with surveyor   |
|   | 2.4 | Actions to ensure weight distribution does not compromise vessel safety are identified, confirmed with surveyor and incorporated into survey task as required                       |
|   | 2.5 | Actions to be taken in anticipation of environmental changes that may affect vessel stability are identified, confirmed with surveyor and incorporated into survey task as required |
|   | 2.6 | Actions to be taken in emergency situations to maintain vessel stability within safe limits are identified, confirmed with and implemented promptly and effectively                 |
| <b>3 Carry out reporting requirements</b>   | 3.1 | Recorded calculations are reviewed by surveyor for accuracy and relevance   |
|   | 3.2 | Draft survey report is developed and reviewed with surveyor for accuracy and compliance   |
|   | 3.3 | Feedback provided on draft survey report is acknowledged and draft report is amended as required  |
|   | 3.4 | Storage and security of information is identified, and records are stored and filed according to organisational and regulatory requirements   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Basic data includes one or more of the following:

- certificate of survey
- vessel log
- vessel plans and drawings
- vessel stability data book

Commercial vessels must include:

- vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law

Precautions include one or more of the following:

- ballast management
- closing openings exposed to weather
- damage control measures to maintain, stabilise or restore watertight integrity of hull during an emergency
- managing distribution of load on vessel
- managing position, stowage and lashing of cargo, stores and equipment, and location of passengers
- taking precautions when using lifting equipment and associated gear

Emergency situations include one or more of the following:

- flooding when there is damage to hull
- inadequate securing of weights on board
- unplanned movement of heavy items or stores and equipment on board vessel

## Unit Mapping Information

This unit replaces and is equivalent to MARM4004A Evaluate vessel stability.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARM008 Evaluate vessel stability

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- Analysing, planning and carrying out vessel stability calculation should be undertaken for at least five different types and size of vessels and include:
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out accurate and reliable calculations associated with vessel stability using basic stability criteria calculations, including interpreting and correlating resultant data
- interpreting measurements and observations required when maintaining vessel stability
- providing high quality reports
- reading and interpreting vessel specifications and drawings
- reading, interpreting and applying simple instructions for maintaining vessel stability
- selecting and using relevant equipment according to instructions.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic stability theory, including:
  - equilibrium
  - impact of design and hull shape on stability
  - principles of stability
  - relationship between weight and buoyancy in relation to floating bodies
  - reserve buoyancy
  - terms and definitions
- difference between transverse and longitudinal stability, and causes of list and trim
- effects of density of water on draught and freeboard of vessel
- effects on vessel stability that has been bilged
- information contained in basic stability data book supplied to vessel and how this information

is used to maintain vessel in a stable condition during operations

- marine Safety (Domestic Commercial Vessel) National Law
- principal design features of vessels related to stability and watertight integrity, such as:
  - maintenance and survey requirements necessary to maintain watertight integrity of vessel
  - openings in hull and on main deck of vessel and safe working practices that must be followed to maintain watertight integrity
- principal factors that affect operational stability of vessel and related measures that can be taken to maintain stability, including:
  - adding and removing weights
  - additions and alterations to vessel structure
  - free surface effect of slack tanks
  - operation of lifting equipment
  - roll period
  - stiff and tender condition
  - water on deck
- recording stability calculations in survey report
- relationship between lightship, loaded displacement and deadweight
- relevant WHS/OHS legislation and policies
- steps involved in bringing unstable vessel to a stable condition.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where evaluating vessel stability can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals

- tools, equipment, materials and personal protective equipment currently used in industry required to evaluate vessel stability.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARM009 Implement a systematic approach to the audit of safety management systems**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to implement a systematic approach to the audit of safety management systems (SMSs) on commercial vessels. It includes advising vessel owners, masters and and/or crew on the requirements for developing and implementing appropriate safety systems and plans.

This unit applies to individuals with responsibilities for auditing SMSs including safety plans and equipment, work health and safety/occupational health and safety (WHS/OHS) policies, procedures, and instruction and training for self, crew and others.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

M – Marine Surveying

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Scope legislative and regulatory**

1.1 Relevant legislation and standards for the role of surveyor in auditing SMSs are identified and evaluated



<b>framework</b>	1.2	Relevant safety management legislation and standards for vessel owners and operators, and implications for managing safety of crew and others is identified and evaluated
	1.3	Sources of information and data for impact on hazards, risks and management of SMSs on commercial vessels are monitored
<b>2 Determine safety management priorities and identify implementation plans</b>	2.1	Safety management priorities are determined in consultation with colleagues and other workplace consultative arrangements
	2.2	Appropriate implementation plans are identified to ensure preparedness for SMS audit
	2.3	Input from surveyors, SMS specialists and technical advisors is sought when required
<b>3 Audit vessel safety management systems for vessel operations and provide advice to control risks</b>	3.1	Vessel SMSs are identified and assessed for compliance
	3.2	Existing safety management arrangements are identified and advice on proposed changes is provided
	3.3	Appropriate advice is provided to vessel owners and operators on risk mitigation
	3.4	Disputes relating to SMS implementation issues are handled effectively and negotiation skills are employed to ensure agreement on SMS action plans
	3.5	Regulatory documentation and vessel history are updated to reflect advice provided and agreed actions plans, according to organisational or legislative requirements
<b>4 Evaluate effectiveness of approach to audit of safety management systems</b>	4.1	Sources of external and internal SMS information and data are accessed as part of evaluation
	4.2	Need for any external evaluation input is identified and action is taken as appropriate
	4.3	Stakeholders are consulted for evaluation input
	4.4	Areas for improvement are identified, documented and actioned

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |  |   |
|--|---|
| Relevant legislation and standards include one or more of the following: | <ul style="list-style-type: none"><li>• commonwealth, state and territory WHS/OHS legislation</li><li>• Marine Safety (Domestic Commercial Vessel) National Law</li><li>• National Standard for Commercial Vessels (NSCV)</li><li>• National Standard for the Administration of Marine Safety (NSAMS)</li></ul>   |
| Commercial vessels must include:   | <ul style="list-style-type: none"><li>• vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law</li></ul>  |
| Safety management priorities include one or more of the following:       | <ul style="list-style-type: none"><li>• identifying:<ul style="list-style-type: none"><li>• high risk vessels</li><li>• known hazards to vessel operations</li><li>• range and types of additional compliance arrangements</li></ul></li></ul>  |
| Consultative arrangements include one or more of the following:          | <ul style="list-style-type: none"><li>• health and safety representatives</li><li>• industry associations and peak bodies</li><li>• involvement in SMS activities such as observing inspections and surveys</li><li>• regulatory and other SMS consultative and planning committees</li><li>• unions</li><li>• work group meetings</li></ul>  |
| Implementation plans include one or more of the following:               | <ul style="list-style-type: none"><li>• communicating with vessel owners and operators about new requirements</li><li>• developing procedures and policies for SMS audit</li><li>• negotiating compliance timeframes based on risk documented plans developed in negotiation with vessel owners and operators to improve SMS management, which allocates items to be addressed and timeframes</li><li>• procedures for reporting hazards and non-compliance</li><li>• SMS performance indicators for a range of different commercial operations</li></ul> |
| SMS specialists include  | <ul style="list-style-type: none"><li>• industry peak bodies</li></ul>  |

one or more of the following:

- ISM code auditors
- other surveyors
- regulators
- risk management specialists
- WHS/OHS specialists

Technical advisors include one or more of the following:

- engineers
- legal practitioners
- maintenance and trades people
- naval architects
- shipwrights
- workplace trainers and assessors

Risk mitigation include one or more of the following:

- engaging consultants
- interpreting legislation to vessel operations and size
- ongoing self-assessment and testing of systems
- reducing operational capacity
- repairs and maintenance
- safety data sheets/material safety data sheets
- training of crew

SMS action plans include one or more of the following:

- changes to:
  - management practices
  - operational environment
  - operational practices and conditions
  - work processes and systems
- equipment purchases
- introducing new technology
- introducing training and instruction
- material purchases
- organisational restructure
- other labour market changes
- refreshing skills

Sources of external and internal SMS information and data include one or more of the following:

- consultants
- employees/colleagues
- government departments/agencies including SMS authorities and organisations such as AMSA
- industry networks and associations
- internet sites
- manufacturer manuals and specifications
- newspapers and journals, trade/industry publications
- SMS and other relevant legislation
- SMS specialists
- technical data

Stakeholders include one or more of the following:

- colleagues and other supervisors
- managers/employer
- maritime safety authorities
- SMS committees
- tradespeople
- vessel owners and operators

## Unit Mapping Information

This unit replaces and is equivalent to MARM4005A Implement a systematic approach to the audit of safety management systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM009 Implement a systematic approach to the audit of safety management systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- addressing disputes relating to safety management system (SMS) implementation issues
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- building relationships with stakeholders (internal and external to organisation)
- communicating effectively verbally and in writing
- consulting on and negotiating the development, implementation and audit of SMS requirements for commercial vessels
- ensuring integrity of data
- inspecting compliance level of SMS
- producing accurate and reliable information
- relating to people from diverse backgrounds and to people with diverse abilities
- researching and evaluate relevant SMS information and data
- sequencing tasks and meet timelines
- using a range of software and office equipment to access internal and external SMS information and data.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- communication skills and strategies to communicate effectively with people at all levels within the organisation
- internal and external sources of SMS information and data
- internal and external survey environment
- legislative requirements for:
  - compliance timeframes
  - consulting with vessel operators and owners
  - exercising powers to enforce compliance requirements
  - information and data collection
  - recordkeeping
- organisational policies and procedures for the audit of SMSs
- principles and practices of systematic approaches to surveying and improving SMSs for commercial vessels
- principles relating to:
  - hazard identification
  - hierarchy of control
  - risk management
  - systematic approaches to SMSs
- relevant state/territory and commonwealth legislation, codes of practice and standards
- roles and responsibilities of surveyors as specified in relevant legislation
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where a systematic approach to the audit of SMSs can be implemented.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM010 Survey lifesaving appliances, fire and other safety systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to assess operational condition of lifesaving appliances, fire and other safety systems, including verifying the monitoring of systems and their components to ensure they function.

This unit applies to people working in the maritime industry as a marine surveyor assistant.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Identify requirements for lifesaving appliances, fire and other safety systems**

- |     |  |
|-----|--|
| 1.1 | Types of lifesaving appliances, fire and other safety systems relevant to type of vessel under survey are identified and incorporated into survey plan |
| 1.2 | Maintenance requirements for lifesaving appliances, fire and other safety systems are identified and incorporated into                                 |



- survey plan according to regulatory requirements
- 1.3 Correct type and scale of safety equipment is identified according to size, type and operational area of vessel being surveyed
  - 1.4 Documentation requirements for safety systems for vessel size and nature are identified, accessed and confirmed against survey plan
- 2 Assess operational condition of lifesaving appliances, fire and other safety systems**
- 2.1 Powers and responsibility for inspecting and reporting operational condition of lifesaving appliances, fire and other safety systems are identified, reviewed and applied to survey tasks
  - 2.2 Inspection and assessment of condition of lifesaving appliances, fire and other safety systems and consumables is carried out according to regulatory and organisational requirements
  - 2.3 Inspection and assessment of maintenance procedures for lifesaving appliances, fire and other safety systems and consumables on board a commercial vessel are carried out according to regulatory and organisational requirements
- 3 Review and report on documentation for lifesaving appliances, fire and other safety systems**
- 3.1 Records and certificates related to routine monitoring and maintenance of condition of lifesaving appliances, fire and other safety systems and equipment is reviewed
  - 3.2 Actions to be taken to maintain, repair or replace lifesaving appliances, fire and other safety systems are communicated to appropriate personnel according to organisational and/or regulatory requirements
  - 3.3 Recordkeeping and reporting requirements related to condition of lifesaving appliances, fire and other safety systems are carried out according to regulatory and organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Lifesaving appliances include one or more of the following:	<ul style="list-style-type: none"><li>• emergency position indicating radio beacons (EPIRBs)</li><li>• first aid</li><li>• life buoys and jackets</li><li>• pyrotechnics</li><li>• search and rescue transponders (SARTs)</li><li>• self-contained breathing apparatus (SCBA)</li><li>• survival craft</li></ul>
Fire systems include one or more of the following:	<ul style="list-style-type: none"><li>• air flaps</li><li>• CO2</li><li>• dry chemical and wet foam</li><li>• fan shut-offs</li><li>• fire detection alarms</li><li>• foam</li><li>• portable fire extinguishers</li><li>• water</li></ul>
Regulatory requirements include one or more of the following:	<ul style="list-style-type: none"><li>• National Standard for Commercial Vessels (NSCV)</li><li>• Marine Safety (Domestic Commercial Vessel) National Law</li><li>• WHS/OHS legislation, regulations and codes of practice</li></ul>
Consumables include one or more of the following:	<ul style="list-style-type: none"><li>• batteries for detectors, radios, beacons, etc.</li><li>• dry and wet chemicals used in fire extinguishers</li><li>• flares</li><li>• survival rations</li></ul>
Maintenance procedures include one or more of the following:	<ul style="list-style-type: none"><li>• identifying faults in and damage to lifesaving appliances, fire and other safety systems and equipment</li><li>• routine checks for operational serviceability of lifesaving appliances, fire and other safety systems and equipment</li></ul>
Records and certificates include one or more of the following:	<ul style="list-style-type: none"><li>• licensed contractor certificates of inspection</li><li>• lifesaving appliances, fire and other safety systems and equipment operational and maintenance instructions and recommended procedures</li><li>• NSCV and applicable Australian and international regulatory requirements</li><li>• relevant maritime authority instructions for the maintenance and serviceability of shipboard lifesaving appliances, fire and other safety systems and equipment</li></ul>

- safety management system (SMS) plans, procedures, checklists and instructions
- vessel log books

## Unit Mapping Information

This unit replaces and is equivalent to MARM4006A Survey lifesaving appliances, fire and other safety systems.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM010 Survey lifesaving appliances, fire and other safety systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- communicating effectively verbally and in writing
- developing effective planning documents
- identifying variations in equipment and systems between different vessels, and when equipment and systems are changed on a vessel
- providing high quality reports
- reading and interpreting technical specifications and other graphical information related to lifesaving appliances, fire and other safety systems and consumables
- receiving and interpreting oral and written orders and instructions related to maintaining operational condition of lifesaving appliances, fire and other safety systems
- recognising faults and defects in lifesaving appliances, fire and other safety systems, and taking appropriate action to report non-compliance or maintenance requirements.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable sections of the Marine Safety (Domestic Commercial Vessel) National Law
- importance of maintaining lifesaving appliances, fire and other safety systems and equipment, and potential consequences if systems and/or equipment are not operational during an emergency
- safety management system (SMS) plans, procedures, checklists and instructions (where applicable) as they relate to lifesaving appliances, fire and other safety systems and equipment
- lifesaving appliances and fire systems:
  - installation

- maintenance
- use
- relevant legislation, regulations, codes of practice, policies and procedures related to maintaining lifesaving appliances, fire and other safety systems and equipment
- relevant state and territory maritime regulations
- statutory and organisational requirements for documenting condition and maintenance procedures and outcomes for lifesaving appliances, fire and other safety systems and equipment used on board vessels
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where lifesaving appliances, fire and other safety systems can be surveyed.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, material and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARM011 Calculate, assess and report on vessel trim and stability**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to assess and report on vessel trim and intact stability as part of the survey function. It is limited to undertaking practical stability tests, simplified stability calculations, reporting inclining experiments and consideration of damage stability implications.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

M – Marine Surveying

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Plan and prepare stability testing**

1.1 Applicable stability criteria for class of vessel and its operations are identified and confirmed against regulatory requirements

- 1.2 Differences between Uniform Shipping Laws (USL) and National Standard for Commercial Vessels (NSCV) standards for assessing stability are identified and applied to survey plan as required
- 1.3 Information and data is used to establish and verify stability characteristics required for safe operation
- 1.4 Types of stability related hazards that may occur during all types of operations are identified
- 1.5 Range of intended and/or likely vessel loading conditions are accurately identified and their impact on stability is assessed
- 2 Calculate vessel trim and stability**
  - 2.1 Simplified stability calculations are performed to assess compliance with applicable stability criteria
  - 2.2 Stability assessment methods for equivalent solutions are applied as necessary according to regulatory requirements
  - 2.3 Trim, draughts and freeboard are measured accurately to safely and efficiently allow assessment of compliance with criteria
  - 2.4 Effects of weight distribution that may compromise vessel safety are included in stability assessment
  - 2.5 Computer-based stability programs are used as appropriate to assist with assessing compliance
  - 2.6 Results are recorded and verified to confirm compliance
  - 2.7 Appropriate methods are used to ensure vessel is not put at risk during assessment
- 3 Apply tests, assessments and theories to confirm compliance**
  - 3.1 Tests and assessments that could assist to confirm stability compliance are verified and carried out according to safety instructions
  - 3.2 Small angle stability theories are used to establish metacentric height (GM) through transverse movement of weights across vessel deck
  - 3.3 Causes of inaccuracies and limitations of assumptions in tests, assessments and theories are interpreted accurately and considered in stability assessment report
- 4 Identify other impacts on stability**
  - 4.1 Types and effects of damage on vessel stability are identified and considered according to regulatory requirements

<b>calculations</b>	4.2	Damage stability considerations are accurately identified and effect of damage is correctly quantified
	4.3	Operational impact on stability is identified and considered in compliance assessment
	4.4	Vessel safety management plan is reviewed to ensure known or likely impacts on stability are included
<b>5 Document and report findings</b>	5.1	Records are maintained and reports are prepared according to regulatory and organisational guidelines
	5.2	Survey report is completed according to regulatory requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Applicable stability criteria includes one of the following:	<ul style="list-style-type: none"> <li>• NSCV guidelines</li> <li>• USL Code</li> </ul>
Regulatory requirements include one of the following:	<ul style="list-style-type: none"> <li>• Marine Safety (Domestic Commercial Vessel) National Law</li> <li>• NSCV</li> </ul>
Information and data include one or more of the following:	<ul style="list-style-type: none"> <li>• cargo information</li> <li>• load lines</li> <li>• means to:</li> <li>• sound tanks</li> <li>• read draught marks</li> <li>• stability book</li> </ul>
Tests and assessments include one or more of the following:	<ul style="list-style-type: none"> <li>• buoyancy and stability after flooding</li> <li>• freeboard</li> <li>• lightship measurement</li> </ul>



	<ul style="list-style-type: none"><li>• practical inclining</li><li>• roll period test</li><li>• simplified stability tests</li><li>• stability proof test</li></ul>
Types and effects of damage include one or more of the following:	<ul style="list-style-type: none"><li>• added mass</li><li>• flooding</li><li>• large amounts of water on deck</li><li>• lost buoyancy</li></ul>
Stability considerations include one or more of the following:	<ul style="list-style-type: none"><li>• ballast management</li><li>• closing openings</li><li>• damage control measures to maintain, stabilise or restore watertight integrity of hull</li><li>• distribution of load on a vessel</li><li>• positioning of stowage and lashing of cargo, stores and equipment</li><li>• taking action to avoid or minimise cargo shift</li><li>• taking precautions when using lifting equipment and other associated equipment</li></ul>
Operational impact includes one or more of the following:	<ul style="list-style-type: none"><li>• ballast</li><li>• cargo</li><li>• crew movement</li><li>• cross connections</li><li>• lifting gear (including cranes on deck)</li><li>• passengers and passenger movements</li><li>• towing</li><li>• vessel mooring arrangements</li><li>• wind/ice and other weather constraints</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM5001A Calculate, assess and report on vessel trim and stability.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM011 Calculate, assess and report on vessel trim and stability**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria.

Analysing, planning and assessing trim and stability should be conducted for at least five different vessels varying in size and operational limits and include:

- accessing and interpret a variety of information
- analysing information and data
- anticipating and solving problems that may occur in calculations
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- calculating trim and stability using statutory formula and criteria
- carrying out and reporting on at least three inclining experiments and three lightship measurements
- carrying out a range of different stability tests and assessments
- collating and preparing required documentation
- collecting and accurately interpreting valid and reliable data and/or regulations
- developing effective planning documents
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- identifying and correcting causes of erratic or excessive deviation in mass movements during an inclining experiment
- identifying gaps in data and sourcing additional information
- identifying hazards, assessing risks, and developing and implementing risk treatment options
- liaising with relevant people to obtain information
- reading and accurately interpreting vessel specifications and design drawings
- relating effectively to people from a range of social, cultural and ethnic backgrounds
- resolving conflict and negotiating effectively
- selecting and using appropriate equipment
- undertaking ballast management
- undertaking research
- using calculation and stability software.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- application of vessel construction principles and stability assessments applicable to a wide range of operational contexts
- calculations and formulas related to determining vessel trim and stability
- cargo loading and impact on stability
- configuration and subdivision requirements of a typical vessel including:
  - collision bulkhead
  - down flooding
  - deck edge immersion
  - freeboard and bulkhead deck
  - watertight compartments
  - weather tight compartments
  - vessel bulkhead
- correct identification and use of equipment and data required for stability tests and calculations
- damage control measures designed to maintain, stabilise or restore hull watertight integrity
- definition of intact stability
- distribution of load on a vessel
- implications and management of free surface effect
- information and data requirements, and statutory documents such as stability book, safety management plans, certificate of operation, vessel history
- naval architectural theory to the level necessary to carry out stability assessments for a range of domestic commercial vessels surveyor is intending to survey
- procedures for:
  - carrying out an inclining experiment
  - determining weights to be added or subtracted from calculated displacement to determine lightship displacement
  - maintaining vessel security and stability
  - measuring draughts and or freeboard to determine displacement of a vessel i.e. carrying out a lightship measurement
- recordkeeping requirements
- regulatory requirements for:
  - calculating vessel stability
  - surveying vessels
  - vessel compliance to trim and stability
- requirements for conducting a load line survey
- risk management
- safety management procedures and precautions when determining vessel trim and stability

- simplified stability criteria as outlined in NSCV Part C6A and C6C
- survey report requirements
- theories relating to damage stability and precautions to be taken to ensure down-flooding or progressive flooding does not occur
- typical problems and solutions related to vessel trim and stability
- types of simplified stability tests
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where calculating, assessing and reporting on vessel trim and stability can be conducted

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry to assess a vessels trim and intact stability.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **MARM012 Conduct a range of surveys on domestic commercial vessels**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to conduct new construction, alteration, change of class or use surveys on domestic commercial vessels according to Marine Safety (Domestic Commercial Vessel) National Law. It includes survey planning, carrying out a survey and providing a survey report.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

M – Marine Surveying

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |
|---|--|
| <b>1 Plan and prepare for survey task</b> | <b>1.1</b> Relevant standards for vessel hull and superstructure are accurately identified and accessed to support survey task |
|---|--|

- 1.2 Vessel survey regime is identified and relevant regulatory requirements, organisational requirements and procedures for survey scope are accessed and reviewed
- 1.3 Vessel survey regime is confirmed against regulatory and organisational requirements
- 1.4 Survey scope and depth is confirmed against relevant regulatory and organisational requirements
- 1.5 Survey purpose, objectives and variations are identified with relevant personnel
- 1.6 Operational limits, certificate of operations and previous certificates of survey are reviewed to identify and take into consideration any special conditions, equivalent solutions, specific areas of operations and other regulatory limitations, exceptions or conditions that may impact on survey task
- 1.7 Survey equipment and tools to carry out survey are accurately identified, selected and checked prior to survey task
- 2 **Confirm features of vessel and approved plans**
  - 2.1 Types of hull machinery and systems common to domestic commercial vessels are accurately identified and regulatory or additional standards are accessed and reviewed for use in survey
  - 2.2 Common materials used in hull construction and superstructure are identified and regulatory or additional standards are accessed and reviewed for use in survey
  - 2.3 Set of approved plans is obtained and read prior to start of survey
- 3 **Conduct non periodic vessel surveys**
  - 3.1 Type of survey is determined and full preparations are made to ensure successful completion of survey
  - 3.2 Vessel survey is carried out according to scope of survey, regulatory requirements and approved plans
  - 3.3 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule
  - 3.4 Non conformance to approved plans or regulatory requirements are identified and appropriate follow-up action is carried out

- |   |     |  |
|---|-----|--|
|   | 3.5 | Vessel plans and supporting survey documentation are altered according to organisational and regulatory practices to ensure they reflect 'as-built' vessel |
|   | 3.6 | Vessel systems are surveyed to ensure they meet statutory requirements   |
| <b>4 Report and act on non-compliance</b> | 4.1 | Non-compliance is detected, recorded and reported according to regulatory and organisational requirements  |
|   | 4.2 | Specialist support services are identified and sourced as appropriate  |
|   | 4.3 | Risks arising from detected non-compliance are reported and communicated to relevant personnel   |
|   | 4.4 | Relevant provisions of legislation appropriate to level of risk detected are identified and followed   |
|   | 4.5 | Appropriate reports and documentation relating to survey are developed and managed according to organisational and regulatory requirements                 |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- Relevant standards include one or more of the following:
- Australian Standards
  - class rules and instructions
  - manufacture guidelines
  - Marine Orders
  - National Standard for the Administration of Marine Safety (NSAMS) Section 4
  - NSCV
  - safety data sheets/material safety data sheets (SDS/MSDS)
  - safety of life at sea (SOLAS)



	<ul style="list-style-type: none"><li>• uniform Shipping Laws (USL) Code</li><li>• work health and safety/occupational health and safety (WHS/OHS)</li></ul>
Survey regime must include:	<ul style="list-style-type: none"><li>• class of vessel</li><li>• survey depth and level of vessel</li></ul>
Relevant regulatory requirements include one or more of the following:	<ul style="list-style-type: none"><li>• Australian/New Zealand Standards (AS/NZS), in particular:<ul style="list-style-type: none"><li>• AS/NZS ISO 9001: 2008 Quality Management Systems – requirements</li></ul></li><li>• Marine Safety (Domestic Commercial Vessel) National Law</li><li>• NSAMS Section 4</li><li>• NSCV:<ul style="list-style-type: none"><li>• Part B – General Requirements</li><li>• Part C – Vessel Construction</li><li>• Part E – Operational Practices</li></ul></li></ul>
Survey scope and depth include one or more of the following:	<ul style="list-style-type: none"><li>• condition</li><li>• initial</li><li>• modification/further building</li><li>• repair/damage</li></ul>
Survey equipment and tools include one or more of the following:	<ul style="list-style-type: none"><li>• communication equipment</li><li>• draft survey hydrometer</li><li>• drill</li><li>• entry authority</li><li>• hammer/welder's hammer</li><li>• meat piercing thermometer</li><li>• mirror</li><li>• non-destructive evaluation (NDE) tools</li><li>• personal protective equipment such as respirators, gloves, overalls, boots, hearing protection, goggles, masks</li><li>• plastic sampling bags</li><li>• pocket calculator</li><li>• recording equipment:<ul style="list-style-type: none"><li>• camera</li><li>• dictaphone</li><li>• lap top computer</li><li>• notebook</li></ul></li><li>• sampling equipment:<ul style="list-style-type: none"><li>• silver nitrate test kit for chlorides</li><li>• test kit equipment</li><li>• thermometers</li><li>• water-detecting paste</li></ul></li></ul>

	<ul style="list-style-type: none"><li>• scraper</li><li>• screwdriver</li><li>• small mallet</li><li>• sounding tapes</li><li>• storage equipment/facilities</li><li>• tape measure/measuring wheel</li></ul>
Types of hull include one or more of the following:	<ul style="list-style-type: none"><li>• box</li><li>• catamaran</li><li>• foils</li><li>• non water displacement</li><li>• shallow draft</li><li>• single</li><li>• wave piercing</li></ul>
Domestic commercial vessels must include:	<ul style="list-style-type: none"><li>• vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law</li></ul>
Materials include one or more of the following:	<ul style="list-style-type: none"><li>• aluminium</li><li>• cement</li><li>• composite</li><li>• fibreglass</li><li>• steel</li><li>• timber</li></ul>
Survey schedule includes one or more of the following:	<ul style="list-style-type: none"><li>• change of class survey</li><li>• damage/repair or condition surveys</li><li>• equivalent solution or deemed-to-satisfy surveys</li><li>• in-water</li><li>• out-of-water</li></ul>
Follow-up action includes one of the following:	<ul style="list-style-type: none"><li>• engineering delegate approval of non conformance</li><li>• securing authoritative approval</li></ul>
Specialist support services include one or more of the following:	<ul style="list-style-type: none"><li>• analytical laboratories</li><li>• electrical</li><li>• gas fitting/inspection</li><li>• naval architects</li><li>• NDE services</li><li>• noise</li><li>• pressure vessel testing</li></ul>
Appropriate reports and documentation include one or more of the following:	<ul style="list-style-type: none"><li>• certificate of operation</li><li>• certificate of survey</li><li>• statements of compliance</li><li>• survey report</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM5002A Conduct a range of surveys on domestic commercial vessels.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARM012 Conduct a range of surveys on domestic commercial vessels

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria.

A range of surveys should be conducted on domestic commercial vessels in at least three or more contexts and include:

- analysing and evaluating available data and observations to form logical conclusions
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out engineering measurements and applying metric and imperial conversions
- communicating effectively verbally and in writing
- developing and using research techniques to identify gaps in knowledge and to recognise professional development opportunities
- developing effective planning documents
- disseminating and clarifying technical information
- identifying strengths, weaknesses and failure modes of common marine construction materials
- implementing WHS/OHS principles and protection of the marine environment
- interpreting engineering drawings and diagrams
- interpreting relevant legislation, regulations, codes of practice, standards and rules
- managing risks
- providing customer service
- providing high quality reports
- reading and interpreting vessel plans
- recognising own professional limitations
- undertaking research and analysis using relevant reference material
- using computers
- working independently and unsupervised
- writing technical reports.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- acoustic and thermal insulation principles and practices
- awareness of working stresses in vessel under load or in a seaway
- basic principles of stability, procedures for incline experiments, simple roll test, stable and unstable equilibrium
- commercial vessel classifications and survey requirements for various areas of operations
- compatibility and durability of construction materials
- composite production methods, quality assurance and secondary bonding techniques
- damage propagation caused by defects, poor engineering practice and/or transmission of dynamic forces
- domestic commercial vessel systems, installation and maintenance
- documentation and checklists:
  - construction drawings
  - defect list
  - historical records
  - National Standard for the Administration of Marine Safety (NSAMS) Section 4
  - procedural forms
  - safety management systems
  - stability book
  - standard operating procedures
  - vessel files
- elementary ergonomic design principals and methods for reducing harm to crew in a seaway
- environmental controls and regulations
- forms, causes and prevention of corrosion in a marine environment
- galvanic series of common metals used in boat building
- hull forms and vessel types
- implications of poor ventilation practice
- insurance, liability and professional indemnity
- interaction of vessel structures, mechanical systems and appropriate installation practices
- maintaining watertight integrity
- marine craft construction:
  - methods, materials and vessel anatomy
  - terminology and definitions
- marine-grade adhesives, mechanical fasteners, sealants and caulking materials
- marine protective coatings, fairing compounds and finishes
- principles of sheathing
- repair techniques and maintenance procedures for common marine craft construction materials

- report writing formats
- safe working practices and risk assessment procedures
- suitable structural support for out-of-water vessels to prevent topple, sag, hog and/or damage from local stress concentrations
- vessel construction and repair principles and practices, and the National Standard for Commercial Vessels (NSCV)
- welding techniques, procedures and standards
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where a range of surveys on domestic commercial vessels can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry to conduct surveys on domestic commercial vessels.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARM013 Conduct an audit of safety management systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to conduct a regulatory audit of the safety management system (SMS) on a domestic commercial vessel. It involves systematic examination against National Standard for the Administration of Marine Safety (NSAMS) audit criteria to determine conformance with planned arrangements and the effectiveness of the approach to managing operational safety.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### 1 Carry out preliminary planning

- 1.1 Audit scope, objectives and benchmark are verified against regulatory requirements
- 1.2 Relevant documentation is identified and obtained



- |  |     |  |
|--|-----|--|
|  | 1.3 | Resources required to conduct audit are established and arranged   |
|  | 1.4 | Timing requirements are identified and audit is scheduled in agreement with relevant personnel   |
| <b>2 Develop safety management system audit plan</b> | 2.1 | Provision of valid and reliable evidence of a systematic approach to managing safety and risk controls within the context of the certificate of operation is ensured by nature of information and data collected |
|  | 2.2 | Relevant personnel and stakeholders who may need to be consulted for corroborating evidence are included in sources of evidence  |
|  | 2.3 | Opportunities for corroborating evidence are included in information and data collection strategies  |
|  | 2.4 | Security, confidentiality, impartiality and equity issues are addressed through information and data collection strategies   |
|  | 2.5 | Audit plan is developed and documented   |
| <b>3 Develop safety management system audit tool</b> | 3.1 | Benchmark criteria, nature of risks, identified relevant information and certificate of operation are accurately reflected in audit tool/s   |
|  | 3.2 | Ability of audit tool/s to focus on evaluation of performance of SMS management processes is ensured   |
|  | 3.3 | Ability of audit tool/s to produce consistent outcomes if used by others is ensured  |
|  | 3.4 | Collection of evidence in a timely and efficient manner is supported by audit tool/s   |
| <b>4 Undertake safety audit activities</b>           | 4.1 | Entry interview is carried out and records of evidence and findings are progressively documented and retained in an appropriate format   |
|  | 4.2 | Workplace hazard identification activities being undertaken are determined and compared to safety management plan  |
|  | 4.3 | Processes and systems are examined to determine whether hazards of long latency and low frequency/high consequence are included and minimised  |
|  | 4.4 | Processes and systems are examined to determine whether risks to persons other than employees are identified and   |

		minimised
	4.5	Organisational factors that impact on the SMS and safety management plan are identified
	4.6	Own health and safety is addressed during audit according to organisational requirements and standards for safe work practices
	4.7	Compliance of information and data collection and evaluation activities with legal requirements is ensured
	4.8	Information and data collection and evaluation activities are carried out ethically
	4.9	Exit meetings with relevant personnel and stakeholders are conducted as required
<b>5</b>	<b>Assess, evaluate and advise on effectiveness of approach to safety and risk management</b>	
	5.1	Outcomes of the risk assessment process are assessed for validity, reliability and inclusion of all major safety risks, in particular demonstrated use of risk assessment methods in the organisation/on the vessel
	5.2	Risk controls are evaluated for suitability and effectiveness in relation to organisational SMS
	5.3	Scope of organisational processes to monitor ongoing implementation of approaches to managing safety are evaluated
	5.4	Systematic analysis is undertaken to identify areas of compliance and non-compliance
	5.5	Advice is provided on impact of legislation and standards on selection, suitability and implementation of a range of safety management plans
<b>6</b>	<b>Report on safety audit outcomes</b>	
	6.1	Compliance evaluation outcomes are documented and reported to relevant personnel and stakeholders
	6.2	Hazards identified during audit are reported promptly to appropriate person/s
	6.3	Evaluation results are checked and compared against audit criteria
	6.4	Objective evidence of audit findings and recommendations are presented to client at closing meeting
	6.5	Possible challenges to report are anticipated and further

explanations are prepared to promote acceptance

- 6.6 Corrective action and follow-up processes are recommended according to regulatory requirements

## Foundation Skills

*This section describes those language, literacy, numeracy and employment skills that are essential to performance.*

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |  |
|---|--|
| Benchmark includes one or more of the following:              | <ul style="list-style-type: none"> <li>• Australian or international standards for maritime safety management</li> <li>• specific industry standards (such as fishing, pearling, charter cruise, cargo)</li> <li>• standards developed:               <ul style="list-style-type: none"> <li>• by work health and safety/occupational health and safety (WHS/OHS) authorities</li> <li>• internally by the organisation or by commercial organisations or industry bodies</li> </ul> </li> </ul> |
| Regulatory requirements must include:                         | <ul style="list-style-type: none"> <li>• Marine Safety (Domestic Commercial Vessel) National Law</li> </ul>  |
| Relevant documentation includes one or more of the following: | <ul style="list-style-type: none"> <li>• codes of practice</li> <li>• guidance material</li> <li>• industry standards</li> <li>• organisational documents</li> <li>• WHS/OHS legislation, regulations and codes of practice</li> </ul>   |

- Resources must include:
- equipment
  - specialist personnel
- Systematic approach to managing safety includes one or more of the following:
- comprehensive set of processes that are combined in a methodical and ordered manner to minimise risk of injury or ill health in the workplace such as:
    - allocation of resources
    - communication and consultation
    - hazard and risk management
    - processes of WHS/OHS planning
    - recordkeeping and reporting
    - review and evaluation for ongoing safety improvement
    - training and competency
- Information and data collected includes one or more of the following:
- claims
  - complaints
  - enforcement notices and actions
  - hazard logs
  - incident and injury reports
  - information and data changes since last audit such as new equipment, processes, products, substances or certificate of operation
  - interviews with management, supervisors, work groups, employees and other parties across a range of levels and roles including:
    - health and safety representatives
    - maritime regulators
    - contractors
  - legal reports
  - management system documentation including:
    - policies and procedures
    - position descriptions
    - duty statements
  - observations in workplace, work operations and records
  - operational documentation including:
    - completed forms
    - schedules
    - checklists
    - log books
    - minutes of meetings
    - action plans
    - maintenance reports

	<ul style="list-style-type: none"><li>• health surveillance records</li><li>• previous management system reports and industry risk profiles</li><li>• reports and management reviews</li><li>• surveillance audits</li><li>• training materials and records</li></ul>
Relevant personnel and stakeholders include one or more of the following:	<ul style="list-style-type: none"><li>• employees and other parties across a range of levels and roles including:<ul style="list-style-type: none"><li>• customers/clients/passengers</li><li>• health and safety representatives</li><li>• industry associations</li><li>• regulators</li><li>• where appropriate, contractors</li><li>• management, persons in control of workplace, supervisors</li></ul></li></ul>
Audit plan includes one or more of the following:	<ul style="list-style-type: none"><li>• information and data required to be on hand</li><li>• locations to be inspected</li><li>• meetings to be scheduled, people to be interviewed</li><li>• personnel involved</li><li>• sampling methodology including statistical measures</li><li>• scope of audit</li><li>• timelines</li></ul>
Audit tool/s include one or more of the following:	<ul style="list-style-type: none"><li>• instruments for collecting evidence and conducting analysis and evaluation (not the same as audit criteria or benchmark):<ul style="list-style-type: none"><li>• adapted from existing tools</li><li>• developed specifically for the purpose</li><li>• purchased or accessed from existing tools</li></ul></li><li>• and<ul style="list-style-type: none"><li>• descriptions of required characteristics to be checked</li><li>• limitations of and instructions for use</li><li>• performance checklists</li><li>• sets of questions to be asked</li></ul></li></ul>
Appropriate person/s must include:	<ul style="list-style-type: none"><li>• owner</li><li>• person in control of vessel</li></ul>
Objective evidence includes one or more of the following:	<ul style="list-style-type: none"><li>• information and data obtained through:<ul style="list-style-type: none"><li>• measurement</li><li>• observation</li><li>• tests</li></ul></li></ul>
Audit findings and	<ul style="list-style-type: none"><li>• benefits to be achieved by adopting audit report</li></ul>

recommendations must include:

recommendations

Follow-up processes include one or more of the following:

- agreed meeting date with client following sufficient time for implementing corrective actions, and may include:
  - checking rigour of original audit findings
  - providing new non-conformance report/s as required
  - verifying effectiveness of recommendations and control action/s, particularly in correction of non-compliance

## Unit Mapping Information

This unit replaces and is equivalent to MARM5003A Conduct an audit of safety management systems.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM013 Conduct an audit of safety management systems**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- Maritime safety management system (SMS) audits should be conducted against certificate of operation requirements for at least five vessels varying in size and operational limits and include:
- accessing and entering internal and external information on work health and safety/occupational health and safety (WHS/OHS)
- accessing relevant SMS information and data
- advising on and negotiating development of additional safety plans and monitoring designated actions
- applying relevant WHS/OHS requirements and work practices
- attending to detail when making observations and recording outcomes
- developing effective planning documents
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant WHS/OHS skills and knowledge
- making observations of workplace tasks and interactions between people, their activities, equipment, environment and systems
- managing own tasks within a timeframe
- providing high quality reports
- relating effectively to personnel at all levels of the organisation, safety specialists and emergency services personnel as required
- reviewing and analysing relevant workplace information and data
- using language appropriate to work group and task
- working independently and unsupervised
- writing complex reports, procedures and plans.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- benefits, limitations and use of a range of communication strategies and tools appropriate to workplace
- characteristics, mode of action and units of measurement of major hazard types
- concept of common law duty of care
- development of tools such as positive performance indicators (PPIs) in assessing safety management performance
- difference between:
  - common law and statutory law
  - hazard and risk
- ethics related to professional practice
- formal and informal communication and consultation processes
- hierarchy of control and considerations for choosing between different control measures, such as possible inadequacies of particular control measures
- how workforce characteristics and composition impacts on risk and a systematic approach to managing safety for example:
  - communication skills
  - cultural background/workplace diversity
  - gender
  - structure and organisation of workforce e.g. part-time, casual and contract workers, shift rosters, geographical location
  - language, literacy and numeracy
  - workers with specific needs
- how vessel characteristics and certificate of operation may impact on SMSs such as:
  - commercial activity
  - geographical location
  - maintenance requirements for vessel operating systems and work equipment
  - operational limits
  - passengers
  - size of vessel/ type of vessel
- internal and external sources of SMS information and data
- language, literacy and cultural profile of vessel employees
- limitations of generic hazard and risk checklists and risk ranking processes
- maritime legislative requirements for safety management plans and compliance
- methods for:
  - collecting reliable information and data, commonly encountered problems in collection, and strategies for overcoming such problems
  - providing evidence of compliance with maritime and WHS/OHS legislation



- nature and use of information and data that provides valid and reliable results on safety management performance processes (including PPIs) and limitations of other types of measures
- nature of maritime and typical vessel work requirements and processes (including work flow, planning and control) and hazards relevant to particular workplace
- organisational culture as it impacts on safety, risk management and change
- other functional areas that impact on safety management plans, systems and processes
- principles and practices of a systematic approach to managing safety
- principles of:
  - human behaviour and response to interactions with human, physical and task environment to identify psychosocial hazards
  - incident causation and injury processes
- professional liability in relation to providing advice
- range of risk analysis/assessment techniques and tools, and application and limitations of these techniques and tools, and auditing methods and techniques
- requirements for :
  - recordkeeping that addresses WHS/OHS, risk management, privacy and other relevant legislation
  - reporting under WHS/OHS and other relevant legislation including notifying and reporting incidents
- requirements of WHS/OHS and standards related to systematically managing safety
- requirements under hazard-specific WHS/OHS legislation and codes of practice
- risk as a measure of uncertainty and factors that affect risk
- roles and responsibilities under WHS/OHS legislation of employees including supervisors, contractors and other external WHS/OHS inspectors and advisors
- sampling methodologies, application and related statistical measures
- standard maritime industry controls for a range of hazards
- standards related to SMS information and data, statistics and records management including requirements for information and data under elements of systematically managing safety
- state/territory and commonwealth WHS/OHS legislation, regulations, codes of practice, associated standards and guidance material, including prescriptive and performance approaches, and links to other relevant legislation such as industrial relations, equal employment opportunity, workers compensation, rehabilitation
- structure and forms of legislation including regulations, codes of practice, associated standards and guidance material
- types of hazard identification tools
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where an audit of SMSs can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry when conducting an audit of SMSs.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM014 Develop marine survey reports

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to report on survey findings and provide information to clients and stakeholders on issues related to the marine survey.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                   |   |
|-------------------|---|
| 1 Report findings | 1.1 Relevant documentation, evidence, facts and information gathered during survey activities is collated and prepared for inclusion in report  |
|                   | 1.2 Contentious information or findings are promptly forwarded to key stakeholders, and where necessary, involved parties are personally briefed or have opportunities to discuss report prior to compilation |
|                   | 1.3 Reports are thoroughly and accurately prepared, and type of   |

		survey carried out is reflected in reports
	1.4	Client requirements, organisation policy and relevant legislation or codes of practice are complied with, in report format
	1.5	Reports are updated periodically to accurately reflect current status of survey
2	Provide information on marine survey tasks	2.1 Stakeholders are accurately and thoroughly informed of risks identified during survey 2.2 Prompt information is given to clients and stakeholders 2.3 Survey report and information is based on an objective assessment of vessel being surveyed
3	Present information	3.1 Information is presented within specified time, according to client and organisational requirements 3.2 Information is presented in required format, style and structure using relevant business equipment and technology 3.3 Report is maintained with due regard to client confidentiality according to organisational and legislative requirements 3.4 Feedback is evaluated and incorporated into future reports

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Documentation includes one or more of the following:

- correspondence
- legal/government/professional/other documents
- reference to all evidence/information considered
- reports from others such as loss adjusters/assessors/insurers, shipwrights, tradesmen, specialists and other surveyors
- survey books and files

Key stakeholders include one or more of the following:	<ul style="list-style-type: none"><li>• vessel records</li><li>• client</li><li>• government or statutory authorities</li><li>• industry associations</li><li>• insurance broker or agent</li><li>• insurer</li><li>• legal or other practitioners</li><li>• manufacturers</li><li>• marine authorities</li><li>• master or crew</li><li>• mortgagee</li><li>• suppliers</li><li>• third parties</li><li>• trustee</li><li>• vessel owner</li></ul>
Risks include one or more of the following:	<ul style="list-style-type: none"><li>• casualty</li><li>• damage</li><li>• loss or liability</li><li>• repairs</li><li>• safety management system (SMS)</li><li>• tangible or intangible</li><li>• work health and safety/occupational health and safety (WHS/OHS)</li></ul>
Information includes one or more of the following:	<ul style="list-style-type: none"><li>• historical data</li><li>• maintenance schedules</li><li>• operating environment of organisation or vessel</li><li>• other survey reports and relevant survey documentation</li><li>• vessel condition</li></ul>
Business equipment and technology include one or more of the following:	<ul style="list-style-type: none"><li>• cameras</li><li>• computers</li><li>• data storage devices</li><li>• email</li><li>• facsimile machines</li><li>• internet, extranet and intranet</li><li>• photocopiers, printers, scanners</li><li>• software applications, such as databases and word applications</li></ul>
Feedback includes one or more of the following:	<ul style="list-style-type: none"><li>• clients and colleagues</li><li>• documentation and reports</li><li>• quality assurance data</li><li>• questionnaires</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM5004A Develop marine survey reports.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARM014 Develop marine survey reports

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing and interpreting relevant information
- accessing and updating records electronically
- accessing web-based information services
- analysing and evaluating information and findings
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- determining and confirming information, using questioning and active listening as required
- effectively liaising with internal and external authorities/agencies
- ensuring currency of relevant legislative and regulatory knowledge
- interviewing, consulting and negotiating with clients and others
- liaising with others, sharing information and listening
- making effective presentations
- performing calculations related to achieving required outcomes
- performing a marine survey on a domestic commercial vessel
- planning and sequencing work
- producing accurate and reliable information
- reading and interpreting documentation from a variety of sources, and recording and consolidating relevant related information
- using computer applications (word processing, spreadsheet, database, specific purpose computer systems) to assist in achieving required outcomes
- writing effective, high quality reports.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- effective listening techniques
- privacy requirements
- relevant legislation and industry codes of practice
- risk management principles and strategies
- risks related to:
  - survey reports
  - vessel condition, salvage, hire, sale
- safety management system (SMS)
- survey processes
- survey reporting principles and practice for different types of survey tasks
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

This unit involves the skills and knowledge required to report on survey findings and provide information to clients and stakeholders on issues related to the marine survey.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARM015 Participate in investigating marine incidents

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to participate in planning, conducting and reporting investigations of marine incidents that have resulted in, or have a potential to result in, injury or damage to persons, vessels, property or marine environment.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Undertake initial assessment of incident**

- 1.1 Statutory and legal obligations are identified and relevant government agencies are advised as required
- 1.2 Key stakeholders and interested parties are identified and notified as appropriate

- 1.3 Factors affecting complexity of investigation are determined and surveyor competency to conduct investigation is determined based on required specialised skills and knowledge
  - 1.4 Area is checked to ensure it is safe
  - 1.5 Integrity of site and personnel is established and maintained according to legal requirements and to ensure objectivity of information collected
- 2 Participate in establishing investigation processes**
  - 2.1 Organisational policies and procedures, and national law for marine incident investigation are accessed and applied
  - 2.2 Scope of investigation is defined taking account of legislative requirements and client instructions
  - 2.3 Investigation team appropriate to level of responsibility in investigation is convened
  - 2.4 Involvement of stakeholders and interested parties is managed according to legislative requirements
  - 2.5 Resources and expert advice required to assist in incident assessment are identified and sourced
  - 2.6 Barriers to investigation are identified and addressed
  - 2.7 Development and implementation of action plans and timelines is ensured
- 3 Collect information and data for analysis**
  - 3.1 Sources of information and data are identified and accessed
  - 3.2 Incident site, equipment and other evidence is inspected
  - 3.3 Gathering of information and data by others is facilitated
  - 3.4 Photographs, measurements and documentary evidence are taken and recorded, taking objectivity, confidentiality and legal implications into account
  - 3.5 Site, evidence and necessary documentation is appropriately secured
- 4 Analyse information and data**
  - 4.1 Understanding and identification of conceptual basis for analysis is ensured
  - 4.2 Timeline of events leading up to incident is constructed using vessel records and other available data

- |                                       |     |  |
|---------------------------------------|-----|--|
|                                       | 4.3 | Causative event/s and conditions and circumstances that may have contributed to causative event are accurately identified and documented               |
|                                       | 4.4 | Intervention points on timeline for prevention are identified  |
| <b>5 Compile investigation report</b> | 5.1 | Results of analysis are documented in a format to suit required target audience and legal requirements   |
|                                       | 5.2 | Report is phrased in objective terms, and evidence and reasons for conclusions are cited   |
|                                       | 5.3 | Recommendations for prevention are included in report  |
|                                       | 5.4 | Relevant information and data is disseminated to key personnel, stakeholders and external agencies as appropriate, following appropriate authorisation |
|                                       | 5.5 | Findings from report are used to develop further prevention strategies   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |   |
|---|---|
| Relevant government agencies include one or more of the following:        | <ul style="list-style-type: none"> <li>• Australian Maritime Safety Authority (AMSA)</li> <li>• Australian Transport Safety Bureau (ATSB)</li> <li>• environment protection agencies</li> <li>• maritime authorities</li> <li>• police and other emergency services</li> <li>• work health and safety/occupational health and safety (WHS/OHS) specialists</li> </ul> |
| Stakeholders and interested parties include one or more of the following: | <ul style="list-style-type: none"> <li>• community</li> <li>• coroner</li> <li>• government agencies, including WHS/OHS and emergency service agencies</li> </ul>   |

	<ul style="list-style-type: none"><li>• importers</li><li>• installers</li><li>• insurance companies</li><li>• managers</li><li>• manufacturers</li><li>• media</li><li>• naval architects and marine engineers</li><li>• organisation board or advisory council</li><li>• persons in control of workplaces</li><li>• politicians</li><li>• ship personnel</li><li>• sub-contractors</li><li>• suppliers and distributors</li><li>• unions</li><li>• workgroup members and people who may be exposed to similar situations</li></ul>
Complexity includes one or more of the following:	<ul style="list-style-type: none"><li>• administrative implications</li><li>• conflict of interest issues</li><li>• existence of secondary hazards</li><li>• international conventions</li><li>• involvement of external agencies</li><li>• language competencies of parties involved</li><li>• legal implications arising from incident or post incident related matters</li><li>• level of public or political interest</li><li>• number of other parties, including sub-contractors</li><li>• privacy laws</li><li>• seriousness of injury or other outcomes</li><li>• technical implications</li></ul>
Investigation team includes one or more of the following:	<ul style="list-style-type: none"><li>• emergency service personnel</li><li>• government representatives</li><li>• legal advisors and technical experts</li><li>• other surveyors</li><li>• photographers</li></ul>
Barriers to investigation includes one or more of the following:	<ul style="list-style-type: none"><li>• research data and analysis or testing equipment</li><li>• technical design information and data relevant to investigation</li><li>• changes to incident scene</li><li>• condition of witnesses</li><li>• cultural issues</li><li>• economic implications</li><li>• geographical location and/or accessibility</li><li>• lack of records</li></ul>

	<ul style="list-style-type: none"><li>• legal restrictions or limitations (temporary, short-term or long-term)</li><li>• length of time from when incident occurred/first identified</li><li>• limited resources available</li><li>• political and community stakeholder sensitivity</li><li>• ship personnel (attitude and/or desire to protect self and others)</li><li>• time limits imposed</li><li>• weather, tides</li></ul>
Conceptual basis for analysis includes one or more of the following:	<ul style="list-style-type: none"><li>• focusing on ‘why’ and ‘how’ rather than ‘what’</li><li>• emphasising analysis of operations at time of incident</li><li>• encouraging an open minded, objective approach</li><li>• not focusing on individual behaviour or fault</li></ul>
Timeline of events includes one or more of the following:	<ul style="list-style-type: none"><li>• events that extend back in time as far as required, not just immediate events</li><li>• verbal reports from crew</li><li>• vessel records and logs</li></ul>
Conditions and circumstances include one or more of the following:	<ul style="list-style-type: none"><li>• cargo</li><li>• equipment failure</li><li>• fatigue</li><li>• key person absence</li><li>• number of crew</li><li>• onboard safety systems and WHS/OHS procedures</li><li>• stability</li><li>• type of:<ul style="list-style-type: none"><li>• equipment</li><li>• vessel</li></ul></li><li>• vessel operations</li><li>• weather</li></ul>
Target audience includes one or more of the following:	<ul style="list-style-type: none"><li>• environment protection agencies</li><li>• insurance agents</li><li>• maritime authorities</li><li>• organisation</li><li>• police or coroner</li><li>• vessel owner/s</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM5005A Participate in investigating marine incidents.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARM015 Participate in investigating marine incidents**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing data on marine investigations, accidents and incidents from a variety of sources
- accessing relevant marine incident information and data
- analysing relevant workplace information and data
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out calculations (such as vessel stability)
- communicating effectively with personnel at all levels of the organisation, marine incident specialists and, as required, emergency services personnel
- conducting effective formal and informal meetings
- consulting and negotiating with others to develop plans and to implement and monitor designated actions
- contributing to and assessing resources needed to systematically manage marine incidents and, where appropriate, access these resources
- developing effective planning documents
- effectively liaising with internal and external authorities/agencies
- identifying areas for improvement with the survey of marine incidents
- making observations of workplace tasks and interactions between people, their activities, equipment, environment and systems
- managing:
  - incident and responsibilities of self and others
  - own tasks within a timeframe
- paying attention to detail when making observations and recording outcomes
- preparing high quality reports for a range of target groups and stakeholders
- producing accurate and reliable information and data related to vessel, crew and/or marine environment
- using a range of communication media
- using basic measuring equipment including reading scales and dials applicable to selected hazards.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- characteristics, mode of action and survey tasks for major and minor marine incidents
- concept of common law duty of care
- ethics related to professional practice
- formal and informal communication and consultation processes, and key personnel related to communication
- how the characteristics and composition of the workforce impact on risk and the systematic approach to managing a marine incident, for example:
- communication skills
  - cultural background/workplace diversity
  - gender
  - language, literacy and numeracy
  - structure and organisation of workforce (part-time, casual and contract workers, shift rosters, geographical location)
  - workers with specific needs
- internal and external sources of information and data
- language, literacy and cultural profile of the work group
- legislative requirements for marine incident information and data, and consultation
- marine incident causation for a range of different incidents including marine environment incidents
- methods of providing evidence of compliance with maritime legislation
- nature of workplace processes (including work flow, planning and control) and hazards relevant to particular workplace, vessel and vessel operations
- organisational policies and procedures
- other functional areas that impact on managing marine incidents
- principles and practices of continuity and validity of evidence retention for potential legal action
- requirements for:
  - recordkeeping that addresses privacy, maritime and other applicable legislation
  - reporting marine incidents under legislation, organisational policy and procedures, codes of practice including notification and reporting of incidents
- requirements under hazard specific legislation and codes of practice
- rights of marine safety inspectors
- roles and responsibilities of vessel employees and other stakeholders including agents and contractors
- standard industry controls for a range of hazards
- state/territory and commonwealth maritime legislation (acts, regulations, codes of practice, associated standards and guidance material) including prescriptive and performance approaches and links to other relevant legislation such as industrial relations, WHS/OHS and



duty of care

- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where participation in the investigation of marine incidents can be conducted

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM016 Survey hull and superstructure of a commercial vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to undertake a survey of hull and superstructure of a commercial vessel according to relevant regulations. It includes planning survey, carrying out survey and providing survey report.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |   |
|---|---|
| <b>1 Plan and prepare for survey task</b> | <b>1.1</b> Relevant standards for vessel hull and superstructure are accurately identified and accessed to support survey task  |
|   | <b>1.2</b> Vessel survey regime is identified and relevant regulatory requirements, organisational requirements and procedures for survey scope are accessed and reviewed |

- 1.3 Vessel survey regime is confirmed against regulatory and organisational requirements
- 1.4 Survey scope and depth is confirmed against relevant regulatory and organisational requirements
- 1.5 Survey purpose, objectives and variations are discussed with relevant personnel
- 1.6 Operational limits, certificate of operations and previous certificates of survey are reviewed to identify and take into consideration any special conditions, equivalent solutions, specific areas of operations and other regulatory limitations, exceptions or conditions that may impact on survey task
- 1.7 Survey equipment and tools to carry out survey are accurately identified, selected and checked prior to survey
- 2 Confirm hull type and material construction**
  - 2.1 Types of hull common to domestic commercial vessels are accurately identified and regulatory or additional standards are accessed and reviewed for use in survey
  - 2.2 Common materials used in hull construction and superstructure are identified and regulatory or additional standards are accessed and reviewed for use in survey
  - 2.3 Construction, type of hull and materials are confirmed prior to survey by accessing vessel records
- 3 Conduct periodic survey of hull and superstructure**
  - 3.1 Survey of hull and superstructure is carried out according to regulatory requirements
  - 3.2 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule
  - 3.3 Watertight openings and skin fittings are inspected for compliance
  - 3.4 Deformation and integrity of hull and superstructure are inspected for compliance
  - 3.5 Paint and coatings are inspected for condition
  - 3.6 Cathodic protection is inspected where applicable
  - 3.7 Superstructure weather tightness is checked for integrity
  - 3.8 Appendages are inspected for integrity

**4 Report and act on non-compliance**

- 4.1 Non-compliance is detected, recorded and reported according to regulatory and organisational requirements
- 4.2 Specialist support services are identified and sourced as appropriate
- 4.3 Risks arising from detected non-compliance are reported and communicated to relevant personnel
- 4.4 Relevant provisions of legislation appropriate to level of risk detected are identified and followed
- 4.5 Appropriate reports and documentation relating to survey are developed and managed according to organisational and regulatory requirements

**Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

**Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Relevant standards must include:

- Australian/New Zealand Standards (AS/NZS)
- class
- manufacture guidelines
- Marine Orders
- National Standard for the Administration of Marine Safety (NSAMS) section 4
- National Standard for Commercial Vessels (NSCV)
- safety data sheets (SDS)/material safety data sheets (MSDS)
- safety of life at sea (SOLAS)
- Uniform Shipping Law (USL)
- work health and safety/occupational health and safety (WHS/OHS)

Survey regime must include:

- class of vessel
- survey depth and level of vessel

Relevant regulatory requirements include one or more of the following:

- AS/NZS, in particular:
  - AS/NZS ISO 9001: 2008 Quality Management Systems – requirements
- Marine Safety (Domestic Commercial Vessel) National Law
- NSAMS Section 4
- NSCV
  - Part B – General Requirements
  - Part C – Vessel Construction
  - Part E – Operational Practices

Survey scope and depth includes one or more of the following:

- condition
- initial
- modification/further building
- periodic survey (in or out of water)
- repair/damage

Survey equipment and tools include one or more of the following:

- communication equipment
- draft survey hydrometer
- drill
- entry authority
- hammer/welder's hammer
- meat piercing thermometer
- mirror
- personal protective equipment such as respirators, gloves, overalls, boots, hearing protection, goggles, masks
- photographs
- plastic sampling bags
- pocket calculator
- recording equipment:
  - camera
  - dictaphone
  - lap top computer
  - notebook
- sampling equipment:
  - silver nitrate test kit for chlorides
  - test kit equipment
  - thermometers
  - water-detecting paste
- scraper
- screwdriver
- small mallet
- sounding tapes

Types of hull include one or more of the following:	<ul style="list-style-type: none"><li>• storage equipment/facilities</li><li>• tape measure /measuring wheel</li><li>• box</li><li>• catamaran</li><li>• foils</li><li>• non water displacement</li><li>• shallow draft</li><li>• single</li><li>• wave piercing</li></ul>
Domestic commercial vessels must include:	<ul style="list-style-type: none"><li>• vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law</li></ul>
Materials include one or more of the following:	<ul style="list-style-type: none"><li>• aluminium</li><li>• cement</li><li>• composite</li><li>• fibreglass</li><li>• steel</li><li>• timber</li></ul>
Survey schedule include one or more of the following:	<ul style="list-style-type: none"><li>• twelve months</li><li>• twenty-four months</li><li>• thirty-months</li><li>• five year cycle with NSAMS:<ul style="list-style-type: none"><li>• periodic survey (either annual or bi-annual)</li><li>• change of class survey</li><li>• safety equipment only survey</li><li>• damage/repair or condition surveys</li><li>• equivalent solution or deemed-to-satisfy surveys</li><li>• SMS components</li><li>• in water</li><li>• out of water</li></ul></li></ul>
Watertight openings and skin fittings include one or more of the following:	<ul style="list-style-type: none"><li>• cooling water systems</li><li>• doppler log</li><li>• drain plugs</li><li>• hatch</li><li>• inlet valve</li><li>• sea chest</li><li>• stabilisers</li></ul>
Deformation and integrity include one or more of the following:	<ul style="list-style-type: none"><li>• blisters</li><li>• chemical attack</li><li>• cracking</li></ul>

	<ul style="list-style-type: none"><li>• degradation</li><li>• distortion</li><li>• dry rot</li><li>• isolated damage</li><li>• leaching</li><li>• out of trim</li><li>• structural failure</li><li>• ultra violet (UV) breakdown</li><li>• water ingress</li><li>• weathering</li></ul>
Paint and coatings include one or more of the following:	<ul style="list-style-type: none"><li>• anti fouling</li><li>• copper sheathing</li><li>• gel based</li></ul>
Appendages include one or more of the following:	<ul style="list-style-type: none"><li>• bilge keels</li><li>• keel coolers</li><li>• rudders</li><li>• stabilisers</li></ul>
Specialist support services include one or more of the following:	<ul style="list-style-type: none"><li>• analytical laboratories</li><li>• chemical (sewage systems)</li><li>• electrical</li><li>• naval architects</li><li>• non-destructive evaluation (NDE) services</li><li>• noise</li><li>• pressure vessel testing</li></ul>
Appropriate reports and documentation include one or more of the following:	<ul style="list-style-type: none"><li>• certificate of operation</li><li>• certificate of survey</li><li>• statements of compliance</li><li>• survey report</li></ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM5006A Survey hull and superstructure of a commercial vessel

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>





# Assessment Requirements for MARM016 Survey hull and superstructure of a commercial vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria.

Survey of hull and superstructure of a commercial vessel should be undertaken in at least three or more contexts and include:

- analysing and evaluating available data and observations to form logical conclusions
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out engineering measurements and applying metric and imperial conversions
- communicating effectively with others as required verbally and in writing
- developing and using research techniques to identify gaps in knowledge and to recognise professional development opportunities
- developing effective planning documents
- disseminating and clarifying technical information
- identifying strengths, weaknesses and failure modes of common marine construction materials
- implementing relevant WHS/OHS requirements, work practices and protection of the marine environment
- interpreting engineering drawings
- interpreting relevant legislation, regulations, codes of practice, standards and rules
- managing risks
- providing customer service
- providing high quality reports
- recognising own professional limitations
- undertaking research and analysis using relevant reference material
- using computers
- working independently and unsupervised
- writing technical reports.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- acoustic and thermal insulation principles and practices
- awareness of working stresses in vessel under load or in a seaway
- basic principles of stability, procedures for incline experiments, simple roll test, stable and unstable equilibrium
- commercial vessel classifications and survey requirements for various areas of operations
- compatibility and durability of construction materials
- composite production methods, quality assurance and secondary bonding techniques
- damage propagation caused by defects, poor engineering practice and/or transmission of dynamic forces
- documentation and checklists:
  - construction drawings
  - defect list
  - historical records
  - National Standard for the Administration of Marine Safety (NSAMS) Section 4
  - procedural forms
  - safety management systems
  - stability book
  - standard operating procedures
  - Uniform Shipping Laws (USL) Section 14 Appendix 2
  - vessel files
- elementary ergonomic design principals and methods for reducing harm to crew in a seaway
- environmental controls and regulations
- forms, causes and prevention of corrosion in a marine environment
- galvanic series of common metals used in boat building
- hull forms and vessel types
- implications of poor ventilation practice
- insurance, liability and professional indemnity
- interaction of vessel structures, mechanical systems and appropriate installation practices
- maintaining watertight integrity
- marine craft construction:
  - methods, materials and vessel anatomy
  - terminology and definitions
- marine-grade adhesives, mechanical fasteners, sealants and caulking materials
- marine protective coatings, fairing compounds and finishes
- principles of sheathing
- repair techniques and maintenance procedures for common marine craft construction materials

- report writing formats
- safe working practices and risk assessment procedures
- suitable structural support for out-of-water vessels to prevent topple, sag, hog and/or damage from local stress concentrations
- welding techniques, procedures and standards
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where a survey of hull and superstructure of a commercial vessel can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry used when surveying a hull and superstructure of a commercial vessel.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# MARM017 Survey vessel operational systems

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to undertake a periodic survey of vessel operational systems including propulsion and steering gear systems, deck machinery, pumping systems, power generation, refrigeration plant, liquid petroleum gas (LPG) systems for appliances and navigational systems.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Identify survey requirements**

- 1.1 Relevant standards for vessel equipment and operational systems are identified, accessed and incorporated into survey plan as required
- 1.2 Survey scope and depth is confirmed against relevant

		standards and organisational requirements
	1.3	Operational limits, certificate of operations and previous certificates of survey are reviewed for special conditions or equivalent solutions
	1.4	Equipment and operational system requirements for survey and range of variations are accurately identified, selected and tested for serviceability
<b>2 Prepare for survey</b>	2.1	Operational systems to be surveyed for type, size and nature of vessel operations are accurately identified, reviewed and incorporated into survey plan
	2.2	Relationships between different operational systems are accurately interpreted and items to be surveyed are noted in survey plan
	2.3	Maintenance records are obtained and reviewed to confirm survey scope
<b>3 Conduct periodic survey of operational systems</b>	3.1	Survey of operational systems is carried out according to regulatory requirements
	3.2	Primary and secondary operational systems and their components are surveyed according to survey schedule
	3.3	Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule
<b>4 Report and act on non-compliance</b>	4.1	Non-compliance is detected, recorded and reported according to regulatory and organisational requirements
	4.2	Risk arising from non-compliance is detected, reported and communicated to relevant personnel
	4.3	Relevant provisions of legislation appropriate to level of risk detected are identified and followed
	4.4	Appropriate reports and documentation related to survey are developed and managed according to regulatory and organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Relevant standards include one or more of the following:	<ul style="list-style-type: none"> <li>• class rules and approvals</li> <li>• general servicing requirements for operational equipment</li> <li>• manufacturer guidelines and servicing requirements</li> <li>• Marine Orders</li> <li>• National Standard for the Administration of Marine Safety (NSAMS) Section 4</li> <li>• NSCV and USL Code as applicable</li> <li>• organisational standards</li> <li>• safety data sheets/material safety data sheets (SDSs/MSDSs)</li> <li>• safety management systems (SMS)</li> <li>• safety of life at sea (SOLAS)</li> <li>• Australian/New Zealand Standards (AS/NZS):               <ul style="list-style-type: none"> <li>• AS/NZS 3000: Electrical installations</li> <li>• AS/NZS 3004: Electrical installations – verification guidelines</li> </ul> </li> <li>• WHS/OHS</li> </ul>
Survey scope and depth include one or more of the following:	<ul style="list-style-type: none"> <li>• class of vessel</li> <li>• grandfathering conditions</li> <li>• survey cycle in accordance with NSAMS Chapter 4:               <ul style="list-style-type: none"> <li>• change of class survey</li> <li>• damage/repair or condition surveys</li> <li>• equivalent solution or deemed-to-satisfy surveys</li> <li>• periodic survey (either annual or bi-annual)</li> </ul> </li> <li>• survey level of vessel</li> </ul>
Operational limits include one or more of the following:	<ul style="list-style-type: none"> <li>• as defined in certificate of operations and/or certificate of survey</li> <li>• testing requirements for electrical and fire systems</li> </ul>
Regulatory requirements include one or more of the following:	<ul style="list-style-type: none"> <li>• Marine Safety (Domestic Commercial Vessel) National Law</li> <li>• NSCV</li> <li>• regulations and Marine Orders</li> <li>• USL Code</li> </ul>

- Primary and secondary operational systems include one or more of the following:
- maintenance and servicing requirements as well as general condition of:
  - ballast
  - bilge pumping systems
  - communication equipment
  - electrical systems
  - engines and auxiliaries
  - fire and safety systems
  - fuel systems
  - hydraulic systems
  - machinery systems
  - navigational systems
  - piping and pumping systems
  - power generating plants such as hybrid systems, wind and solar generation
  - propulsion systems
  - refrigeration
  - sanitary systems
  - steering systems
  - tanks
- Equivalent solutions include one or more of the following:
- as noted in certificate of operation or certificate of survey
  - as noted in NSCV Part B
  - national register of exemptions and equivalent solutions

## Unit Mapping Information

This unit replaces and is equivalent to MARM5007A Survey vessel operational systems.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# Assessment Requirements for MARM017 Survey vessel operational systems

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accurately interpreting relevant codes, standards, rules and regulations for vessel operational systems
- analysing and evaluating available data and observations to form logical conclusions
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out engineering measurements and applying metric and imperial conversions
- developing effective planning documents
- ensuring currency of relevant WHS/OHS skills and knowledge
- inspecting and testing operational systems according to regulatory and organisational requirements
- communicating effectively with others as required, verbally and in writing
- implementing principles of WHS/OHS and marine environment protection measures
- negotiating and resolving conflict
- reading and interpreting:
  - machinery performance readings and indications
  - plans and drawings
  - technical information
- recognising and documenting faulty equipment
- selecting and using appropriate tools and equipment
- undertaking research and analysing reference material and manufacturer data sheets
- writing high quality reports.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- battery types, care and maintenance
- commercial vessel classifications and survey requirements for various operational systems and their components
- compatibility and durability of construction materials
- construction and layout of a typical commercial vessel, including layouts for pipework, tail shaft assembly and installed machinery
- environmental controls and regulations for primary, secondary or ancillary systems and their components
- ethical behaviour and industry codes of practice
- features and characteristics of typical faults and signs of deterioration in operational systems and components
- features of different engine types and sizes
- forms, causes and prevention of corrosion in a marine environment
- insurance, liability and professional indemnity requirements for self and others
- interaction of vessel structures and mechanical systems
- maintaining watertight integrity
- operational characteristics and performance specifications for different types of marine internal combustion engines and propulsion machinery usually found on vessels of up to 750 kW propulsion power
- principal features of fittings and machinery found on typical small vessels and characteristics of engine/plant and ancillary equipment
- procedures for:
  - checking fittings, machinery and components
  - reading and interpreting machinery performance readings and indications
- purpose and content of safety data sheets/material safety data sheets (SDSs/MSDSs)
- relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code dealing with maintaining small vessels
- report writing requirements for a range of different survey tasks
- safety, environmental and hazard control precautions and procedures relevant to checking and basic maintenance of fittings and machinery
- typical problems related to inspecting and maintaining operational systems
- typical vessel and machinery specifications, operating manuals and specifications
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where a survey of vessel operational systems can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM018 Undertake a periodic statutory survey

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to undertake statutory periodic surveys of vessels.

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |                                |            |  |
|--------------------------------|------------|--|
| <b>1 Identify survey scope</b> | <b>1.1</b> | Vessel survey regime is identified and relevant regulatory requirements, organisational requirements and procedures for survey scope are accessed and reviewed |
|                                | <b>1.2</b> | Vessel survey regime is confirmed against relevant regulatory requirements   |

- 1.3 Survey scope and depth is confirmed against relevant regulatory and organisational requirements
- 1.4 Survey purpose objectives and variations are clarified with relevant personnel
- 1.5 Relevant regulatory and organisational requirements are reflected in survey plan
- 2 Plan and prepare for survey**
  - 2.1 Clients/representatives are informed of survey schedule according to relevant regulatory and organisational requirements
  - 2.2 Survey time is estimated and location confirmed with relevant personnel
  - 2.3 Vessel history and supporting documents are located and reviewed in preparation for survey
  - 2.4 Operational limits, certificate of operations and previous certificates of survey are reviewed for special conditions or equivalent solutions and included in survey plan where required
  - 2.5 Relevant standards for vessel equipment are identified, accessed and included in survey plan as required
  - 2.6 Survey tools and equipment requirements for survey and range of variations are accurately identified, selected and tested for serviceability
  - 2.7 Likelihood of confrontation or risks to self are identified and managed according to organisational procedures
  - 2.8 Risks related to scope of survey are identified and managed according to organisational procedures
- 3 Conduct survey**
  - 3.1 Legal requirements for conducting periodic surveys are reviewed and applied
  - 3.2 Purpose and scope of survey is confirmed with clients/representatives
  - 3.3 Continued existence, quantity and/or type of components, systems or equipment on board vessel is verified, examined and/or tested according to survey schedule
  - 3.4 Degradation or loss of functionality in components, systems or equipment is noted for repair, deficiency or renewal in

survey report

- 3.5 Vessel construction, machinery or equipment not under survey but noted as unsafe are reported according to relevant regulatory, legislative and organisational requirements
  - 3.6 Survey findings are documented in vessel history log in a systematic order and according to survey schedule and organisational requirements
  - 3.7 Survey results are confirmed with clients/representatives, and improvements and actions required to issue certificate of survey for vessel are noted and issued to clients/representatives
- 4 Finalise survey**
- 4.1 Survey outcomes are logged or reported to relevant personnel according to organisational requirements
  - 4.2 Improvement actions required are reviewed for compliance before certificate of survey is issued
  - 4.3 Results of final compliance requirements are forwarded to relevant personnel for certification

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Survey regime includes one of the following:

- class of vessel
- survey level of vessel

Relevant regulatory requirements include one or more of the following:

- Australian/New Zealand Standards (AS/NZS), in particular:
  - AS/NZS 3000: 2007 Electrical installations
  - AS/NZS 3017: 2007 Electrical installations – verification guidelines
  - AS/NZS ISO 9001: 2008 Quality Management Systems – requirements

	<ul style="list-style-type: none"> <li>• National Standard for the Administration of Marine Safety (NSAMS) Section 4</li> <li>• NSCV: <ul style="list-style-type: none"> <li>• Part B – General Requirements</li> <li>• Part E – Operational Practices</li> </ul> </li> </ul>
Variations include one or more of the following:	<ul style="list-style-type: none"> <li>• combined Uniform Shipping Laws (USL) Code and NSCV</li> <li>• equivalent solutions</li> <li>• NSCV</li> <li>• pre USL Code</li> <li>• USL Code</li> </ul>
Relevant personnel include one or more of the following:	<ul style="list-style-type: none"> <li>• classification societies</li> <li>• colleagues</li> <li>• government bodies</li> <li>• owners or owner representatives of vessels and/or charters</li> <li>• port authorities</li> </ul>
Clients/representatives include one or more of the following:	<ul style="list-style-type: none"> <li>• classification societies</li> <li>• environmental agencies/authorities</li> <li>• government bodies</li> <li>• lawyers</li> <li>• owners of vessels and/or charterers</li> <li>• port authorities</li> </ul>
Survey schedule includes one or more of the following:	<ul style="list-style-type: none"> <li>• twelve months</li> <li>• twenty-four months</li> <li>• thirty-months</li> <li>• five year cycle with NSAMS: <ul style="list-style-type: none"> <li>• periodic survey (either annual or bi-annual)</li> <li>• change of class survey</li> <li>• safety equipment only survey</li> <li>• damage/repair or condition surveys</li> <li>• equivalent solution or deemed-to-satisfy surveys</li> <li>• safety management system (SMS) components <ul style="list-style-type: none"> <li>• in water</li> <li>• out of water</li> </ul> </li> </ul> </li> </ul>
Vessel history and supporting documents include one or more of the following:	<ul style="list-style-type: none"> <li>• case files/incident reports</li> <li>• commercial documentation</li> <li>• current survey practice, both formal and informal</li> <li>• current vessel designs, practices and materials</li> <li>• deck and engine logs</li> <li>• forms (such as application forms, notification forms)</li> <li>• insurance certificates</li> </ul>

	<ul style="list-style-type: none"><li>• notices (such as seizure notice, infringement notice)</li><li>• previous surveys and certificates of survey</li><li>• relevant national and international standards</li><li>• ship log books and other recordkeeping instruments</li><li>• vessel Stability Book</li></ul>
Operational limits include one or more of the following:	<ul style="list-style-type: none"><li>• certificate of operations</li><li>• certificate of survey</li><li>• restrictions and endorsements</li><li>• SMS</li></ul>
Survey tools and equipment include one or more of the following:	<ul style="list-style-type: none"><li>• communication equipment</li><li>• draft survey hydrometer</li><li>• drill</li><li>• entry authority</li><li>• hammer/welder's hammer</li><li>• mallet</li><li>• mirror</li><li>• personal protective equipment such as respirators, gloves, overalls, boots, hearing protection, goggles, masks</li><li>• photographs</li><li>• plastic sampling bags</li><li>• pocket calculator</li><li>• recording equipment:<ul style="list-style-type: none"><li>• camera</li><li>• dictaphone</li><li>• laptop computer</li><li>• notebook</li></ul></li><li>• sampling equipment:<ul style="list-style-type: none"><li>• silver nitrate test kit for chlorides</li><li>• test kit equipment</li><li>• thermometers</li><li>• water-detecting paste</li></ul></li><li>• satellite imagery</li><li>• scraper</li><li>• screwdriver</li><li>• sounding tapes</li><li>• storage equipment/facilities</li><li>• tape measure/measuring wheel</li></ul>
Risks include one or more of the following:	<ul style="list-style-type: none"><li>• age of vessel</li><li>• area of operation, nature of operation</li></ul>



- Legal requirements include one or more of the following:
- incident history of particular class of vessels
  - operational and maintenance performance of operator
  - personal attributes of operator/client
  - physical attributes of vessel
  - common law
  - conflict of interest
  - consequences and penalties for noncompliance
  - duty of care
  - ethical behaviour
  - requirements under Marine Safety (Domestic Commercial Vessel) National Law

## Unit Mapping Information

This unit replaces and is equivalent to MARM5008A Undertake a periodic statutory survey.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARM018 Undertake a periodic statutory survey

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria.

A periodic survey for at least three different vessels under different conditions should be conducted and include:

- accurately interpreting standards and guidelines, and applying rules and/or regulatory requirements to survey tasks
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- carrying out survey tasks in a logical sequence according to organisational operating procedures
- communicating effectively with others as required
- developing effective planning documents
- conducting vessel history searches
- following instructions, regulations, marine orders, organisational operating procedures
- identifying defects, faults and corrosion to operational systems, hull and superstructure, safety and fire equipment
- operating technical and electronic equipment
- providing high quality written and verbal reports
- selecting and using suitable equipment including personal protection equipment
- using a range of communication techniques including:
  - establishing rapport
  - listening
  - negotiating
  - probing
  - reflecting
  - resolving conflict
- using appropriate communication and interpersonal techniques with a diverse range of clients/representatives and staff
- using business technology and common software programs.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- applicable Australian/New Zealand Standards (AS/NZS), in particular:
  - AS/NZS 3000: 2007 Electrical installations
  - AS/NZS 3017: 2007 Electrical installations – verification guidelines
  - AS/NZS ISO 9001: 2008 Quality Management Systems – requirements
- certificates of operation and how they apply to the survey task, in particular:
  - assessment of seafarer eligibility
  - certificate of survey requirements
  - restrictions and endorsements
  - safety management system (SMS) requirements
- international conventions and acts such as International Convention for the Prevention of Pollution from Ships (MARPOL), safety of life at sea (SOLAS)
- international conventions for load lines
- legal requirements relating to recording information
- Marine Safety (Domestic Commercial Vessel) National Law
- national and international regulations, International Maritime Organization (IMO) Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders
- National Standard for Commercial Vessels (NSCV) relating to conducting periodic surveys and in particular:
  - Part B – General Requirements
  - Part E – Operational Practices
- National Standard for the Administration of Marine Safety (NSAMS)
- risk management principles and techniques
- role of surveyor in carrying out periodic statutory surveys
- state/territory and local government legislation and regulations relating to:
  - environmental protection
  - maritime regulations
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions, where a periodic statutory survey can be conducted.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, material and personal protective equipment currently used in industry and required when undertaking a periodic statutory survey.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARM019 Establish a marine surveyor practice

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to develop a business plan that includes a marketing, sales and promotional strategy to grow a small surveyor business. It includes researching and developing an integrated business plan for achieving business goals and objectives.

This unit applies to people working in the maritime industry as a marine surveyor.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

M – Marine Surveying

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Prepare to develop a business plan**

- |     |  |
|-----|--|
| 1.1 | Essential components of a business plan are identified and reviewed for suitability for inclusion in overall plan for size and nature of proposed business |
| 1.2 | Sources and costs of finance to be included in financial plan are established and required business liquidity and profitability is outlined                |

- |  |     |  |
|--|-----|--|
|  | 1.3 | Business resources and required legal and compliance requirements to be considered are identified and documented                             |
| <b>2 Develop a business plan</b>                 | 2.1 | Proposed business operation and overall business goals and objectives are identified and documented  |
|  | 2.2 | Operational requirements are identified to effectively produce/deliver products/services   |
|  | 2.3 | Specialist services and sources of advice are identified, where required, and costed according to resources available                        |
|  | 2.4 | Vision statement is developed that reflects business objectives  |
|  | 2.5 | Target markets are identified through market research data   |
|  | 2.6 | Competitor analysis is obtained and market position the business is developed/reviewed   |
| <b>3 Develop strategies for minimising risks</b> | 3.1 | Specific interests and objectives of relevant people are identified and their support for planned business direction is sought and confirmed |
|  | 3.2 | Risk management strategies are identified and developed according to business goals and objectives, and relevant legal requirements          |
|  | 3.3 | Contingency plan is developed to address potential areas of non-conformance with plan  |
| <b>4 Develop business promotion plans</b>        | 4.1 | Business brand is developed  |
|  | 4.2 | Benefits of practice products/services are identified  |
|  | 4.3 | Promotional tools are selected and included in business plan and applicable legislation is incorporated as required                          |
| <b>5 Develop sales plans</b>                     | 5.1 | Plans to increase sales through yield per existing client are identified and developed for immediate or future inclusion in plan             |
|  | 5.2 | Plans and strategies to grow business and add new clients and sales are developed  |
|  | 5.3 | Proposed plans are ranked according to priority  |
|  | 5.4 | Action plan to implement top ranked plan is developed and agreed with any relevant personnel   |

- |   |     |   |
|---|-----|---|
|   | 5.5 | Business work practices are reviewed to ensure they support plans   |
| <b>6 Implement and monitor promotional strategy</b> | 6.1 | Promotional package is created to meet sales plan requirements, relevant legislative requirements and to enhance business corporate image |
|   | 6.2 | Promotional strategy is implemented within budget in specified timeframes   |
|   | 6.3 | Criteria to measure effectiveness of sales/promotional strategy is established  |
|   | 6.4 | Adjustments to promotional strategy or service distribution are made as necessary to ensure required result is being obtained             |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Business plan must include:

- business opportunities, which may be influenced by:
  - amount and types of finance available
  - expected financial viability
  - skills of operator
- details of ownership/management
- finance, expenditure statement, balance sheet and cash flow forecast, projections for the initial years of operation, assumptions underlying business plan, expected level of inflation and taxation, expected trend of interest rate, capital expenditure and its timing, stock turnover, debtor collection period, creditor payment period, return on investment
- level of risk involved, risk assessment and management
- market focus of business
- marketing requirements
- need to raise finance and requirements of lenders

Financial plan must include:

- organisation/operational arrangements
- proposed size and scale of business
- recognition of any seasonal or cyclical (time-based) elements, which are crucial to business success
- resources required and available
- sources of funding
- specialist services and sources of advice that may be required
- staffing
- stages in business development
- analysis of sales by product/service, identifying where they were sold and to whom
- cash flow estimates for each forward period
- current financial state of enterprise (or owner/operator)
- estimates of profit and loss projections for each forward period
- financial performance to date (where applicable)
- likely return on investment
- monthly, quarterly or annual returns
- non-recurrent asset calculations
- profit, turnover, capital and equity targets
- projected profit targets, pricing strategies, margins
- projections of likely financial results (budgeting)
- projections, which may vary depending on importance of such information and stage in life of business
- resources required to implement proposed marketing and production strategies (staff, materials, plant and equipment)
- review of financial inputs required (sources and forms of finance)
- risks and measures to manage or minimise risks
- working, fixed, debt and equity capital
- achievable, measurable, realistic, time defined
- customer needs
- family benefits
- goal and objective plans, systems and processes
- lifestyle issues
- market focus of business
- short, medium, or long-term goals
- social responsibility
- Australian Bureau of Statistics (ABS)
- chambers of commerce information
- client surveys
- data about existing clients and possible new clients
- data from external sources such as other like businesses, industry

Business goals and objectives include one or more of the following:

Market research data includes one or more of the following:



	<ul style="list-style-type: none"><li>associations and regulators</li><li>industry reports</li><li>internet</li><li>libraries</li><li>personal interviews</li><li>primary market research</li><li>secondary market research (available research by other people)</li><li>small business surveys</li><li>telephone surveys</li><li>trade associations/journals</li></ul>
Competitor analysis includes one or more of the following:	<ul style="list-style-type: none"><li>competitor:<ul style="list-style-type: none"><li>offerings</li><li>profile in market place</li><li>promotion strategies and activities</li></ul></li></ul>
Market position includes one or more of the following:	<ul style="list-style-type: none"><li>data on:<ul style="list-style-type: none"><li>augmented product (total package of features/benefits)</li><li>communication</li><li>core product and/or the goods or services provided</li><li>cost components</li><li>distribution strategies</li><li>market position</li><li>marketing channels</li><li>new/changed products</li><li>place</li><li>price</li><li>pricing objectives (profit, market penetration)</li><li>pricing strategies (cost plus, supply/demand, ability to pay)</li><li>product services or mix of services</li><li>product/services differentiation from competitors</li><li>promotion</li><li>promotion budget</li><li>promotional strategies</li><li>tangible product (what is perceived)</li><li>target audience</li></ul></li></ul>
Business brand includes one or more of the following:	<ul style="list-style-type: none"><li>attention, interest, desire, action (AIDA)</li><li>business image</li><li>practice/business logo/letterhead/signage</li><li>facility decor</li><li>phone answering protocol</li></ul>

	<ul style="list-style-type: none"> <li>• slogans</li> <li>• style guide</li> <li>• templates for communication/invoicing</li> <li>• writing style</li> </ul>
Benefits must include:	<ul style="list-style-type: none"> <li>• benefits as perceived by client</li> <li>• features as perceived by client</li> </ul>
Promotional tools include one or more of the following:	<ul style="list-style-type: none"> <li>• advertising</li> <li>• brochures</li> <li>• direct mail</li> <li>• networking and referrals</li> <li>• newsletters (print and/or electronic)</li> <li>• press releases</li> <li>• publicity and sponsorship</li> <li>• seminars</li> <li>• telemarketing/cold calling</li> <li>• websites</li> </ul>
Applicable legislation includes one or more of the following:	<ul style="list-style-type: none"> <li>• consumer protection</li> <li>• corporate governance</li> <li>• marine insurance</li> <li>• marine Safety (Domestic Commercial Vessel) National Law</li> <li>• National Standard for Commercial Vessels (NSCV)</li> <li>• trade practices</li> <li>• work health and safety/occupational health and safety (WHS/OHS)</li> </ul>
Yield per existing client includes one or more of the following:	<ul style="list-style-type: none"> <li>• packaging fees</li> <li>• raising charge out rates/fees</li> <li>• reducing discounts</li> <li>• selling more services to existing clients</li> </ul>
Promotional package includes one or more of the following:	<ul style="list-style-type: none"> <li>• directing to existing or new clients</li> <li>• client newsletters or bulletins</li> <li>• media advertising (radio, television, newspapers, trade journals, direct marketing)</li> <li>• product service brochures</li> <li>• products or give-a-ways and third party services</li> <li>• sponsorship</li> </ul>

## Unit Mapping Information

This unit replaces and is equivalent to MARM5009A Establish a marine surveyor practice.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARM019 Establish a marine surveyor practice

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- accessing and interpreting relevant information
- accessing and updating records electronically
- accessing web-based information services
- applying relevant work health and safety/occupational health and safety (WHS/OHS) requirements and work practices
- assessing business performance
- communicating effectively with others as required
- determining and confirming information using questioning and active listening techniques
- developing effective planning documents
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- liaising with others and sharing information
- making presentations
- managing databases and projects
- marketing products and services
- negotiating effectively with clients and others
- performing calculations related to achieving required outcomes
- planning and sequencing work
- reading and interpreting documentation from a variety of sources
- recording and consolidating relevant related information
- solving problems
- using computer applications (word processing, spreadsheet, database, specific purpose computer systems) to assist in achieving required outcomes
- using language and concepts appropriate to cultural differences
- using statistical/data analysis and interpretation.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- business/organisational policy and procedure development and implementation
- commonwealth, state/territory and local government legislative requirements relating to business operations, especially in regard to:
  - anti-discrimination
  - due diligence
  - equal employment opportunity
  - governance requirements
  - industrial relations
  - WHS/OHS and environmental issues
- how to acquire and interpret relevant data
- industry:
  - compliance requirements
  - market position relative to type of survey and business operations
- information technology and communications systems
- marketing and promotional principles
- methods of evaluating current industry/organisation product and marketing mix
- planning processes
- preparation of a business plan
- principles of risk management relevant to business planning
- relevant:
  - common law, legal systems and procedures
  - industry codes of practice
- reasons for and benefits of, business planning
- setting goals and objectives
- types of business planning:
  - feasibility studies
  - strategic, operational, financial and marketing planning
- WHS/OHS legislation, policies and procedures.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site that replicates workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials and personal protective equipment currently used in industry.

Performance should be demonstrated consistently over time and in a suitable range of contexts.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARN001 Apply general purpose hand skills aboard a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to perform general purpose hand duties aboard a vessel.

This unit applies to general purpose hands working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

N – Seamanship

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

### **1 Use and maintain ropes**

- 1.1 Rope types and common areas of use are correctly identified
- 1.2 Ropes are checked for wear and any damage is reported according to workplace procedures
- 1.3 Ropes are coiled and stowed correctly
- 1.4 Knots and hitches are tied neatly and securely, and are used according to their correct application

- |   |     |   |
|---|-----|---|
|   | 1.5 | Ropes are spliced neatly and securely according to their correct application and rope ends are whipped where instructed, to maintain good condition   |
| <b>2 Operate deck machinery and emergency stops</b>                                 | 2.1 | Prior to use, deck machinery is checked and prepared for operation  |
|   | 2.2 | Operations are carried out safely according to instructions and standard operating procedures (SOPs) or organisational safety management system (SMS) |
|   | 2.3 | Emergency stops on motor and machinery are operated in response to an emergency situation   |
| <b>3 Assist in securing vessel at anchor</b>  | 3.1 | Prior to letting go, anchor and equipment are prepared as instructed and organisational communications are followed                                   |
|   | 3.2 | Instructions provided are complied with in relation to quantity of anchor cable run out or recovered  |
|   | 3.3 | During operation, control of cable is maintained within safe operating limits   |
|   | 3.4 | On completion of anchoring operations, anchor and equipment are secured according to instructions   |
|   | 3.5 | Throughout all operations, anchoring area is kept free of loose ropes, wires and debris   |
| <b>4 Assist in securing and adjusting vessel position during mooring operations</b> | 4.1 | At all times, mooring lines and associated equipment are handled safely   |
|   | 4.2 | Mooring plan and organisational communications are followed   |
|   | 4.3 | Throughout mooring operations, mooring area is kept free of loose ropes, wires and debris   |
|   | 4.4 | Tension on ropes is maintained at an appropriate level for the stage and nature of the operation  |
|   | 4.5 | Mooring lines are secured according to instructions provided  |
|   | 4.6 | Equipment malfunction or problems encountered during operations are promptly reported   |
| <b>5 Assist in securing vessel for sea</b>  | 5.1 | Cargo and cargo handling equipment are checked to ensure they are stowed securely   |



- 5.2 Hatches and openings are checked to ensure they are secured as required
- 5.3 Maintenance equipment is returned to storage location and secured
- 5.4 Assistance is provided in testing equipment as instructed
- 5.5 All mooring lines are stowed and secured
- 5.6 Assistance is provided in stowing the gangway
- 6 Perform tasks aloft and over vessel side**
  - 6.1 Area and equipment for working aloft or over the side are prepared as instructed
  - 6.2 Required precautions are taken when working aloft or over the side
  - 6.3 Chairs, safety harnesses and appropriate safety equipment are used according to workplace procedures
  - 6.4 Tasks are completed safely according to instructions and organisational SMS
  - 6.5 After use, equipment is maintained and stored
- 7 Assist with safe refuelling operations**
  - 7.1 All personal protective equipment is accessed and used
  - 7.2 Safety boundary for the refuelling process is established
  - 7.3 Instructions are followed to ensure spill prevention systems are correctly deployed
  - 7.4 Instructions are followed in completing tasks related to the refuelling or fuel transfer process

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Rope types include one or more of the following:

- braided
- Kevlar
- natural fibre
- polyester
- plaited
- wire core rope
- wire rope

Knots and hitches must include:

- bowline
- clove hitch
- eye splice
- reef knot
- round turn and two half hitches
- rolling hitch
- short splice

Deck machinery includes one or more of the following:

- capstans
- cranes
- derricks
- winches
- windlasses

Operations must include:

- anchoring in varying weather conditions
- berthing and unberthing
- loading or discharging

Mooring lines include one or more of the following:

- back springs
- bow and stern ropes
- breast lines
- fore and aft springs

Mooring operations include one or more of the following:

- adjustments from both fore and aft mooring positions
- making fast and letting go to a single-point mooring
- making fast and letting go fore and aft to a wharf
- rigging and recovering means of access to the vessel

Tasks include one or more of the following:

- hull maintenance
- painting
- renewing wires and ropes

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARN1001A Apply general purpose hand skills aboard a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARN001 Apply general purpose hand skills aboard a vessel**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchoring in varying weather conditions
- assisting in different types of mooring operations
- handling ropes and wires
- implementing safe and environmentally responsible work practices
- lashing cargo
- performing an eye splice, back splice and a short splice
- performing common whipping on ropes
- securing equipment and objects for sea passage, transit in port or ready for use
- tying common knots, bends and hitches
- using capstans
- using cranes and derricks
- using different anchoring and mooring winches
- using synthetic rope and wire mooring lines.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anchor cable markings
- characteristics of different types of mooring ropes
- construction of different types of rope
- correct application of common knots, bends and hitches
- correct terminology
- different configurations of mooring lines for various parts of a vessel
- different types of anchor
- emergency stop procedures
- hazards that could occur if the operation is not properly controlled
- maintenance of different types of rope
- means of access

- organisational:
  - safety management system (SMS)
  - standard operating procedures (SOPs)
- procedures for working in confined spaces
- refuelling procedures
- requirements for access equipment
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARN004 Manage seaworthiness of a vessel up to 80 metres

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to manage vessel in a seaworthy condition for all stages of a voyage or operation being undertaken.

This unit applies to people working in the maritime industry on a range of vessels up to 80 metres.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

N – Seamanship

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Supervise weather tight and watertight integrity of vessel**

- 1.1 Principal structural components of vessel are identified from vessel drawings to understand the function of these components in relation to conventional vessel design
- 1.2 Pumping and pipeline systems of vessel are investigated to establish survivability of vessel in case of flooding and damage control
- 1.3 Procedures for maintaining weather tight and watertight

- integrity of vessel are interpreted and implemented according to vessel safety management plan and regulations
- 1.4 Crew are instructed on requirements of plan and their responsibilities
  - 1.5 Actions are instigated to confirm weather tight and watertight integrity of vessel at all times
- 2 Take action to meet changed sea and weather conditions**
- 2.1 Weather forecasts and observations of sea and weather conditions are used to predict situations that may jeopardise vessel weather tight and watertight integrity
  - 2.2 Effect of severe wind and rolling in associated sea conditions on vessel weather tight and watertight integrity is recognised
  - 2.3 Effect of water on deck on vessel weather tight and watertight integrity is ascertained
  - 2.4 Appropriate action is taken to maintain vessel weather tight and watertight integrity according to organisational procedures
- 3 Maintain records**
- 3.1 Relevant documents and records are completed and maintained as required according to regulatory and organisational requirements
  - 3.2 Relevant documents are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements
  - 3.3 Documents are stored according to regulatory and organisational requirements

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Structural components must include:	<ul style="list-style-type: none"><li>• design characteristics attributing to watertight integrity</li><li>• principal components of vessel structure</li><li>• structural arrangements to restrain fires</li><li>• watertight and collision bulkheads</li></ul>
Actions include one or more of the following:	<ul style="list-style-type: none"><li>• closing openings</li><li>• ensuring passenger distribution does not exceed allowed limits</li><li>• ensuring stores, cargo and equipment are properly stowed and lashed</li><li>• establishing procedures for restoring or managing weather tight and watertight integrity during an emergency</li><li>• maintaining stability condition within approved limits</li><li>• methods for testing tanks and other watertight openings</li></ul>
Relevant documents and records include one or more of the following:	<ul style="list-style-type: none"><li>• deck and official logbook entries</li><li>• notes of protest</li><li>• safety management plan</li></ul>

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARN4001A Manage seaworthiness of a vessel up to 80 metres.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



# **Assessment Requirements for MARN004 Manage seaworthiness of a vessel up to 80 metres**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- appropriately using bilge and other pumping arrangements
- assessing damage control measures
- completing required records
- maintaining weather tight and watertight integrity of vessel
- reading and interpreting vessel specifications, drawings and operational manuals.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- bilge pumping arrangements
- different vessel types
- effects of adding and removing weights, water on deck, slack tanks, rolling period, stiff and tender vessel, additions or alterations to vessels
- principal parts of vessel and their various functions
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## **Assessment Conditions**

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARN005 Maintain seaworthiness of a vessel

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to maintain the seaworthiness of a vessel.

This unit applies to people working in the maritime industry as a Watchkeeper Deck, a Master up to 500 gross tonnage (GT), or a Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

N – Seamanship

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |     |  |     |   |     |   |     |  |
|---|--|-----|--|-----|---|-----|---|-----|--|
| <b>1 Check weather tight and watertight integrity of vessel</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Structural members of vessel are investigated to establish weather tight and watertight requirements of vessel</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Inspections of vessel are planned according to regulatory and organisational requirements</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Checks are completed to confirm weather tight and watertight integrity of vessel at all times</td></tr><tr><td style="vertical-align: top;">1.4</td><td>Defects and damage to vessel are identified and reported</td></tr></table> | 1.1 | Structural members of vessel are investigated to establish weather tight and watertight requirements of vessel | 1.2 | Inspections of vessel are planned according to regulatory and organisational requirements | 1.3 | Checks are completed to confirm weather tight and watertight integrity of vessel at all times | 1.4 | Defects and damage to vessel are identified and reported |
| 1.1   | Structural members of vessel are investigated to establish weather tight and watertight requirements of vessel   |     |  |     |   |     |   |     |  |
| 1.2   | Inspections of vessel are planned according to regulatory and organisational requirements  |     |  |     |   |     |   |     |  |
| 1.3   | Checks are completed to confirm weather tight and watertight integrity of vessel at all times  |     |  |     |   |     |   |     |  |
| 1.4   | Defects and damage to vessel are identified and reported   |     |  |     |   |     |   |     |  |

- according to organisational procedures
- 2 Take action to meet environmental changes**
- 2.1 Anticipated sea and weather conditions are analysed to identify situations that may jeopardise vessel weather tight and watertight integrity
- 2.2 Effect of severe wind and rolling in associated sea conditions on vessel weather tight and watertight integrity is recognised
- 2.3 Effect of water on deck on vessel weather tight and watertight integrity is ascertained
- 2.4 Appropriate action is taken to maintain vessel weather tight and watertight integrity according to organisational procedures
- 3 Maintain records**
- 3.1 Relevant documents and records are completed and maintained as required according to regulatory and organisational requirements
- 3.2 Relevant documents are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements
- 3.3 Documents are stored according to regulatory and organisational requirements

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Structural members of vessel include one or more of the following:	<ul style="list-style-type: none"><li>• bulkheads including the collision bulkhead</li><li>• frames</li><li>• freeboard deck</li><li>• hatch and tank openings</li><li>• longitudinal and transverse girders</li><li>• shell plating</li><li>• tank tops</li><li>• various types of keel arrangements</li><li>• watertight and weather tight compartments</li></ul>
Inspections of vessel includes one or more of the following:	<ul style="list-style-type: none"><li>• inspection of hull and fittings during dry-docking</li><li>• inspections required after completion of maintenance work</li><li>• inspections required after docking prior to refloating</li><li>• inspections to be made after any situation which may have caused damage to the vessel</li><li>• pre sailing inspections</li><li>• routine inspections</li></ul>
Defects and damage include one or more of the following:	<ul style="list-style-type: none"><li>• corrosion to operating or structural parts of the vessel</li><li>• damage to the vessel through cargo shift</li><li>• hatch cover seals</li><li>• structural damage through collision, grounding or fire</li><li>• watertight door seals and closing arrangements</li></ul>
Situations that may jeopardise vessel weather tight and watertight integrity include one or more of the following:	<ul style="list-style-type: none"><li>• collision, grounding or fire</li><li>• failure to conduct appropriate inspections</li><li>• heavy weather damage</li></ul>
Appropriate actions include one or more of the following:	<ul style="list-style-type: none"><li>• avoiding adverse weather</li><li>• checking the security of the vessel</li><li>• closing openings</li><li>• ensuring appropriate equipment is in readiness for damage control</li><li>• ensuring free surface is minimised in ballast and fuel tanks</li><li>• ensuring freeing ports allow water taken on deck to clear</li><li>• ensuring passenger distribution does not exceed allowed limits</li><li>• ensuring stores, cargo and equipment are properly stowed and</li></ul>

lashed

- establishing procedures for restoring or managing weather tight and watertight integrity during an emergency
- maintaining the stability condition within approved limits
- testing of tanks and other watertight areas

Relevant documents and records include one or more of the following:

- equipment manufacturer instructions
- logbooks, including oil record and garbage log books as applicable
- organisational operation orders under the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM) Code
- plans and drawings
- relevant maritime regulations and legislative requirements
- stability data manual

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARN5001A Maintain seaworthiness of a vessel.

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARN005 Maintain seaworthiness of a vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- completing required records
- reading and interpreting vessel specifications and drawings
- taking actions to ensure and maintain the weather tight and watertight integrity of vessel.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- application of appropriate safety, environment and hazard control procedures
- characteristics of stress and the principal stresses acting on a vessel
- corrosion control methods
- damage control measures that may be required to maintain the integrity of the hull
- fundamental actions to be taken in the event of partial loss of intact buoyancy
- fundamentals of watertight integrity
- maintenance procedures contained in the safety management system
- one's surroundings and changes to these surroundings
- principal materials used in the construction of a vessel
- principal structured members and layout of a vessel and the proper names for various parts
- principles and procedures to ensure the watertight integrity of vessel hull
- procedures for checking and inspecting vessel seaworthiness
- stability, trim and stress tables, diagrams and stress calculating equipment
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## MARN006 Manage cargo operations

### Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

### Application

This unit involves the skills and knowledge required to plan and ensure safe loading, stowage, securing and care during the voyage and unloading of cargo.

This unit applies to maritime workers in the maritime industry.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Not applicable.

### Competency Field

N – Seamanship

### Unit Sector

Not applicable.

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

#### 1 Develop cargo plan

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Cargo properties and characteristics are identified and their impact on safety, the environment and vessel operations are outlined
- 1.2 Communication is conducted with terminal personnel to establish loading and unloading arrangements

- 1.3 Information and equipment is used in planning, to ensure hull stress is kept within acceptable limits
- 1.4 Cargo plan is prepared according to legislative and organisational requirements
- 2 Oversee cargo operations**
  - 2.1 Preparations for loading are monitored according to the cargo plan and organisational procedures
  - 2.2 Regulations, procedures and instructions are interpreted to ensure that cargo is correctly identified, inspected and confirmed against documentation
  - 2.3 Communication is maintained with crew and terminal personnel involved in cargo loading/unloading to facilitate loading/unloading
  - 2.4 Cargo operations are managed to ensure they comply with regulations, procedures and instructions
  - 2.5 Vessel stability is monitored during loading/unloading operations
  - 2.6 Ballast management procedures are carried out according to organisational procedures and port authority requirements
  - 2.7 Action is taken in a cargo handling incident or emergency to secure the cargo and the vessel and to maintain the safety of persons involved
  - 2.8 All cargo handling documentation is completed according to organisational procedures and regulatory requirements
- 3 Comply with legislation for dangerous cargo**
  - 3.1 Regulations, procedures and instructions are interpreted to ensure that dangerous cargo is correctly identified, inspected and confirmed against documentation, prior to cargo operations
  - 3.2 Information regarding dangerous cargo is made readily available in an incident
  - 3.3 Cargo operations are managed to ensure they comply with regulations, operational and security procedures, and cargo plan
  - 3.4 Safety data sheets (SDSs)/material safety data sheets (MSDSs) are accessed and interpreted to identify relevant cargo-related hazards to vessel and to personnel

- 3.5 Procedures for safety and safety management are identified and documented
- 3.6 Hazards associated with dangerous cargo are identified and action is taken to minimise risk to personnel, cargo, vessel and the environment
- 3.7 Action is taken in a dangerous cargo handling incident or emergency to secure cargo and vessel, and to maintain the safety of persons involved
- 3.8 All documentation is completed according to organisational procedures and regulatory requirements

#### **4 Manage the care of cargo during the voyage**

- 4.1 Plan for the care of cargo during the voyage is prepared according to organisational and customer requirements, and relevant regulations
- 4.2 Cargo care operations are managed to ensure they comply with regulations, procedures and instructions
- 4.3 Cargo stowage and security is managed to ensure stability and stress conditions remain within safe limits at all times during the voyage
- 4.4 Extent and frequency of cargo condition monitoring is determined appropriate to its nature and prevailing conditions
- 4.5 Hazards associated with cargo stowage are identified and action is taken to minimise risk to personnel, cargo, vessel and the environment
- 4.6 Unacceptable or unforeseen variations in the condition or specification of the cargo is promptly recognised and remedial action is taken immediately to safeguard the safety of the vessel and those on board
- 4.7 All documentation is completed according to organisational procedures and regulatory requirements

#### **5 Manage emergencies related to cargo**

- 5.1 On becoming aware of emergency, initial actions are taken according to contingency plans, urgency of the situation and nature of the emergency
- 5.2 Onboard personnel are given information and instructions clearly and accurately
- 5.3 Procedures are implemented to combat emergency and protect persons on board

5.4 Communications are established with others to facilitate the emergency response process

5.5 Injured persons are provided with assistance

5.6 Contact is maintained with others at all times to keep them briefed on the emergency response process

5.7 Preparation for abandoning vessel is undertaken, if required

5.8 Cessation of emergency is communicated to appropriate personnel

## **6 Prevent pollution of the environment**

6.1 Procedures to prevent pollution are identified and observed at all times

6.2 Measures to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures

6.3 All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud

6.4 Shore-based response personnel are promptly notified when a vapour leak or cloud occurs

## **7 Complete documentation related to cargo**

7.1 Correct logbook entries are made relating to cargo operations and incidents according to regulatory requirements and organisational procedures

7.2 Letter of protest is completed in an incident relating to cargo operations and care

7.3 Cargo reports and documentation are completed and maintained according to regulatory requirements and organisational procedures

7.4 Independent cargo surveyor reports are received and acknowledged as required

7.5 Cargo samples are correctly documented and secured as required

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Cargo includes one or more of the following:

- chemicals and oils
- explosives
- general cargo, break bulk, unitised or in containers
- hazardous or dangerous goods
- heavy lifts
- liquids in portable containers
- liquefied gas
- livestock
- mineral concentrates
- refrigerated cargo
- scrap, pig iron ingots, steel coils and sheets
- solid bulk materials
- timber and deck cargo

Information and equipment includes one or more of the following:

- automatic data-based (ADB) equipment
- bulk Cargo Codes
- calculations relating to drafts, deadweight, stability, trim and stress
- cargo and lashing codes
- International Maritime Dangerous Goods (IMDG) Code
- knowledge of ballasting and deballasting procedures
- relevant Australian Maritime Safety Authority (AMSA) Marine Orders
- requirements for loading and care of various cargo types
- requirements for the carriage of grain, grain stability and timber cargo
- shipboard data including drawings, load limitations, safe working loads
- stability and trim diagrams
- stress-calculating equipment

Cargo plan includes:

- allocating cargo containers requiring refrigeration appropriate spaces
- avoiding incompatible cargo stowage
- calculations relating to stability and stress
- ensuring cargo is evenly distributed to maintain acceptable trim at all phases of the voyage
- ensuring the unloading sequence is effective
- observing regulations relating to hazardous material/dangerous goods stowage

Preparations for loading include one or more of the following:

- checking hatch covers for water tightness
- checking holds to ensure they are clean, dry and free of smell
- covering bilges with tarpaulins/wrappers before loading as required
- ensuring survey certification for all cargo handling equipment is valid and cargo record book is available for inspection
- following confined space entry procedures as required
- inspecting access arrangements in holds to ensure they are in a safe condition
- reviewing supplies of dunnage, mats and cargo securing equipment to ensure sufficient are available

Cargo handling incidents or emergencies include one or more of the following:

- cargo shift
- damaged cargo
- damaged dangerous goods and escaping cargo or fumes
- failure of cargo handling equipment, including lashings
- failure of refrigeration machinery
- fire in cargo spaces
- incorrect ventilation
- incorrectly stowed cargo
- spontaneous combustion

Cargo handling documentation includes one or more of the following:

- cargo gear register
- cargo plan
- letter of protest
- logbook
- ship/shore safety and security checklists
- stability, trim and stress records

- Cargo care operations include one or more of the following:
- checking cargo lashings
  - maintaining ventilation requirements
  - monitoring cargo temperatures liable to spontaneous combustion
  - monitoring refrigerated cargo temperatures
- Initial actions include one or more of the following:
- contact with relevant authorities and organisational personnel
  - locating fire as a result of fire, smoke or fire alarms
  - positioning vessel to minimise effects of weather and sea conditions
  - securing cargo when safe to do so

## Unit Mapping Information

This unit replaces and is equivalent to MARN6001A Manage cargo operations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARN006 Manage cargo operations

## Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package Release 3.0.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargo
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and effectively, establishing effective communications and improving working relationships
- conducting and recording tests and inspections of cargo handling equipment according to regulations and organisational procedures
- conducting loading and unloading operations to ensure safe stowage of cargo, vessel stability, trim and stress limitations are not exceeded at any time
- correctly identifying safety data sheets (SDSs)/material safety data sheets (MSDSs), relevant cargo-related hazards to vessel and personnel, and taking appropriate action according to organisational procedures
- developing effective planning documents and providing high quality reports
- ensuring currency of relevant regulatory and legislative knowledge
- establishing procedures for safe cargo handling according to provisions of the relevant instruments such as International Maritime Dangerous Goods (IMDG) Code, International Maritime Solid Bulk Cargoes (IMSBC) Code, International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 Annexes III and V and other relevant information
- interpreting and applying knowledge of bulk ships, containers and container ships, chemical and oil tanker, and liquefied gas tanker layouts, platform supply vessels, roll on roll off carriers, cargo features, and characteristics applying available shipboard data related to loading, care and unloading of cargo
- using draft survey methods to determine cargo quantities and vessel displacement
- using stability and trim diagrams, and stress-calculating equipment to keep hull stress and stability within acceptable limits at all times
- recognising problems and hazards that can arise when managing safety on chemical and oil tankers, and liquefied gas tankers, taking appropriate remedial action and initiating



appropriate solutions.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- application of ventilation requirements for various cargo
- bulk ship, chemical and oil tanker layouts, and liquefied gas tanker layouts, cargo features and characteristics
- confined space entry procedures
- dangerous goods classification, signage, stowage and segregation requirements under the IMDG Code and relevant Marine Orders
- effect on trim and stability of cargo and cargo operations
- hazards and control measures associated with bulk ship, chemical and oil tanker, liquefied gas tanker cargo operations
- IMDG Code, IMSBC Code, MARPOL 73/78 Annexes III and V and other relevant information including Australian Maritime Safety Authority (AMSA) Marine Orders and Notices relating to cargo carriage, loading and unloading
- international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargo
- loading and unloading operations with special regard to the transport of cargo identified in the Code of Safe Practice for Cargo Stowage and Securing
- loading cargo and ballasting to keep hull stress within acceptable limits
- maintenance of survey certification required for cargo handling equipment
- relevant firefighting operations and the use of firefighting equipment
- relevant sections of maritime regulations, codes and conventions related to chemical and oil tankers, and liquefied gas tankers
- stowage and securing of cargo on board vessels including cargo-handling gear, and securing and lashing equipment
- WHS/OHS requirements and work practices
- world load line zones and associated draft limitations.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations or where these are not available, in simulated workplace operational situations or an industry-approved marine operations site where the oversight of cargo operations can be observed.

Resources for assessment include access to:

- gas monitoring equipment including:
  - gas monitoring instruments
  - oxygen indicators
- firefighting equipment including:
  - firefighting agents
  - fixed dry chemical systems
  - fixed foam systems
  - portable foam systems
- relevant documentation including cargo handling documentation, cargo plan, workplace procedures, regulations, codes of practice and operation manuals
- tools, cargo handling equipment, piping systems and valves, and personal protective equipment currently used in industry and required for cargo operations.
- 

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARN007 Use seamanship skills on board a vessel**

### **Modification History**

Release 1. New unit of competency.

### **Application**

This unit involves the skills and knowledge required to apply practical seamanship skills as part of operations on a vessel.

This unit applies to an Integrated Rating or Able Seafarer-Engine/Deck who assists the responsible officer in a range of seamanship activities on a range of vessels.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

N – Seamanship

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

#### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Use and maintain ropes and wires**

#### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Knots, splices, stoppers, whippings and servings are created and used in the course of operations on board a vessel

- 1.2 Ropes are spliced neatly and securely according to their correct application and rope ends are whipped as required to maintain good condition
  - 1.3 Breaking strain and safe working loads of rope and wire is determined and applied as load limits in the course of operations on board a vessel
  - 1.4 Wear and damage to rope and wire are identified and recorded
  - 1.5 Rope and wire are maintained and stored according to organisational procedures
- 2 Secure vessel at anchor**
  - 2.1 Anchor and equipment are prepared for use according to organisational procedures
  - 2.2 Control of cable is maintained within safe operating limits during anchoring operations
  - 2.3 Anchor and equipment are secured on completion of anchoring operations as instructed for anticipated forecast conditions
  - 2.4 Anchoring area is kept free of loose ropes, wires and debris during all operations
- 3 Secure vessel at a berth**
  - 3.1 Mooring lines and associated equipment are handled safely at all times
  - 3.2 Mooring area is kept free of loose ropes, wires and debris throughout operations
  - 3.3 Rope stoppers are correctly applied to transfer mooring lines when securing vessel or tug
  - 3.4 Securing a tug using tug or ships lines is carried out safely and tug lines are monitored at all times
  - 3.5 Tension on ropes is maintained at an appropriate level for stage and nature of the operation
  - 3.6 Tension on shore-power leads and other umbilicals is monitored
- 4 Lash and secure stores, cargo and access ways**
  - 4.1 Lashing equipment is inspected, maintained and correctly stored after use according to organisational procedures
  - 4.2 Cargo is stowed according to recognised principles and organisational procedures relating to transporting and

- handling dangerous goods
- 4.3 Cargo is lashed and secured according to recognised principles and organisational procedures
  - 4.4 Equipment and items on deck and in galley spaces are secured according to organisational procedures
  - 4.5 Personnel access ways are rigged and secured according to organisational procedures
  - 4.6 Accommodation spaces and personnel facilities on board vessel are checked and correctly secured for sea according to organisational procedures
- 5 Conduct fuelling and oil transfer operations**
- 5.1 Appropriate personal protective equipment is accessed and used
  - 5.2 Safety boundary for fuelling and transferring operations is established
  - 5.3 Spill prevention systems are correctly deployed
  - 5.4 Tank levels are correctly measured and reported pre- and post-fuelling and transferring operations
  - 5.5 Fuelling and transferring operations are performed safely, and associated valves and pipelines are secured on completion to avoid spillages
  - 5.6 Appropriate action is taken to handle incidents arising during fuelling and transferring operations according to organisational procedures and regulatory requirements
  - 5.7 Effective communication is maintained with crew during fuelling and transferring operations to ensure the safety and integrity of the vessel and crew

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |  |  |
|--|--|
| Anchor and equipment include one or more of the following: | <ul style="list-style-type: none"><li>• anchors and cables</li><li>• anchor buoy</li><li>• anchor securing arrangements</li><li>• anchor windlass</li><li>• sea anchor</li></ul> |
| Lashing equipment includes one or more of the following:   | <ul style="list-style-type: none"><li>• chains</li><li>• ropes</li><li>• tensioning device</li><li>• webbing</li><li>• wires</li></ul>   |
| Incidents include one or more of the following:            | <ul style="list-style-type: none"><li>• failure of communications systems</li><li>• leakage from faulty valves and hoses</li><li>• tank overflow</li></ul>                       |

## Unit Mapping Information

This unit replaces and is equivalent to MARN3002A Use seamanship skills on board a vessel.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARN007 Use seamanship skills on board a vessel

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- anchoring a vessel in varying weather conditions
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices including:
  - chemical and biohazard safety
  - lifting techniques and methods of preventing back injury
- coiling and stowing ropes correctly
- ensuring currency of relevant legislative and regulatory knowledge
- handling ropes and wires safely
- handling, stowing and securing dangerous, hazardous and harmful substances and liquids safely
- identifying and correctly using personal protective equipment
- lashing and securing moveable equipment, especially on deck, in holds and freezers
- measuring and reporting tank levels correctly
- operating anchoring equipment under various conditions such as anchoring, weighing anchor, securing for sea and in emergencies
- performing:
  - eye splice, joining and a short splice in 3 strand hawser laid rope
  - appropriate whippings on ropes and line
  - eye and joining splice in 8 strand multiplait mooring rope
  - eye splice (with locking tuck) in 6 strand flexible steel wire rope
- preparing and throwing a heaving line
- securing a vessel at its berth according to operational requirements
- securing from fuelling and transferring operations
- tying a figure-eight knot, reef knot, bowline, half hitch, clove hitch, round turn and two half hitches, rolling hitch, sheet bend and timber hitch
- using basic crane, winch and hoist signals
- using knots and hitches and securing arrangements.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic crane, winch and hoist signals
- capacities, safe working loads and breaking strengths of mooring equipment
- correct application of common knots and hitches
- dangers of working with ropes under tension
- different type of personal protective equipment and their application
- function of mooring and tug lines and how each line functions as part of an overall system
- maintenance of different types of rope, wire and chain
- methods of securing cargo including vehicles, stores and equipment on a vessel before it puts to sea
- preparations for fuelling and transfer operations
- procedures and order of events associated with mooring to a buoy or buoys
- procedures and order of events for making fast and letting go mooring, tug lines and wires
- procedures and precautions for safe handling, stowage and securing of cargo and stores, including dangerous, hazardous and harmful substances and liquids
- procedures for connecting and disconnecting fuelling and transfer hoses
- procedures relating to incidents that may arise during fuelling and transferring operations
- purpose and application of lock out tags
- purpose and application of the Australian Dangerous Goods (ADG) Code or International Maritime Dangerous Goods (IMDG) Code
- purpose of a permit to work and restricted access guidelines
- purpose of safety data sheets (SDSs)/material safety data sheets (MSDSs)
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- safe working practices, procedures and personal shipboard safety when working aloft
- safe working practices, procedures and personal shipboard safety when working over the side
- types of anchors, principles, method of operation and use in various conditions.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of



assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment of seamanship skills must occur in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, materials and personal protective equipment that replicate and are currently used in industry
- deck equipment and machinery including:
  - bow and stern cargo doors
  - cam lock fittings
  - fast rescue craft davits/workboat davit
  - gangways
  - hatches and hatch covers
  - helidecks
  - hoists
  - pilot ladders
  - rollers
  - rat-guards
  - side doors
  - shark jaws
  - tow pins
- mooring lines and associated equipment including:
  - bitts
  - bollards
  - capstan
  - chocks
  - mooring wires
  - multiplait mooring lines
  - synthetic and fibre lines
  - tug lines and wires
  - winches
  - windlass.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARN008 Apply seamanship skills aboard a vessel up to 12 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Application**

This unit involves the skills and knowledge required to apply practical seamanship skills and techniques as part of work duties aboard a vessel up to 12 m in length.

This unit applies to people working in the maritime industry in the capacity of:

- coxswain on vessels <12 m in length, with propulsion power that is unlimited for an outboard engine or <500 kW for an inboard engine, operating in inshore or designated waters or
- coxswain on tenders or auxiliary vessels operating within 3 nautical miles (nm) of a parent vessel within the exclusive economic zone (EEZ).

## **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Coxswain Grade 2 NC and Coxswain Grade 1 NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months relevant sea service, or
- a relevant seafarer certificate, as master, engineer or deck officer, issued under the Navigation Act 2012.

## **Pre-requisite Unit**

Not Applicable

## **Competency Field**

N – Seamanship

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1 Use and maintain ropes

- 1.1 Rope types and common areas of use are correctly identified
- 1.2 Ropes are checked for wear and repairs are undertaken according to manufacturer guidelines
- 1.3 Ropes are coiled and stowed correctly
- 1.4 Knots and hitches are tied neatly and securely, and are used according to their correct application
- 1.5 Ropes are spliced neatly and securely according to their correct application
- 1.6 Rope ends are whipped where appropriate to maintain good condition

#### 2 Secure vessel at anchor

- 2.1 Prior to letting go, anchor and equipment are prepared
- 2.2 Quantity of anchor cable run out or recovered is appropriate to the depth of water, weather and sea conditions, and tidal range in area of operation
- 2.3 During operation, control of cable is maintained within safe operating limits
- 2.4 Degree to which anchor and equipment are secured on completion of anchoring operations is appropriate to forecast conditions
- 2.5 During all operations, anchoring area is kept free of loose ropes, wires and debris

#### 3 Secure vessel at a berth

- 3.1 At all times, mooring lines and associated equipment are handled safely

- |  |            |   |
|--|------------|---|
|  | <b>3.2</b> | Throughout operations, mooring area is kept free of loose ropes, wires and debris   |
|  | <b>3.3</b> | Tension on ropes is maintained at an appropriate level for the stage and nature of the operation  |
| <b>4 Check condition and seaworthiness of vessel</b> | <b>4.1</b> | Coverage and frequency of checks and inspections on vessel seaworthiness are undertaken according to workplace procedures and organisational safety management system |
|  | <b>4.2</b> | Watertight integrity is checked and appropriate action is taken to prepare for prevailing and forecast weather and sea conditions                                     |
|  | <b>4.3</b> | Degree to which vessel is secured is appropriate to prevailing and forecast conditions  |
|  | <b>4.4</b> | Irregularities are identified and appropriate action is taken to rectify the situation  |
|  | <b>4.5</b> | Irregularities beyond ability to rectify are reported in time to enable remedial action to be taken   |
|  | <b>4.6</b> | Reports of condition are completed according to workplace procedures  |
| <b>5 Conduct refuelling operations</b>               | <b>5.1</b> | All personal protective equipment (PPE) is accessed and used  |
|  | <b>5.2</b> | Safety boundary for the refuelling process is established   |
|  | <b>5.3</b> | Spill prevention systems are correctly deployed   |
|  | <b>5.4</b> | Refuelling operations are performed safely and according to organisational safety management system   |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## Unit Mapping Information

This unit replaces and is equivalent to MARN002 Apply seamanship skills aboard a vessel up to 12 metres.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **Assessment Requirements for MARN008 Apply seamanship skills aboard a vessel up to 12 metres**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- checking seaworthiness and general condition of a vessel up to 12 metres
- coiling and stowing ropes
- handling ropes
- identifying deterioration and causes in hull and fittings
- performing an eye splice
- performing common whipping on ropes
- performing preparations for and letting go and weighing anchor
- preparing and throwing a heaving line
- securing a vessel alongside using vessel mooring lines, including:
  - bow and stern lines
  - fore and aft springs
- securing anchor and equipment on completion of anchoring operations
- tying reef knot, bowline, clove hitch, round turn and two half hitches, rolling hitch and sheet bend - single and double.

### **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anchors, types and characteristics
- basic structural parts of a small vessel
- considerations to make when selecting an anchorage
- correct application of common knots and hitches
- coverage and frequency of checks of vessels seaworthiness
- factors affecting the safety and integrity of vessel; its equipment and materials on board
- how to make a vessel watertight

- identifying and rectifying irregularities in the condition and seaworthiness of the vessel
- large objects likely to move in a sea way
- loading, discharging and movement of weights
- maintenance of synthetic and natural fibre ropes
- materials on deck and below
- mooring line arrangements for securing at a berth
- openings including hatch covers and all other openings that water can enter
- principles of maintaining watertight integrity
- process for checking seaworthiness and general condition of a vessel up to 12 metres including:
  - accommodation and storage spaces
  - anchors
  - galley, stores and equipment
  - large objects likely to move in a sea way
  - materials on deck and below
  - opening
- procedure for anchoring
- refuelling a vessel according to safety regulations and organisational safety management system requirements
- rope types, characteristics and applications, dynamic and non-dynamic, including:
  - braided
  - natural fibre
  - plaited
  - polyester
  - wire core rope
  - wire rope
- safety precautions and pollution control measures during refuelling
- securing a vessel for sea
- types of anchors used on small vessels up to 12 metres
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating



to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage. With the exception of whipping, splicing and knot tying, the Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) must be undertaken on a vessel  $\geq 5.0$  metres in length.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety management system, workplace procedures and operational manuals
- a vessel  $\geq 5.0$  m in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## **MARN009 Perform seamanship operations on board a vessel up to 24 metres**

### **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

### **Application**

This unit involves the skills and knowledge required to apply practical seamanship skills and techniques as part of operations on board a vessel up to 24 m.

This unit applies to people working in the maritime industry in the capacity of:

- master on commercial vessels <24 m in length within the exclusive economic zone (EEZ) or
- chief mate or deck watchkeeper on vessels <35 m in length within the EEZ or
- chief mate or deck watchkeeper on vessels <80 m in length in inshore waters; and
- master on commercial vessels <24 m in length in inland waters.

### **Licensing/Regulatory Information**

Legislative and regulatory requirements are applicable to this unit. This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master (Inland waters) and Master <24m NC as defined in the National Standard for Commercial Vessels (NSCV) Part D. The AMSA mandated practical assessment (AMPA) is a requirement for AMSA certification. The Australian Maritime Safety Authority (AMSA) mandated practical assessment (AMPA) will cover a range, but not all, of the requirements identified in the Performance Evidence and Knowledge Evidence. The AMPA shall be undertaken in accordance with its instructions.

Assessors of AMPA must hold as a minimum:

- a current certificate of competency issued under Marine Safety (Domestic Commercial Vessel) National Law Act 2012 at the same level as the qualification being assessed with at least 12 months' relevant sea service, or
- a relevant seafarer certificate, as master or deck officer, issued under the Navigation Act 2012.

### **Pre-requisite Unit**

Not Applicable

## Competency Field

N – Seamanship

## Unit Sector

Not Applicable

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### **1 Use and maintain ropes and wires**

- 1.1** Knots, hitches and bends using rope are correctly made and used in the course of operations on board a vessel
- 1.2** Ropes are spliced neatly and securely according to their correct application and rope ends are whipped, where appropriate, to maintain good condition
- 1.3** Breaking strain and safe working loads of rope and wire are determined and applied as load limits in the course of operations on board a vessel
- 1.4** Wear and damage to rope and wire are recognised
- 1.5** Rope and wire are maintained and stored according to organisational procedures

#### **2 Operate lifting gear**

- 2.1** Lifting gear is checked and prepared for operation prior to use
- 2.2** Defective lifting gear is isolated and reported according to organisational procedures
- 2.3** Loads are correctly attached using appropriate slings and rigging gear according to organisational procedures and safety requirements
- 2.4** Maximum and safe working load limits are determined and not exceeded
- 2.5** Lifting gear is safely operated to carry out operations

#### **3 Secure vessel at anchor**

- 3.1** Prior to letting go, anchor and equipment are prepared and crew is briefed

- 3.2** Quantity of anchor cable run out or recovered is appropriate to depth of water, weather and sea conditions, and tidal range in area of operation
  - 3.3** Control of cable is maintained within safe operating limits during anchoring operations
  - 3.4** Degree to which anchor and equipment are secured on completion of anchoring operations is appropriate to forecast conditions
  - 3.5** Anchoring area is kept free of loose ropes, wires and debris during all operations
- 4 Secure vessel at a berth**
  - 4.1** Mooring lines and associated equipment are handled safely at all times
  - 4.2** Mooring area is kept free of loose ropes, wires and debris throughout operations
  - 4.3** Tension on ropes is maintained at an appropriate level for stage and nature of the operation
  - 4.4** Tension on shore-power leads and other umbilicals is monitored
- 5 Check condition and seaworthiness of vessel**
  - 5.1** Coverage and frequency of checks and inspections on vessel seaworthiness are undertaken according to organisational procedures
  - 5.2** Watertight integrity is checked and appropriate action is taken to prepare for prevailing and forecast weather and sea conditions according to vessel seaworthiness plans and regulatory requirements
  - 5.3** Vessel is secured to degree which is appropriate to prevailing and forecast conditions
  - 5.4** Irregularities are identified and appropriate action is taken to rectify the situation
  - 5.5** Irregularities beyond ability to rectify are reported in time to enable remedial action to be taken
  - 5.6** Reports of vessel condition are completed according to organisational procedures
- 6 Check stability of vessel**
  - 6.1** Information from vessel stability data book is used to determine loading limits and displacement from draft

- 6.2** Stability conditions for proposed nature of voyage and operations are confirmed and required stress and stability criteria are met
- 7 Perform tasks aloft and over vessel side**
- 7.1** Area and equipment for working aloft or over the side are prepared according to organisational procedures
- 7.2** Required precautions are taken when working aloft or over the side
- 7.3** Chairs, safety harnesses and appropriate safety equipment are used according to organisational procedures
- 7.4** Portable ladders are used correctly to perform tasks
- 7.5** Tasks are completed safely according to instructions
- 7.6** Equipment is inspected, maintained and stored after use according to organisational procedures
- 8 Lash and secure stores, cargo and access ways**
- 8.1** Lashing equipment is inspected, maintained and correctly stored after use according to organisational procedures
- 8.2** Cargo is stowed according to recognised principles and organisational procedures relating to transport and handling of dangerous goods
- 8.3** Cargo is lashed and secured according to recognised principles and organisational procedures
- 8.4** Equipment and items on deck and in galley spaces are secured according to organisational procedures
- 8.5** Personnel access ways are rigged and secured according to organisational procedures
- 8.6** Accommodation spaces and personnel facilities on board vessel are checked and correctly secured for sea according to organisational procedures
- 9 Supervise refuelling operations**
- 9.1** Personal protective equipment (PPE) is accessed and used
- 9.2** Amount of fuel required is calculated
- 9.3** Instructions are provided to ensure safety boundary for refuelling process is established

- 9.4** Spill prevention systems are correctly deployed
- 9.5** Instructions are provided to ensure refuelling operations are performed safely
- 9.6** Notification of intention to refuel is made to authorities and other nearby operations

## **Foundation Skills**

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

## **Unit Mapping Information**

This unit replaces and is equivalent to MARN003 Perform seamanship operations on board a vessel up to 24 metres.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARN009 Perform seamanship operations on board a vessel up to 24 metres**

## **Modification History**

Release 1. New unit of competency. Licensing/regulatory information has been incorporated in accordance with Regulatory requirements. Assessment Requirements have been strengthened in accordance with Regulatory requirements.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- anchor a vessel according to depth and prevailing winds
- applying work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- checking seaworthiness of vessel
- completing basic stability calculations
- correctly coiling and stowing ropes
- correctly interpreting vessel stability data
- maintaining watertight integrity of vessel
- performing an eye splice on natural and synthetic fibre rope
- performing appropriate whippings on ropes and line
- preparing and throwing a heaving line
- preparing for and anchoring vessel according to depth and prevailing winds
- recognising damaged or worn ropes, wires and chains
- safely handling ropes and wires
- safely operating winches or windlasses and capstans
- safely using:
  - blocks
  - drum ends or capstans
  - eye bolts and shackles
  - hooks
  - swivels
  - wires, ropes and chains
- securing anchor and equipment on completion of anchoring operations
- securing vessel at its berth according to operational requirements and prevailing conditions
- tying figure-eight knot, reef knot, bowline, single and double sheet bend, half hitch, clove hitch, round turn and two half hitches, and rolling hitch using natural or synthetic fibre rope
- using portable ladders to access heights up to 1.8 metres.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- anchoring principles and methods for different conditions
- basic principles of stability
- basic structural parts of a small vessel
- communication techniques when operating lifting gear
- construction of vessel sufficient to understand which areas need to be made watertight
- correct application of common knots and hitches
- correct use and maintenance of equipment used for working aloft and over the side
- correctly slinging loads ready for lifting
- coverage and frequency of checks of vessels seaworthiness
- dangers of working with ropes under tension
- different types of anchors and where they can be most effectively used
- effect of design and hull on vessel stability
- effects on stability of:
  - adding and removing weights
  - additions or alterations to original vessel configuration
  - slack tanks
  - water on deck
  - hauling nets using power block
  - snagged trawl (hook up)
  - transferring weights using a crane or other lifting devices
- how to make vessel watertight
- inspection and maintenance of harnesses, safety lines and other equipment for working aloft
- irregularities in the condition and seaworthiness of the vessel affecting the safety and integrity of the vessel, its equipment and materials/cargo on board
- irregularities in the condition and seaworthiness of the vessel affecting the safety of crew and passengers
- maintenance of different types of rope, wire and chain
- method of calculating breaking strain and safe working load for ropes and equipment
- methods of securing cargo
- precautions to take when working aloft or over the side
- principles and limitations of lifting equipment and components
- principles of International Maritime Dangerous Goods (IMDG) code
- process for checking bow doors (barges) for seaworthiness
- procedures for checking and operating lifting equipment
- procedures for refuelling vessel with due regard to regulations and organisational procedures
- providing the required amount of detail in reports
- regulations affecting watertight integrity
- routine and emergency operation of anchors



- roll period and stiff and tender vessels
- safely working aloft or over the side
- securing methods for a vessel at sea, including:
  - accommodation and storage spaces
  - anchors
  - doors
  - engine room
  - galley stores and equipment
  - navigation lights
  - personnel facilities
  - hatches
  - large objects likely to move in a sea way
  - materials on deck and below
  - tanks
- selection and safe use of appropriate rigging and lifting gear, including:
  - blocks (including chain blocks and power blocks)
  - wires, ropes and chains
  - drum ends or capstans
  - eye bolts and shackles
  - hooks
  - lifting device
  - slings and chains
- use of sea anchors
- using stability book to determine loading limits and displacement from draft
- WHS/OHS requirements and work practices.

## Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment. Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions. Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, safety

management system (SMS), workplace procedures, operational manuals and stability booklets

- a commercial vessel  $\geq 7.5$  m in length
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARO001 Perform basic lookout duties

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to contribute to a safe lookout on a vessel up to 80 metres under instructions from the Master.

This unit applies to general purpose hands working in the maritime industry on vessels up to 80 metres. They could be working independently or as part a vessel crew.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

O – Watchkeeping

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |     |  |     |  |     |   |
|--|--|-----|--|-----|--|-----|---|
| <b>1 Follow instructions to monitor vessel situation when moored or anchored</b> | <table border="0"><tr><td style="vertical-align: top;">1.1</td><td>Scheduled checks and inspections are conducted to comply with instructions</td></tr><tr><td style="vertical-align: top;">1.2</td><td>Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of the vessel</td></tr><tr><td style="vertical-align: top;">1.3</td><td>Restrictions on access to the vessel by visitors are followed according to instructions</td></tr></table> | 1.1 | Scheduled checks and inspections are conducted to comply with instructions | 1.2 | Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of the vessel | 1.3 | Restrictions on access to the vessel by visitors are followed according to instructions |
| 1.1  | Scheduled checks and inspections are conducted to comply with instructions   |     |  |     |  |     |   |
| 1.2  | Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of the vessel   |     |  |     |  |     |   |
| 1.3  | Restrictions on access to the vessel by visitors are followed according to instructions  |     |  |     |  |     |   |

- |  |     |   |
|--|-----|---|
|  | 1.4 | VHF equipment is monitored and information is communicated to the Master as required                                |
| <b>2 Follow instructions to monitor vessel situation when at sea</b> | 2.1 | Proper lookout is maintained at all times according to instructions   |
|  | 2.2 | Lights, shapes and sound signals are correctly recognised   |
|  | 2.3 | Effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel |
|  | 2.4 | VHF equipment is monitored and information is communicated to the Master as required                                |
| <b>3 Respond to potential emergency situations</b>                   | 3.1 | Emergency situations are promptly reported to the Master  |
|  | 3.2 | Distress signals are recognised and reported  |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Scheduled checks and inspections must include:

- coverage
- frequency
- timing

Irregularities or abnormal conditions include one or

- events affecting the safety and integrity of:
- vessel

more of the following:

- crew
- equipment
- materials, such as cargo

Monitored includes one or more of the following:

- communications with other vessels
- communications with those on shore
- weather reports and warnings

Emergency situations include one or more of the following:

- cargo shift
- collision
- dragging anchor
- failure of vessel equipment and navigational lights
- fire
- fog or restricted visibility
- heavy weather
- loss of engine or propulsion controls
- loss of mooring lines
- loss of watertight integrity
- person overboard
- reception of distress signal
- stranding
- sudden list or loll
- synchronous rolling

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARO1001A Perform basic lookout duties.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARO001 Perform basic lookout duties

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with others on lookout issues and arrangements
- communicating required information in a timely manner
- correctly reporting other ships, objects, lights and navigation marks in relation to the ship's head
- identifying and reporting lights, buoys and sound signals
- monitoring and anticipating hazards and risks that may arise during lookout duties
- monitoring VHF equipment
- providing required amount of detail in reports
- responding to helm and engine orders given by the Master.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- International Regulations for Preventing Collisions at Sea
- navigation lights, shapes and sound signals
- typical emergency situations and appropriate action and solutions.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

## MARO002 Maintain a safe navigational watch

### Modification History

Release 1. New unit of competency.

### Application

This unit involves the skills and knowledge required to apply the accepted principles and procedures to be observed in maintaining a watch according to bridge resource management principles, to ensure a safe navigational watch on a vessel.

This unit applies to a Watchkeeper Deck, a Master up to 500 gross tonnage (GT), a Master up to 80 metres Near Coastal, or a Master Unlimited.

This unit has links to legislative and certification requirements.

### Pre-requisite Unit

Not applicable.

### Competency Field

O – Watchkeeping

### Unit Sector

Not applicable.

### Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Maintain watch on the bridge**

- 1.1 Own responsibility for the safety of navigation is clearly defined at all times including periods when the Master is on the bridge and while under pilotage
- 1.2 Proper lookout is maintained at all times according to organisational procedures and regulatory requirements
- 1.3 Lights, shapes and sound signals are correctly recognised and



acted upon

- 1.4 Frequency and extent of monitoring traffic, vessel and environment are scheduled to conform with organisational procedures and regulatory requirements
- 1.5 Bridge communication is maintained with other team members on matters relevant to the safety and integrity of the vessel
- 1.6 Clear and unambiguous bridge communications are maintained and clarification is sought from or given to other team members when watch information or instructions are not clearly understood
- 1.7 Internal and external communications systems are used according to organisational procedures
- 1.8 Conduct, handover and relief of the watch is completed according to organisational procedures and regulatory requirements

## **2 Maintain watch when anchored**

- 2.1 Organisational procedures and regulatory requirements are complied with through frequency, timing and coverage of scheduled checks and inspections
- 2.2 Appropriate action is taken in the event of irregularities or abnormal conditions to maximise the safety and integrity of the vessel
- 2.3 Restrictions on access to the vessel by non-authorised persons are followed according to organisational procedures and regulatory requirements
- 2.4 Internal and external communications systems are used according to organisational procedures

## **3 Respond to potential collision and emergency situations**

- 3.1 Potential collision situations are analysed and appropriate action is taken in ample time according to regulatory requirements
- 3.2 Correct responses are made to emergencies and situations that pose a danger to the vessel and personnel on board
- 3.3 Distress signals are recognised and appropriate action is taken to initiate search and rescue operations
- 3.4 Master is called in the event of a navigational incident which falls outside own responsibility

- |   |     |   |
|---|-----|---|
| <b>4 Resource the bridge according to bridge resource management principles</b> | 4.1 | Bridge resource management principles are interpreted to establish the functions and responsibilities of the watchkeeping team on board a vessel    |
|   | 4.2 | Resources are allocated and assigned as needed in correct priority to perform necessary tasks to obtain and maintain situational awareness          |
|   | 4.3 | Watchkeeping schedule is developed with due consideration to team experience  |
|   | 4.4 | Instructions on watchkeeping and lookout requirements are clearly and unambiguously given in relation to monitoring traffic, vessel and environment |
|   | 4.5 | Clear and unambiguous roles and responsibilities of watchkeeping team are determined and allocated  |
|   | 4.6 | Effective communication is maintained with team on matters relevant to safety and integrity of vessel   |
|   | 4.7 | Questionable decisions and/or actions are dealt with using an appropriate challenge and response  |
| <b>5 Maintain navigation records</b>  | 5.1 | Proper record of the movements and activities related to the navigation of the vessel is maintained   |
|   | 5.2 | Records are filed and stored according to organisational procedures   |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Lights, shapes and sound signals must include:

- alternative power source for lights
- day time shapes for a vessel more than 500 gross tonnage
- emergency lights for a vessel more than 500 gross tonnage
- means of making sound signals for a vessel more than 500 gross tonnage
- navigation lights for a vessel more than 500 gross tonnage

Bridge communication includes one or more of the following:

- communication with engine room
- verbal instruction relating to watchkeeping duties
- written Master instructions

Irregularities or abnormal conditions include one or more of the following:

- dragging anchor
- fog and restricted visibility
- heavy weather, including cyclones

Emergencies include one or more of the following:

- person overboard
- search and rescue operations

Matters relevant to safety and integrity of vessel include one or more of the following:

- maintenance of proper lookout
- navigation path and maintenance of vessels position
- traffic density
- visibility
- weather and sea conditions

Questionable decisions and/or actions include one or more of the following:

- excessive speed in heavy weather or reduced visibility
- inappropriate action to avoid collision
- incorrect helm orders

Proper records include one or more of the following:

- course recorder
- courses steered and vessel position
- echo sounder recordings
- logbook entries
- passage plan

- radar logbook
- weather reports

## Unit Mapping Information

This is a new unit. This unit is equivalent to MAR5001A Maintain a safe navigational watch.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# Assessment Requirements for MARO002 Maintain a safe navigational watch

## Modification History

Release 1. New unit of competency.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- allocating and assigning resources as needed in correct priority to perform necessary tasks
- applying principles of bridge resource management
- appropriately challenging and responding to questionable decisions and/or actions
- clearly defining responsibility for the safety of navigation at all times
- communicating effectively with others on watchkeeping issues, arrangements and requirements
- conforming to accepted principles and procedures in the conduct, handover and relief of the watch
- correctly providing sound signals
- correctly recognising lights, shapes and sound signals
- giving and receiving clear and unambiguous communications
- identifying and solving problems that may arise during watchkeeping duties, reporting problems and issues and taking appropriate action based on available information
- identifying and implementing effective leadership behaviours
- interpreting and implementing procedures relevant to the role and responsibilities of watchkeeper
- maintaining a proper lookout at all times and in such a way as to conform to accepted principles and procedures
- maintaining a proper record of the movements and activities relating to the navigation of the vessel
- modifying activities dependent on differing vessel contingencies, risk situations and environments
- monitor and anticipate hazards and risks that may arise during watchkeeping duties and take appropriate action
- monitoring traffic, the ship and the environment to conform to accepted principles and procedures
- reporting according to the General Principles for Ship Reporting Systems and vessel traffic services (VTS) procedures
- selecting and using appropriate internal and external communications equipment during watchkeeping

- sharing an accurate understanding of current and predicted vessel state, navigation path and external environment with team members
- using information from navigational equipment to maintain a safe navigational watch
- using routing according to the General Provisions on Ships' Routing.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- Australian Maritime Safety Authority (AMSA) watchkeeping procedures contained in Marine Orders
- blind pilotage techniques
- bridge instrumentation, controls and alarms relevant to the function of watchkeeping
- bridge procedures on board a vessel
- bridge resource management principles including allocation, assignment and prioritisation of resources; effective communication; assertiveness and leadership; obtaining and maintaining situational awareness; consideration of team experience
- causes of groundings, collisions and casualties
- content, application and intent of the International Regulations for Preventing Collisions at Sea
- fatigue management principles and techniques
- functions and responsibilities of the watchkeeping team on board a vessel
- International Association of Lighthouse Authorities (IALA) buoyage system A and B
- manual and electronic navigational aids available to the bridge team and procedures for their operation and use during a watch
- maritime communication techniques on board a vessel
- navigational hazards and implications for watchkeeping
- operating procedures for typical navigational aids
- precautions necessary when navigating in or near traffic separation schemes or other routing measures
- principles and use of navigational recording devices for keeping records of the operation, behaviour and performance of the vessel and navigation equipment
- principles for the use of vessel routing and reporting systems for safe navigation
- principles to be observed in keeping a navigational watch
- procedures for the conduct, handover and relief of a watch
- procedures for the use of internal communications and alarm systems
- signs of fatigue
- typical bridge instrumentation, controls and alarms and their functions
- typical watchkeeping problems and emergency situations, and appropriate actions and solutions
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARO003 Transmit and receive information by the global maritime distress and safety system**

## **Modification History**

Release 2. Change to RoC to include current terminology Mapping information has been corrected.

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to transmit and receive information by global maritime distress and safety system (GMDSS) subsystems and equipment.

This unit applies to those in charge of or performing radio duties on a ship required to participate in the GMDSS.

This unit has links to legislative and certification requirements.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

O – Watchkeeping

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

**1 Operate GMDSS subsystems and equipment to send and receive messages**

1.1 GMDSS communication equipment is operated to send and receive various types of signals according to manufacturer instructions, established GMDSS procedures and regulatory requirements



- 1.2 GMDSS procedures appropriate for the sea area concerned are correctly applied according to regulatory requirements
- 1.3 Regulations and procedures applicable to vessel stations equipped with GMDSS communication equipment and digital selective calling facilities are applied during radio communication
- 1.4 Work health and safety/occupational health and safety (WHS/OHS) procedures and hazard control strategies are applied when operating radio equipment according to vessel International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM) Code safety management system
- 2 Maintain radio equipment**
  - 2.1 Routine maintenance checks are conducted on GMDSS equipment according to manufacturer specifications and organisational procedures
  - 2.2 Out-of-specification performance and faults are investigated using fault finding techniques
  - 2.3 Identified faults and defective equipment and component parts are rectified or replaced according to manufacturer specifications and organisational procedures
- 3 Provide radio services during emergencies**
  - 3.1 Emergencies are correctly identified according to organisational procedures
  - 3.2 Organisational procedures are conformed with when taking initial action on becoming aware of an emergency or abnormal situation
  - 3.3 Communications are established with others using GMDSS communication equipment to facilitate the emergency response process
  - 3.4 Contact is maintained at all times with others to keep them briefed on the emergency response process
  - 3.5 Radio procedures as defined in the international and national radio regulations and safety of life at sea (SOLAS) convention and the IAMSAR Manual are applied during the emergency
- 4 Maintain records**
  - 4.1 Records are completed and maintained as required according to regulatory and organisational requirements
  - 4.2 Relevant records are sent to appropriate bodies and copies

are filed according to regulatory and organisational requirements

- 4.3 Documents are stored according to regulatory and organisational requirements

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

- |   |   |
|---|---|
| GMDSS communication equipment must include: | <ul style="list-style-type: none"><li>• antennas</li><li>• batteries</li><li>• digital selective calling (DSC) equipment</li><li>• electrical and radio cable connections</li><li>• electrical fuses</li><li>• emergency position indicating radio beacon (EPIRB)</li><li>• enhanced group calling (EGC) receiver</li><li>• medium frequency/high frequency (MF/HF) equipment</li><li>• Narrow Band Direct Printing (NBDP)</li><li>• navigational telex (NAVTEX) receiver</li><li>• search and rescue radar transponder r (RADAR-SART)</li><li>• very high frequency (VHF) equipment</li><li>• AIS search and rescue transmitter (AIS-SART)</li></ul> |
| Regulations must include:                   | <ul style="list-style-type: none"><li>• IMO STCW 95 Code concerning radio communication</li><li>• Australian Maritime Safety Authority (AMSA) Marine Orders</li><li>• SOLAS Convention Chapter IV</li><li>• ITU Radio</li><li>• Regulations</li></ul>   |
| Routine maintenance checks must include:    | <ul style="list-style-type: none"><li>• battery checks including specific gravity</li><li>• equipment testing</li></ul>   |
| Emergencies include one                     | <ul style="list-style-type: none"><li>• abandon ship</li><li>• assisting vessels in distress</li></ul>  |

or more of the following:

- fire on board ship
- partial or full breakdown of radio installations
- rescuing persons from the water

Records include one of the following:

- radio communication log
- records of radio communication

## Unit Mapping Information

This unit replaces and is equivalent to MARO5002A Transmit and receive information by the Global Maritime Distress and Safety System.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARO003 Transmit and receive information by the global maritime distress and safety system**

## **Modification History**

Release 2. Change to Performance Evidence (PE) and Knowledge Evidence (KE) to include current terminology. Clarification of guidance information in PE, KE and Assessment Conditions.

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- applying work health and safety/occupational health and safety (WHS/OHS) procedures when operating GMDSS subsystems and equipment
- communicating effectively with others when using GMDSS subsystems and equipment
- conducting operational checks on GMDSS subsystems and equipment
- keeping records of radio communications
- operating GMDSS subsystems and equipment according to manufacturer instructions
- reading and interpreting instructions for the use of GMDSS subsystems and equipment
- recognising typical faults with GMDSS subsystems and equipment, and taking appropriate action
- using the international phonetic alphabet and figure code.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- basic principles and features of marine radio communications including:
  - correct use of frequencies, frequency bands and modes of emission
  - frequencies for routine call and reply
  - distress, urgency and safety communication
  - definition of coverage and sea areas for digital selective calling (DSC)
  - radio calling, replying and relaying procedures
  - purpose of silence periods when operating radio equipment
  - limitations on the performance of different types of marine radio equipment

- purpose for and procedures for the monitoring of calling and working frequencies
- methods of communicating vessel position
- different types of marine radio equipment, their features, applications, operating characteristics and operating procedures
- hazards associated with radio transmission and the repair and maintenance of radio equipment and related hazard control measures
- international and national radio regulations applicable to mobile marine communication
- maintenance strategies and requirements for GMDSS equipment as defined in the International Convention for the Safety of Life at Sea (SOLAS) and Radio Regulations and STCW
- means to prevent the transmission of false distress alerts
- operational checks including checking radio performance; testing fuses; measuring capacity of batteries and the specific gravity of the electrolyte; measuring on and off load voltage
- principles of radio propagation including:
  - basic propagation mechanisms at LF, MF, HF and VHF
  - maximum usable frequency (MUF)
  - optimum working frequency (OWF)
  - frequency bands
  - classes of emission
  - duplex, simplex paired frequencies and ITU channels
- procedures for:
  - keeping records of radio communication
  - transmitting and decoding the international phonetic alphabet and figure code
  - using various GMDSS systems and services including Inmarsat services (B, C, M); enhanced group calling system (EGC); MF/HF radio with NBDP; DSC facilities and usage; EGC receiver; maritime safety information (MSI) services; navigational telex (NAVTEX) system; SafetyNET system
- prohibitions on connecting non-GMDSS equipment to reserve source of supply
- radio communication problems and appropriate actions and solutions
- radio equipment faults, defects and related fault finding techniques
- requirements of ship reporting systems
- types, applications and features of basic antenna systems used in marine radio communications
- use of radio medical services.

## Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must satisfy the National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) standards.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARO004 Transmit and receive information by visual signalling

## Modification History

Release 1. New unit of competency.

## Application

This unit involves the skills and knowledge required to transmit and receive information by visual signalling.

This unit applies to a Watchkeeper Deck, a Master up to 500 gross tonnage (GT), a Master up to 80 metres Near Coastal, or a Master Unlimited.

This unit has links to legislative and certification requirements.

## Pre-requisite Unit

Not applicable.

## Competency Field

O – Watchkeeping

## Unit Sector

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |     |  |
|--|-----|--|
| <b>1 Use code to send and receive messages by flashing light</b> | 1.1 | Codes for letters and numerals are correctly recognised                  |
|  | 1.2 | Message is correctly coded and sent using a flashing light               |
|  | 1.3 | Message transmitted in code by flashing light is correctly decoded       |
| <b>2 Use International Code of Signals to</b>                    | 2.1 | Flags used in the International Code of Signals are correctly recognised |

<b>send and receive messages with flags</b>	2.2	Message is correctly coded and sent with flags using the International Code of Signals
	2.3	Message coded and sent with flags using the International Code of Signals is correctly decoded
<b>3 Maintain records of visual communications</b>	3.1	Records of messages sent and received are completed and maintained as required according to regulatory and organisational requirements
	3.2	Relevant records are sent to appropriate bodies if requested and copies are filed according to regulatory and organisational requirements
	3.3	Documents are stored according to regulatory and organisational requirements

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Codes must include:

- Morse Code
- single letter and numeral international code flags

Messages include one or more of the following:

- distress signal SOS
- medical advice
- single letter flag signal codes



Flashing lights include one or more of the following:

- fixed mast installation
- mirrors
- Morse signalling lamp

## Unit Mapping Information

This is a new unit. This unit is equivalent to MARO5003A Transmit and receive information by visual signalling.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARO004 Transmit and receive information by visual signalling**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating effectively with others, including the Master, when transmitting and receiving information by visual signalling
- keeping records of visual signalling communications
- reading and interpreting maritime regulations relating to visual signalling
- transmitting and receiving by Morse light, distress signal SOS as specified in Annex IV International Regulations for the Prevention of Collisions at Sea and Appendix 1 of the International Code of Signals
- transmitting and receiving messages using flags according to the International Code of Signals
- using the International Code of Signals.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- International Code of Signals
- Australian Maritime Safety Authority (AMSA)
- procedures for sending visual messages with flags using the International Code of Signals
- procedures for using a flashing light to send messages using Morse Code
- visual signalling of single-letter signals as specified in the International Code of Signals
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

## **Assessment Conditions**

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARO005 Contribute to monitoring and controlling a safe engine watch**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to contribute to a safe engine watch on a vessel while under the direction of the officer in charge of the engineering watch.

This unit applies to an Integrated Rating or Able Seafarer-Engine, who assists, under the direction of the officer in charge of the engineering watch, in performing engine watchkeeping duties.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

O – Watchkeeping

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Follow instructions**

### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Unsafe conditions and potential hazards are recognised, and

<b>to monitor engine-room machinery and equipment</b>		risk is assessed and reported according to organisational procedures
	1.2	Unsafe conditions and hazards are rectified according to organisational procedures
	1.3	Effective communication is maintained with the officer in charge of the engineering watch about matters relevant to the safety and integrity of the vessel
	1.4	Procedures for relief, maintenance and handover of a watch are followed
	1.5	Emergency situations are promptly reported to the officer in charge of the engineering watch
	1.6	Alarms are recognised and reported
<b>2 Respond to potential emergency situations</b>	2.1	Control measures to minimise a potential emergency are implemented
	2.2	Containment procedures are applied as required
	2.3	Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures
	2.4	Emergency is eliminated where possible or actions are taken to control the emergency
	2.5	Appropriate firefighting equipment is identified to carry out firefighting operations
	2.6	Unsafe conditions and potential hazards are recognised, and risk is assessed and reported to the officer in charge of the engineering watch according to organisational procedures
	2.7	Unsafe conditions and hazards are rectified according to organisational procedures

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

Emergency situations include one or more of the following:

- crankcase and gearbox explosions
- fire, including engine room scavenge fires
- gearbox failure
- generator failure
- loss of engine cooling water
- starting air-line

## Unit Mapping Information

This unit replaces and is equivalent to MARO3001A Contribute to monitoring and controlling a safe engine watch.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARO005 Contribute to monitoring and controlling a safe engine watch**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely and acknowledging orders in a seamanlike manner
- communicating effectively with the officer in charge of the engineering watch about matters relevant to watchkeeping duties
- conforming to accepted practices and procedures in the maintenance, handover and relief of the watch
- conforming to established procedures and practices in taking initial action on becoming aware of an emergency or abnormal situation
- maintaining the integrity of emergency alarm systems at all times
- monitoring and anticipating hazards and risks that may arise during engine watchkeeping duties
- monitoring engine-room machinery and equipment including:
  - boiler water levels and steam pressure
  - engine-room machinery temperatures
  - oil levels
- monitoring propulsion and auxiliary machinery according to instructions during watchkeeping duties
- performing basic engine watchkeeping duties under the direction of the officer in charge of the engineering watch on a vessel moored, at anchor or under way
- recognising potential hazards, assessing risks and reporting them to the officer of the watch
- responding to engine orders given by the officer in charge of the engineering watch
- seeking advice/clarification from the officer in charge of the engineering watch where watch information or instructions are not clearly understood
- using internal communications and alarm systems.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- alarms associated with engine-room machinery and their meaning
- basic knowledge and correct use of monitoring equipment used in the engine room
- emergency duties and alarm signals
- engine-room alarm systems and the difference between the various alarms
- engine-room emergency situations, and appropriate action and solutions
- escape routes from machinery spaces
- function and operation of main propulsion and auxiliary machinery
- information required to maintain a safe engine watch
- monitoring equipment used in the engine room
- orders as they relate to watchkeeping provided by the officer in charge of the engineering watch
- procedures for the relief, maintenance and handover of a watch
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- requirements for the safe operation of boilers
- shipboard terms and definitions
- terms used in machinery spaces, and names of machinery and equipment.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment of engine watchkeeping duties must occur in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment that replicate and are currently used in



industry

- firefighting equipment including:
  - fixed gas systems
  - fixed water systems
  - portable extinguishers
- alarms including:
  - bilge
  - boiler level and pressure
  - fire extinguishing gas alarms
  - temperature.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **MARO006 Contribute to monitoring and controlling a safe navigational watch**

## **Modification History**

Release 1. New unit of competency.

## **Application**

This unit involves the skills and knowledge required to contribute to a safe navigational watch on a vessel while under the direction of the officer in charge of the navigational watch.

This unit applies to an Integrated Rating or Able Seafarer-Deck who assists under the direction of the officer in charge of the navigational watch, in performing navigational watchkeeping duties.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not applicable.

## **Competency Field**

O – Watchkeeping

## **Unit Sector**

Not applicable.

## **Elements and Performance Criteria**

### **ELEMENTS**

Elements describe the essential outcomes.

#### **1 Follow instructions**

### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Scheduled checks and inspections are conducted to comply

<b>to monitor vessel situation when moored or anchored</b>		with instructions
	1.2	Appropriate action is taken in irregularities or abnormal conditions to maximise the safety and integrity of the vessel
	1.3	Restrictions on access within the vessel are enforced according to Master instructions
	1.4	VHF is monitored and information is communicated to the Master as required
	1.5	Procedures for the relief, maintenance and handover of a watch are followed
<b>2 Follow instructions to monitor vessel situation when at sea</b>	2.1	Responsibilities of a lookout are established
	2.2	Proper lookout is maintained by sight and hearing at all times according to instructions
	2.3	Lights, shapes and sound signals are correctly recognised and recorded
	2.4	Approximate bearing of a sound signal, light or other object is reported in degrees or points, to the officer in charge of the navigational watch
	2.5	Effective communication is maintained with the officer in charge of the navigational watch about matters relevant to the safety and integrity of the vessel
	2.6	VHF is monitored and information is communicated to the officer in charge of the navigational watch as required
	2.7	Procedures for the relief, maintenance and handover of a watch are followed
<b>3 Respond to potential emergency situations</b>	3.1	Emergency situations are promptly reported to the officer in charge of the navigational watch
	3.2	Distress signals are recognised and reported
	3.3	False distress alerts are avoided and correct action is taken in an accidental activation
	3.4	Integrity of emergency and distress alerting systems is maintained at all times

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

- |   |  |
|---|--|
| Scheduled checks and inspections include one or more of the following:      | <ul style="list-style-type: none"><li>• coverage</li><li>• frequency</li><li>• timing</li></ul>  |
| Irregularities or abnormal conditions include one or more of the following: | <ul style="list-style-type: none"><li>• events affecting the safety and integrity of:<ul style="list-style-type: none"><li>• crew</li><li>• equipment</li><li>• materials such as cargo</li><li>• vessel</li></ul></li></ul>   |
| Emergency situations include one or more of the following:                  | <ul style="list-style-type: none"><li>• cargo shift</li><li>• collision</li><li>• dragging anchor</li><li>• failure of vessel equipment and navigational lights</li><li>• fire, including engine room scavenge fires</li><li>• fog or restricted visibility</li><li>• heavy weather</li><li>• loss of:<ul style="list-style-type: none"><li>• engine or propulsion controls</li><li>• watertight integrity</li><li>• mooring lines</li></ul></li><li>• person overboard</li><li>• reception of distress signal</li><li>• stranding</li><li>• sudden list or loll</li><li>• synchronous rolling</li></ul> |

## Unit Mapping Information

This unit replaces and is equivalent to MARO3002A Contribute to monitoring and controlling a safe navigational watch.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# **Assessment Requirements for MARO006 Contribute to monitoring and controlling a safe navigational watch**

## **Modification History**

Release 1. New unit of competency.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices
- communicating clearly and concisely and acknowledging orders in a seamanlike manner
- communicating effectively with the officer in charge of the navigational watch about matters relevant to watchkeeping duties
- conforming to accepted practices and procedures in the maintenance, handover and relief of the navigational watch
- conforming to established procedures and practices in taking initial action on becoming aware of an emergency or abnormal situation
- identifying and reporting lights, buoys and sound signals
- monitoring and anticipating hazards and risks that may arise during watchkeeping duties
- monitoring vessel situation including:
  - communicating with other vessels
  - communicating with those onshore
  - regularly checking weather reports and warnings
- monitoring VHF equipment
- recognising and reporting distress signals including:
  - pyrotechnic distress signals
  - search and rescue transponders (SARTs)
  - satellite emergency position indicating radio beacons (EPIRBs)
- recognising potential hazards, assessing and reporting risks to the officer in charge of the navigational watch
- reporting approximate bearing of a sound signal, light or other object in degrees or points
- reporting other ships, objects lights and navigation marks correctly, in relation to the ship's head
- responding to orders given by the officer in charge of the navigational watch
- seeking advice/clarification from the officer in charge of the navigational watch where watch information or instructions are not clearly understood
- using internal communications and alarm systems.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic environmental protection procedures as they apply on a vessel
- emergency situations and appropriate action and solutions taken to address them
- functions and purpose of pyrotechnic distress signals, satellite EPIRBs and SARTs
- information required to maintain a safe navigational watch on a vessel
- International Regulations for Preventing Collisions at Sea
- procedures for the relief, maintenance and handover of a watch
- relevant WHS/OHS requirements, work practices and pollution control regulation and policies
- shipboard terms and definitions that are critical to a safe navigational watch
- types, function and purpose of navigational lights, shapes and sound signals.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment of navigational watchkeeping duties must occur in workplace operational situations. Where this is not available, in simulated workplace operational situations that replicate workplace conditions.

Resources for assessment include access to:

- relevant documentation including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment and personal protective equipment that replicate and are currently used in industry including:
  - EPIRBs
  - firefighting equipment

- internal public address system
- pyrotechnic distress signals
- SARTs
- ship's whistle
- VHF radio.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>



## HLTAID003 Provide first aid

### Modification History

Release	Comments
Release 6	Updated: <ul style="list-style-type: none"><li>• assessor requirements statement</li><li>• foundation skills lead in statement</li><li>• licensing statement</li><li>• modification history to reflect 2012 standards</li></ul> Equivalent outcome.
Release 5	Updated mapping information. Changes to assessment requirements. Equivalent outcome.
Release 4	Updated mapping information. Equivalent outcome.
Release 3	Updated mapping information.
Release 2	Minor corrections to formatting to improve readability. Equivalent competency outcome.
Release 1	<p>This version was released in <i>HLT Health Training Package release 1.0</i> and meets the requirements of the 2012 Standards for Training Packages.</p> <p>Significant changes to elements and performance criteria, changes to scope of unit. New evidence requirements for assessment.</p> <p>Removal of prerequisite unit.</p>

### Application

This unit describes the skills and knowledge required to provide a first aid response to a casualty. The unit applies to all workers who may be required to provide a first aid response in a range of situations, including community and workplace settings.

*Specific licensing /regulatory requirements relating to this competency, including requirements for refresher training should be obtained from the relevant national/state/territory Work Health and Safety Regulatory Authorities.*

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

*Elements define the essential outcomes.*

*Performance criteria specify the level of performance needed to demonstrate achievement of the element.*

1. Respond to an emergency situation

- 1.1 Recognise an emergency situation
- 1.2 Identify, assess and manage immediate hazards to health and safety of self and others
- 1.3 Assess the casualty and recognise the need for first aid response
- 1.4 Assess the situation and seek assistance from emergency response services

2. Apply appropriate first aid procedures

- 2.1 Perform cardiopulmonary resuscitation (CPR) in accordance with Australian Resuscitation Council (ARC) guidelines
- 2.2 Provide first aid in accordance with established first aid principles
- 2.3 Display respectful behaviour towards casualty
- 2.4 Obtain consent from casualty where possible
- 2.5 Use available resources and equipment to make the casualty as comfortable as possible
- 2.6 Operate first aid equipment according to manufacturer's instructions
- 2.7 Monitor the casualty's condition and respond in accordance with first aid principles

3. Communicate details of the incident

- 3.1 Accurately convey incident details to emergency response services
- 3.2 Report details of incident to workplace supervisor as appropriate
- 3.3 Maintain confidentiality of records and information in line with statutory and/or organisational policies

**ELEMENT****PERFORMANCE CRITERIA**

*Elements define the essential outcomes.*

*Performance criteria specify the level of performance needed to demonstrate achievement of the element.*

4. Evaluate the incident and own performance

4.1 Recognise the possible psychological impacts on self and other rescuers involved in critical incidents

4.2 Participate in debriefing to address individual needs

**Foundation Skills**

*The Foundation Skills describe those required skills (language, literacy, numeracy and employment skills) that are essential to performance.*

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

**Unit Mapping Information**

No equivalent unit.

**Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ced1390f-48d9-4ab0-bd50-b015e5485705>

## Assessment Requirements for HLT AID003 Provide first aid

### Modification History

Release	Comments
Release 6	Updated: <ul style="list-style-type: none"><li>• assessor requirements statement</li><li>• foundation skills lead in statement</li><li>• licensing statement</li><li>• modification history to reflect 2012 standards</li></ul> Equivalent outcome.
Release 5	Updated mapping information. Changes to assessment requirements. Equivalent outcome.
Release 4	Updated mapping information. Equivalent outcome.
Release 3	Updated mapping information.
Release 2	Minor corrections to formatting to improve readability. Equivalent competency outcome.
Release 1	<p>This version was released in <i>HLT Health Training Package release 1.0</i> and meets the requirements of the 2012 Standards for Training Packages.</p> <p>Significant changes to elements and performance criteria, changes to scope of unit. New evidence requirements for assessment.</p> <p>Removal of prerequisite unit.</p>

### Performance Evidence

The candidate must show evidence of the ability to complete tasks outlined in elements and performance criteria of this unit, manage tasks and manage contingencies in the context of the job role.

There must be evidence that the candidate has completed the following tasks in line with state/territory regulations, first aid codes of practice, Australian Resuscitation Council (ARC) guidelines and workplace procedures:

- Followed DRSABCD in line with ARC guidelines, including:

- performed at least 2 minutes of uninterrupted single rescuer cardiopulmonary resuscitation (CPR) (5 cycles of both compressions and ventilations) on an adult resuscitation manikin placed on the floor
- performed at least 2 minutes of uninterrupted single rescuer CPR (5 cycles both compressions and ventilations) on an infant resuscitation manikin placed on a firm surface
- responded appropriately in the event of regurgitation or vomiting
- managed the unconscious breathing casualty
- followed single rescue procedure, including the demonstration of a rotation of operators with minimal interruptions to compressions
- followed the prompts of an Automated External Defibrillator (AED)
- Responded to at least two simulated first aid scenarios contextualised to the candidate's workplace/community setting, including:
  - conducted a visual and verbal assessment of the casualty
  - demonstrated safe manual handling techniques
  - post-incident debrief and evaluation
  - provided an accurate verbal or written report of the incident
- Applied first aid procedures for the following:
  - allergic reaction
  - anaphylaxis
  - bleeding control
  - choking and airway obstruction
  - envenomation, using pressure immobilisation
  - fractures, sprains and strains, using arm slings, roller bandages or other appropriate immobilisation techniques
  - respiratory distress, including asthma
  - shock

## Knowledge Evidence

The candidate must be able to demonstrate essential knowledge required to effectively complete tasks outlined in elements and performance criteria of this unit, manage tasks and manage contingencies in the context of the work role. This includes knowledge of:

- State/Territory regulations, first aid codes of practice and workplace procedures including:
  - ARC Guidelines relevant to provision of CPR and first aid
  - safe work practices to minimise risks and potential hazards
  - infection control principles and procedures, including use of standard precautions
  - requirements for currency of skill and knowledge
- legal, workplace and community considerations including:
  - awareness of potential need for stress-management techniques and available support following an emergency situation
  - duty of care requirements

- respectful behaviour towards a casualty
- own skills and limitations
- consent
- privacy and confidentiality requirements
- importance of debriefing
- considerations when providing first aid including:
  - airway obstruction due to body position
  - appropriate duration and cessation of CPR
  - appropriate use of an AED
  - chain of survival
  - standard precautions
  - how to conduct a visual and verbal assessment of the casualty
- principles and procedures for first aid management of the following scenarios:
  - abdominal injuries
  - allergic reaction
  - anaphylaxis
  - basic care of a wound
  - bleeding control
  - burns
  - cardiac conditions, including chest pain
  - choking and airway obstruction
  - crush injuries
  - diabetes
  - dislocations
  - drowning
  - envenomation
  - environmental impact, including hypothermia, hyperthermia, dehydration and heat stroke
  - eye and ear injuries
  - fractures
  - febrile convulsions
  - head, neck and spinal injuries
  - minor skin injuries
  - needle stick injuries
  - poisoning and toxic substances
  - respiratory distress, including asthma
  - seizures, including epilepsy
  - shock
  - soft tissue injuries, including strains and, sprains
  - stroke

- unconsciousness
- basic anatomy and physiology relating to:
  - how to recognise a person is not breathing normally
  - chest
  - response/consciousness
  - upper airway and effect of positional change
  - considerations in provision of first aid for specified conditions

## Assessment Conditions

Skills must be demonstrated working individually in an environment that provides realistic in-depth, industry-validated scenarios and simulations to assess candidates' skills and knowledge.

Assessment resources must include:

- adult and infant resuscitation manikins in line with ARC Guidelines for the purpose of assessment of CPR procedures
- adrenaline auto-injector training device
- AED training device
- placebo bronchodilator and spacer device
- roller bandages
- triangular bandages
- workplace First Aid kit
- workplace injury, trauma and/or illness record, or other appropriate workplace incident report form for written reports
- wound dressings

Simulated assessment environments must simulate the real-life working environment where these skills and knowledge would be performed, with all the relevant equipment and resources of that working environment.

## Assessor requirements

Assessors must satisfy the Standards for Registered Training Organisations (RTOs) 2015/AQTF mandatory competency requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ced1390f-48d9-4ab0-bd50-b015e5485705>

# HLTAID011 Provide First Aid

## Modification History

Not applicable.

## Application

This unit describes the skills and knowledge required to provide a first aid response to a casualty in line with first aid guidelines determined by the Australian Resuscitation Council (ARC) and other Australian national peak clinical bodies.

The unit applies to all persons who may be required to provide a first aid response in a range of situations, including community and workplace settings.

*Specific licensing/regulatory requirements relating to this competency, including requirements for refresher training should be obtained from the relevant national/state/territory Work Health and Safety Regulatory Authorities.*

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

*Elements describe the essential outcomes*

*Performance criteria describe the performance needed to demonstrate achievement of the element.*

1. Respond to an emergency situation.

- 1.1. Recognise and assess an emergency situation.
- 1.2. Ensure safety for self, bystanders and casualty.
- 1.3. Assess the casualty and recognise the need for first aid response.
- 1.4. Seek assistance from emergency services.

2. Apply appropriate first aid procedures.

- 2.1. Perform cardiopulmonary resuscitation (CPR) in accordance ARC guidelines.
- 2.2. Provide first aid in accordance with established first aid principles.
- 2.3. Display respectful behaviour towards casualty.
- 2.4. Obtain consent from casualty where possible.
- 2.5. Use available resources and equipment to make the casualty as comfortable as possible.
- 2.6. Operate first aid equipment according to manufacturers' instructions.
- 2.7. Monitor the casualty's condition and respond in accordance with first aid principles.



- 3. Communicate details of the incident.
  - 3.1. Accurately convey incident details to emergency services.
  - 3.2. Report details of incident in line with appropriate workplace or site procedures.
  - 3.3. Complete applicable workplace or site documentation, including incident report form.
  - 3.4. Maintain privacy and confidentiality of information in line with statutory or organisational policies.
- 4. Review the incident.
  - 4.1. Recognise the possible psychological impacts on self and other rescuers and seek help when required.
  - 4.2. Contribute to a review of the first aid response as required.

## Foundation Skills

The Foundation Skills describe those required skills (language, literacy, numeracy and employment skills) that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Unit Mapping Information

Supersedes and not equivalent to HLTAID003 Provide first aid

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ced1390f-48d9-4ab0-bd50-b015e5485705>

# Assessment Requirements for HLTAID011 Provide First Aid

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the workplace or community setting.

There must be evidence that the candidate has completed the following tasks in line with State/Territory regulations, first aid codes of practice, first aid guidelines determined by the Australian Resuscitation Council (ARC) and other Australian national peak clinical bodies and workplace or site procedures:

- managed, in line with ARC guidelines, the unconscious, breathing casualty including appropriate positioning to reduce the risk of airway compromise
- managed, in line with ARC guidelines, the unconscious, non-breathing adult, including:
  - performing at least 2 minutes of uninterrupted single rescuer cardiopulmonary resuscitation (CPR) (5 cycles of both compressions and ventilations) on an adult resuscitation manikin placed on the floor
  - following the prompts of an automated external defibrillator (AED) to deliver at least one shock
  - demonstrating a rotation of single rescuer operators with minimal interruptions to compressions
  - responding appropriately in the event of regurgitation or vomiting
- managed, in line with ARC guidelines, the unconscious, non-breathing infant, including:
  - performing at least 2 minutes of uninterrupted single rescuer CPR (5 cycles both compressions and ventilations) on an infant resuscitation manikin placed on a firm surface
- managed casualties, with the following:
  - anaphylaxis
  - asthma
  - non-life-threatening bleeding
  - choking
  - envenomation, using pressure immobilisation
  - fractures, dislocations, sprains and strains, using appropriate immobilisation techniques
  - minor wound cleaning and dressing
  - nosebleed
  - shock

- responded to at least one simulated first aid incident contextualised to the candidate's workplace or community setting, where the candidate has no knowledge of the casualty's condition prior to starting treatment, including:
  - identifying the casualty's illness or injury through history, signs and symptoms
  - using personal protective equipment (PPE) as required
  - providing appropriate first aid treatment
  - conveying incident details to emergency services or advising casualty on any required post incident action
  - providing an accurate verbal and written report of the incident
  - reviewing the incident.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- guidelines and procedures including:
  - ARC guidelines relevant to the provision of first aid
  - first aid guidelines from Australian national peak clinical bodies
  - potential incident hazards and risk minimisation processes when providing first aid
  - infection control procedures, including use of standard precautions and resuscitation barrier devices
  - requirements for currency of skill and knowledge
  - first aid codes of practice
  - appropriate workplace or site procedures relevant to the provision of first aid
  - contents of first aid kits
- legal, workplace and community considerations including:
  - duty of care requirements
  - own skills and limitations
  - consent and how it relates to the conscious and unconscious casualty
  - privacy and confidentiality requirements
  - awareness of potential need for stress management techniques and available support for rescuers
- considerations when providing CPR, including:
  - upper airway and effect of positional change
  - appropriate duration and cessation of CPR
  - appropriate use of an AED
  - safety and maintenance procedures for an AED
  - chain of survival
  - how to access emergency services
- techniques for providing CPR to adults, children and infants including:
  - how to recognise that a casualty is unconscious and not breathing normally

- rate, ratio and depth of compressions and ventilations
- correct hand positioning for compressions
- basic anatomy, physiology and the differences between adults, children and infants relating to CPR
- signs, symptoms and management of the following conditions and injuries:
  - allergic reaction
  - anaphylaxis
  - asthma
  - non-life-threatening and life-threatening bleeding
  - burns
  - cardiac conditions, including chest pain
  - choking
  - diabetes
  - drowning
  - envenomation - all current treatments
  - eye injuries
  - fractures, dislocations, strains and sprains
  - head, neck and spinal injuries
  - hypothermia
  - hyperthermia
  - minor wounds
  - nose-bleed
  - poisoning
  - seizures
  - shock
  - sharps injuries
  - stroke.

## Assessment Conditions

Each candidate to demonstrate skills in an environment that provides realistic in-depth, scenarios and simulations to assess candidates' skills and knowledge.

Due to the nature of this type of training, it is acceptable for the performance evidence to be collected in a simulated environment.

Compression and ventilation skills must be demonstrated on resuscitation manikins following ARC guidelines for the purpose of assessment of CPR procedures.

Assessment must ensure access to:

- adult and infant resuscitation manikins following ARC guidelines for the purpose of assessment of CPR procedures
- adrenaline auto-injector training device

- AED training devices
- workplace first aid kit
- placebo bronchodilator and spacer device
- different types of wound dressings and bandages
- blankets and items to treat for shock
- personal protective equipment (PPE)
- workplace injury, trauma or illness record, or other applicable workplace or site incident report form.

Simulated assessment environments must simulate real-life situations where these skills and knowledge would be performed, with all the relevant equipment and resources of that workplace or community environment.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors and must hold this unit or demonstrate equivalent skills and knowledge to that contained within this unit.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ced1390f-48d9-4ab0-bd50-b015e5485705>

# MEM11010 Operate mobile load shifting equipment

## Modification History

Release 1. Supersedes and is equivalent to MEM11010B Operate mobile load shifting equipment

## Application

This unit of competency defines the skills and knowledge required to operate mobile load shifting equipment, including planning, moving and placing loads and shutting down and securing equipment after operation where knowledge of codes and signals is not required in workshops and/or on-site locations.

Where the selection and use of hand tools is required unit MEM18001 Use hand tools should also be selected.

Where the use of a forklift is required unit TLILIC2001 Licence to operate a forklift truck should also be selected.

Where the use of an order picking forklift is required unit TLILIC2002 Licence to operate an order picking forklift truck should also be selected.

Where the use of a vehicle loading crane with a capacity of 10 metre tonnes and above is required unit TLILIC0012 Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above) should also be selected.

Depending on the equipment being used a high risk work licence may be required and users should check with the relevant authorities.

**Band: A**

**Unit Weight: 4**

## Pre-requisite Unit

MEM11011	Undertake manual handling
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information

## Competency Field

Materials handling

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	<b>Determine job requirements</b>	1.1	Follow standard operating procedures (SOPs)
		1.2	Comply with work health and safety (WHS) requirements at all times
		1.3	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, job sheets or work instructions
2	<b>Prepare to shift loads</b>	2.1	Inspect work area to identify hazards, and implement appropriate prevention/control measures to avoid hazards
		2.2	Undertake routine pre-operational checks in accordance with manufacturers' specifications and regulatory safety requirements
		2.3	Inspect attachments and/or equipment
3	<b>Check controls and equipment</b>	3.1	Carry out pre-operational and post start-up equipment checks in accordance with manufacturers' specifications and/or operating manual
		3.2	Report defects and damage according to site procedures
4	<b>Shift and place loads</b>	4.1	Select the most appropriate load shifting device to suit load and shifting requirements
		4.2	Operate load shifting device within design specifications and safe working load in accordance with SOPs

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |     |   |
|---|--|-----|---|
|   |  | 4.3 | Lift load, ensuring balance, vision of operation and protection of load                         |
|   |  | 4.4 | Select and use the safe and efficient path of movement  |
|   |  | 4.5 | Check path of movement and monitor for obstacles and hazards                                    |
|   |  | 4.6 | Place loads ensuring safety, stability, protection of material and avoidance of hazards on-site |
| 5 | <b>Shut down equipment and secure site</b> | 5.1 | Park machinery in accordance with procedures, avoiding site and equipment hazards               |
|   |  | 5.2 | Conduct shutdown in accordance with manufacturers' specification to isolate vehicles            |
|   |  | 5.3 | Complete post-operational check in accordance with operational procedures                       |

## Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

- On-site locations include one (1) or more of the following:**
- factories
  - wharfs
  - ships
  - warehouses
  - manufacturing plants



This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

- building sites
- road construction
- demolition sites
- quarries and mine sites

**Pre-operational checks include one (1) or more of the following:**

- battery
- water
- fuel
- hazards warning lights
- fluid or gas leaks
- braking
- movement of booms
- visual checks of tyres
- emergency device/alarms
- log books
- operating motions
- evidence of damage
- excessive wear and tear as determined by manufacturers' specifications and standard operating procedures

**Attachments and/or equipment includes one (1) or more of the following:**

- hooks
- electromagnetic hook
- buckets
- slings
- tag lines
- buckets
- trench
- excavating
- rock breakers
- shackles
- lifting lugs
- fork arms

**Post start-up includes the following:**

- hazards warning systems, attachments, movements and control functions are smooth
- operating and emergency controls and safety devices are located, identified and tested

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

- communication signals are confirmed
- defects and damage are reported

**Load shifting devices include one (1) or more of the following:**

- front end loaders/back hoes
- ride on forklifts
- pallet trucks
- skid steer
- vehicle loading crane

**Safe working load includes the following:**

- assessing weight of load to ensure compliance with equipment load plate specifications

**SOPs include one (1) or more of the following:**

- industry standards
- production schedules
- safety data sheets (SDS)
- work notes and plans
- product labels
- manufacturers' specifications
- operator manuals
- enterprise policies and procedures
- supervisors' oral and written instructions
- current state/territory WHS legislation
- standards and codes of practice

**Obstacles and hazards include one (1) or more of the following:**

- overhead cables
- personnel, obstacles (fixed and moveable)
- trenches
- pits
- uneven terrain
- trees
- underground services
- exposure to chemicals
- dangerous or hazardous substances
- movements of equipment, goods and materials
- vehicular traffic

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

**Shutdown includes the following:**

- post-operational equipment checks, motion locks and brakes are applied
- lifting equipment is checked
- defective equipment is identified, segregated and reported to supervisor
- equipment is correctly stowed

## Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM11010B Operate mobile load shifting equipment

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

# Assessment Requirements for MEM11010 Operate mobile load shifting equipment

## Modification History

Release 1. Supersedes and is equivalent to MEM11010B Operate mobile load shifting equipment

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting tables, figures and instructions (both written and verbal) to work with others to operate mobile load shifting equipment
- performing routine safety, basic service and maintenance procedures as determined by manufacturers' specifications and site procedures
- calculating load masses and safe working loads and assessing calculation to ensure compliance with equipment load plate specifications
- selecting and safely operating appropriate load shifting equipment to shift loads, including interpreting communication signals and instructions
- conducting pre-operational checks, start-up and shutdown procedures
- determining load masses, including irregular shaped loads and equipment requirements
- demonstrating emergency operating procedures
- communicating faults, malfunctions and workplace hazards, reports and maintenance of operational records in accordance with site procedures.

## Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- pre-operational checks
- start-up and shutdown procedures
- manufacturers' and design specifications of load shifting device
- load chart
- licensing requirements
- load protection and safe load placement
- operational environment
- relevant hazards

- effect of load mass and shape on lifting and placing loads
- equipment load plate specifications
- appropriate permits
- workplace communication procedures.

## Assessment Conditions

- Assessors must:
  - have vocational competency in operating mobile load shifting equipment at least to the level being assessed with relevant industry knowledge and experience
  - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

## MEM11010B Operate mobile load shifting equipment

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	This unit covers operating mobile load shifting equipment, including moving and placing loads.
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to the general operation of mobile load shifting equipment, including planning the work, moving and placing loads, and shutting down and securing equipment after operation where knowledge of codes and signals is not required. The unit applies to moving loads in workshops and/or on site.</p> <p>This may include but is not limited to factories, wharfs, ships, warehouses, manufacturing plants, building sites, road construction, demolition sites, quarries and mine sites.</p> <p>If hand tools are required, Unit MEM08001B (Use hand tools) should also be selected.</p> <p>Awareness of licensing requirements - licenses may be required for mobile load shifting equipment in some jurisdictions.</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 4</b></p>
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### Licensing/Regulatory Information

Refer to Application of the Unit

## Pre-Requisites

<b>Prerequisite units</b>		

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare to shift loads	<p>1.1. Work area is inspected to identify hazards, and appropriate prevention/control measures are implemented to avoid hazards.</p> <p>1.2. Routine pre-operational checks are undertaken in accordance with manufacturers' specifications and regulatory safety requirements.</p> <p>1.3. Attachments and/or equipment are inspected.</p>
2. Check controls and equipment	<p>2.1. Pre-operational and post start-up equipment checks are carried out in accordance with manufacturers' specifications and/or operating manual.</p> <p>2.2. Defects and damage are reported according to site procedures.</p>

ELEMENT	PERFORMANCE CRITERIA
3. Shift loads	<p>3.1.The most appropriate load shifting device is selected to suit load and shifting requirements.</p> <p>3.2.Load shifting device is operated within design specifications and safe working load in accordance with standard operating procedures.</p> <p>3.3.Load is lifted, ensuring balance, vision of operation and protection of load.</p> <p>3.4.The safe and efficient path of movement is selected and used.</p> <p>3.5.Path of movement is checked and monitored for obstacles and hazards and safely are maintained.</p>
4. Place loads	<p>4.1.Loads are placed ensuring safety, stability, protection of material and avoidance of hazards on site.</p>
5. Shut down equipment and secure site	<p>5.1.Machinery is parked avoiding equipment hazards.</p> <p>5.2.Shut-down is conducted in accordance with manufacturers' specification to isolate vehicles.</p> <p>5.3.Post-operational check is completed in accordance with operational procedures.</p> <p>5.4.Machinery is parked in accordance with standard operating procedures, avoiding site hazards.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

Look for evidence that confirms skills in:

- interpreting and following routine information on standard operating procedures. May include simple drawings, tables and figures, written documents
- performing routine safety, basic service and maintenance procedures
- calculating load masses and safe working loads
- selecting appropriate load shifting device
- following oral instructions
- safely operating load shifting devices and shifting loads
- working with others
- interpreting communication signals and instructions



## REQUIRED SKILLS AND KNOWLEDGE

- determining load masses and equipment requirements
- determining mass of irregular shaped loads
- demonstrating emergency operating procedures
- communicating faults, malfunctions and workplace hazards, reports and maintenance of operational records

### Required knowledge

Look for evidence that confirms knowledge of:

- pre-operational checks
- design specifications of load shifting device
- load chart
- licensing requirements
- load protection
- safe load placement
- operational environment
- appropriate permits
- hazards and control measures associated with load shifting and equipment
- use and application of personal protective equipment
- safe work practices and procedures
- workplace communication procedures
- manufacturers' specifications

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

A person who demonstrates competency in this unit must be able to operate load sifting equipment to move and place loads.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

**EVIDENCE GUIDE****Context of and specific resources for assessment**

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using load sifting equipment to move and place loads or other units requiring the exercise of the skills and knowledge covered by this unit.

**Method of assessment**

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

**Guidance information for assessment****Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

<b>RANGE STATEMENT</b>	
regional contexts) may also be included.	
<b>Pre-operational checks</b>	Battery, water, fuel, hazards warning lights, fluid or gas leaks, braking, movement of booms, visual checks of tyres, emergency devise/alarms, log books, operating motions, evidence of damage, excessive wear and tear, as determined by manufacturers' specifications and standard operating procedures
<b>Attachments and/or equipment</b>	Hooks, electromagnetic hook, buckets, slings, tag lines, buckets, trench, excavating, rock breakers, shackles, lifting lugs, fork arms
<b>Post start-up</b>	<ul style="list-style-type: none"> <li>• Hazards warning systems, attachments, movements and control functions are smooth</li> <li>• Operating and emergency controls and safety devices are located, identified and tested</li> <li>• Communication signals are confirmed</li> <li>• Defects and damage are reported</li> </ul>
<b>Load shifting device</b>	Front end loaders/back hoes, ride on forklifts and pallet trucks, bobcats, vehicle loading crane
<b>Safe working load</b>	Weight of load is assessed to ensure compliance with equipment load plate specifications
<b>Standard operating procedures</b>	Industry standards, production schedules, material safety data sheets, work notes and plans, product labels, manufacturers' specifications, operator manuals, enterprise policies and procedures, supervisors' oral and written instructions, current State/Territory occupational health and safety legislation, standards and codes of practice
<b>Obstacles and hazards</b>	<ul style="list-style-type: none"> <li>• Overhead cables, personnel, obstacles (fixed and moveable), trenches, pits, uneven terrain, trees, underground services</li> <li>• Exposure to chemicals, dangerous or hazardous substances</li> <li>• Movements of equipment, goods, materials and vehicular traffic</li> </ul>
<b>Shut-down</b>	<ul style="list-style-type: none"> <li>• Post-operational equipment checks, motion locks and brakes are applied</li> <li>• Lifting equipment is checked</li> <li>• Defective equipment is identified, segregated</li> </ul>

**RANGE STATEMENT**

	and reported to supervisor
	• Equipment is correctly stowed

**Unit Sector(s)**

<b>Unit sector</b>	
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**Co-requisite units**

<b>Co-requisite units</b>		

**Competency field**

<b>Competency field</b>	Materials handling
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# **MEM50003 Follow work procedures to maintain the marine environment**

## **Modification History**

Release 1. Supersedes and is equivalent to MEM50003B Follow work procedures to maintain the marine environment

## **Application**

This unit of competency defines the skills and knowledge required to conduct work on vessels or equipment without adversely affecting the quality of the marine environment and applies to the protection of marine environments when working on or around recreational vessels and in workplaces in which vessels are built, repaired, stored, sold and transported.

Where specific coverage of the limitation, capture and disposal of pollutants in the marine environment is required unit MEM50004 Maintain quality of environment by following marina codes should also be selected.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

**Band: A**

**Unit Weight: 1**

## **Pre-requisite Unit**

MEM13015 Work safely and effectively in manufacturing and engineering

## **Competency Field**

Boating services

## **Elements and Performance Criteria**

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 **Follow workplace** 1.1 Follow standard operating procedures (SOPs)

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

	<b>procedures</b>	<p>1.2 Comply with work health and safety (WHS) requirements at all times</p> <p>1.3 Select and use appropriate personal protective equipment (PPE) in accordance with SOPs</p> <p>1.4 Observe workplace and surroundings and use equipment and practices to minimise environmental damage</p> <p>1.5 Complete assigned housekeeping duties following approved workplace procedures</p> <p>1.6 Identify any damaged equipment, tag for maintenance and notify appropriate personnel</p> <p>1.7 Maintain schedules and records for housekeeping duties</p>
2	<b>Demonstrate spill clean-up procedures</b>	<p>2.1 Identify source of spill and stop, if possible, and make notification to appropriate personnel</p> <p>2.2 Identify appropriate materials to contain spills, including booms, portable bunding, absorbent materials and drain blocks</p> <p>2.3 Clean up spills following workplace procedures</p> <p>2.4 Dispose of waste in appropriate locations and containers</p>
3	<b>Assist the business to maintain the quality of the environment</b>	<p>3.1 Follow business environment policy</p> <p>3.2 Avoid excessive idling and revving of engines</p> <p>3.3 Ensure noisy activities are located away from neighbours, where possible</p> <p>3.4 Use noise suppression procedures, where available</p> <p>3.5 Use dust control and waste containment measures</p> <p>3.6 Collect and dispose of waste in accordance with legislative requirements</p>

## Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

**Surroundings include one (1) or more of the following:**

- noting location of drains and interceptors
- bunded work and storage areas
- recyclable, solid and hazardous waste storage
- emergency equipment and spill kits
- areas where work may impact on the environment

**Workplace housekeeping includes the following:**

- covering/protecting surfaces prior to starting work
- returning materials/equipment to storage area
- sweeping and cleaning
- containment and mopping of spills
- appropriate disposal/discharge of waste products

## Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM50003B Follow work procedures to maintain the marine environment

## Links

Companion Volume implementation guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

# **Assessment Requirements for MEM50003 Follow work procedures to maintain the marine environment**

## **Modification History**

Release 1. Supersedes and is equivalent to MEM50003B Follow work procedures to maintain the marine environment

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- locating and interpreting relevant workplace procedures and assessing work activities that can have an impact on the environment
- handling materials, including fuels, oils, protective coatings, and cleaning products
- identifying sources of potential pollution, minimising risks and containing pollution
- implementing appropriate workplace housekeeping methods
- demonstrating procedures for cleaning up spills and disposing of waste
- following business environmental policy and collecting and disposing of waste products in accordance with regulatory and legislative requirements.

## **Knowledge Evidence**

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- pollutants and their sources
- procedures to minimise risk of pollution
- procedures for containment of pollution
- procedures for cleaning up spills and disposing of waste
- applicable environmental legislation and regulatory requirements.

## **Assessment Conditions**

- Assessors must:
  - have vocational competency in following work procedures to maintain the marine environment at least to the level being assessed with relevant industry knowledge and experience



- satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

## MEM50003B Follow work procedures to maintain the marine environment

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	This unit covers conducting work on vessels or equipment without adversely affecting the quality of the marine environment.
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to the protection of marine environments when working on or around recreational vessels. It applies to workplaces in which vessels are built, repaired, stored, sold and transported. These workplaces may involve the use of dangerous goods and hazardous materials and may produce noxious waste products.</p> <p>The unit includes skills and knowledge that are particular to protecting a marine environment and are in addition to those normally applied in the workplace.</p> <p>All work and work practices are undertaken to regulatory and legislative requirements.</p> <p>For specific coverage of the limitation, capture and disposal of pollutants in the marine environment see Unit MEM50004B (Maintain quality of environment by following marina codes).</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 1</b></p>
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## Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

<b>Prerequisite units</b>	
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## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify from work procedures and personal observation activities that may impact on the environment	1.1. Workplace environment and health and safety procedures are located and used to identify approved work procedures. 1.2. Workplace is observed noting location of drains and interceptors; banded work and storage areas; recyclable, solid and hazardous waste storage; emergency equipment and spill kits; areas where work may impact on the environment; and equipment and practices used to minimise environmental damage and legally dispose of waste.
2. Complete assigned housekeeping duties	2.1. Assigned housekeeping duties are completed following workplace procedures ensuring that waste

ELEMENT	PERFORMANCE CRITERIA
	<p>is correctly removed to appropriate location; any damaged equipment is tagged for maintenance and notified to appropriate personnel; and schedules and records for housekeeping duties are maintained.</p> <p>2.2. Housekeeping duties are carried out following workplace approved safe work practices and procedures.</p>
3. Follow spill clean-up procedures	<p>3.1. Source of spill is identified and stopped if possible and notification is made to appropriate personnel.</p> <p>3.2. Appropriate materials are identified to contain spills including booms, portable bunding, absorbent materials and drain blocks.</p> <p>3.3. Spills are cleaned up following workplace procedures.</p> <p>3.4. Waste is disposed of in appropriate locations and containers.</p>
4. Assist the business to maintain the quality of the environment	<p>4.1. Business environment policy is followed.</p> <p>4.2. Excessive idling and revving of engines is avoided.</p> <p>4.3. Noisy activities are located away from neighbours where possible.</p> <p>4.4. Noise suppression procedures are used where available.</p> <p>4.5. Dust control and waste containment measures are used.</p> <p>4.6. Waste is appropriately collected and disposed.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

Look for evidence that confirms skills in:

- locating and interpreting relevant workplace procedures
- assessing work activities that may impact on the environment
- correct use and handling of materials such as fuels, oils, protective coatings, cleaning products

**REQUIRED SKILLS AND KNOWLEDGE**

- identifying sources of potential pollution
- minimising risks of pollution
- containing pollution

**Required knowledge**

Look for evidence that confirms knowledge of:

- identification of pollutants
- procedures to minimise risk of pollution
- procedures for containment of pollution
- overview of applicable environmental legislation

**Evidence Guide****EVIDENCE GUIDE**

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

**Overview of assessment**

A person who demonstrates competency in this unit must be able to conduct work on vessels using sound work practices without adversely affecting the quality of the marine environment.

**Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

**Context of and specific resources for assessment**

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other

<b>EVIDENCE GUIDE</b>	
	units addressing the safety, quality, communication, materials handling associated with a marine environment, or other units requiring the exercise of the skills and knowledge covered by this unit.
<b>Method of assessment</b>	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
<b>Guidance information for assessment</b>	

## Range Statement

<b>RANGE STATEMENT</b>	
<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
<b>Housekeeping duties</b>	<p>Relevant housekeeping duties include:</p> <ul style="list-style-type: none"> <li>• covering/protecting surfaces prior to starting work</li> <li>• returning materials and equipment to appropriate storage</li> <li>• sweeping and cleaning</li> <li>• containment and mopping of spills</li> <li>• appropriate disposal/discharge of waste products</li> </ul>

**Unit Sector(s)**

<b>Unit sector</b>	
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**Co-requisite units**

<b>Co-requisite units</b>		

**Competency field**

<b>Competency field</b>	Boating services
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# MEM50004 Maintain quality of environment by following marina codes

## Modification History

Release 1. Supersedes and is equivalent to MEM50004B Maintain quality of environment by following marina codes

## Application

This unit of competency defines the skills and knowledge required for workers in the industry controlling pollution through the limitation, capture and disposal of pollutants in the marine environment when working on or around recreational vessels and relates to workplaces in which vessels are built, repaired, stored, sold and transported.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

**Band: A**

**Unit Weight: 1**

## Pre-requisite Unit

MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM50003	Follow work procedures to maintain the marine environment

## Competency Field

Boating services

## Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
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1	<b>Determine job</b>	1.1	Follow standard operating procedures (SOPs)
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Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
<b>requirements</b>	<p>1.2 Comply with work health and safety (WHS) requirements at all times</p> <p>1.3 Select and use appropriate personal protective equipment (PPE) in accordance with SOPs</p> <p>1.4 List tasks to be conducted or consult work instructions to establish work requirements</p> <p>1.5 Inspect vessel to be maintained visually to establish any particular potential pollutants</p> <p>1.6 Identify potential pollutants that may be produced as a result of the work</p>
2 <b>Select work area and method</b>	<p>2.1 Identify possible work areas for the work and select to conform to marina/slipway codes and local environmental regulations and to minimise risk of pollution</p> <p>2.2 Select work method, equipment and materials to minimise impact on the environment</p> <p>2.3 Identify pollution control measures and implement</p>
3 <b>Dispose of potential pollutants</b>	<p>3.1 Classify potential pollutants, separate and collect appropriate to the recycling, treatment or storage system adopted by the business</p> <p>3.2 Dispose of collected pollutants in accordance with regulatory requirements and workplace procedures</p>
4 <b>Support implementation of marina and slipway environment management plans</b>	<p>4.1 Follow workplace designated procedures for marina and slipway management</p> <p>4.2 Communicate observations of the effects of the management plan and recommend implementation improvements to appropriate personnel</p> <p>4.3 Participate in the implementation of the environment management plan</p>

## Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

**Pollutants include one (1) or more of the following:**

- wastewater, including bilge/black/grey/storm/cleaning water
- paint, including fumes and overspray
- anti-fouling flakes or solution
- sand or grit from blasting/cleaning
- fuel or oil spills
- discharges of emulsified oil
- domestic waste
- noise
- smoke and fumes

## Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM50004B Maintain quality of environment by following marina codes

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

# **Assessment Requirements for MEM50004 Maintain quality of environment by following marina codes**

## **Modification History**

Release 1. Supersedes and is equivalent to MEM50004B Maintain quality of environment by following marina codes

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and conforming with marina/slipway codes and local environmental regulations to minimise risk of pollution
- communicating observations of the effects of the management plan and recommending implementation improvements
- identifying potential sources of pollution
- identifying work tasks and appropriate area to perform work
- minimising risks of pollution and containing using appropriate measures
- collecting and disposing of pollutants according to SOPs
- following workplace procedures for marina and slipway management.

## **Knowledge Evidence**

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- communication procedures
- marina and slipway environmental management
- identification of pollutants
- procedures to minimise risk of pollution
- procedures for containment of pollution
- applicable environmental legislation
- applicable marina codes and regulations.

## **Assessment Conditions**

- Assessors must:

- have vocational competency in maintaining quality of environment by following marina codes at least to the level being assessed with relevant industry knowledge and experience
- satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

## MEM50004B Maintain quality of environment by following marina codes

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	This unit covers workers in the industry controlling pollution through the limitation, capture and disposal of pollutants in the marine environment.
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to the control of pollution in marine environments when working on or around recreational vessels. It relates to workplaces in which vessels are built, repaired, stored, sold and transported. These workplaces may involve the use of dangerous goods and hazardous materials and may produce noxious waste products and other emissions.</p> <p>The unit includes skills and knowledge that are particular to protecting a marine environment and are in addition to those normally applied in the workplace.</p> <p>All work and work practices are undertaken to regulatory and legislative requirements.</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 1</b></p>
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### Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

Prerequisite units		
Path 1	MEM50003B	Follow work procedures to maintain the marine environment

## Employability Skills Information

Employability skills	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess the environmental implications of the tasks to be conducted	<p>1.1.Tasks to be conducted are listed or work instructions are consulted to establish work requirements.</p> <p>1.2.Vessel to be maintained is visually inspected to establish any particular potential pollutants.</p> <p>1.3.Potential pollutants that may be produced as a result of the work are identified.</p>
2. Select work area and method	<p>2.1.Possible work areas are identified for the work and selected to conform with marina/slipway codes and local environmental regulations and to minimise risk of pollution.</p> <p>2.2.Work method, equipment and materials are selected</p>

ELEMENT	PERFORMANCE CRITERIA
	to minimise impact on the environment. 2.3. Pollution control measures are identified and implemented.
3. Dispose of potential pollutants	3.1. Potential pollutants are classified, separated and collected appropriate to the recycling, treatment or storage system adopted by the business. 3.2. Collected pollutants are disposed of in accordance with regulatory requirements and workplace procedures.
4. Support implementation of marina and slipway environment management plans	4.1. Workplace designated procedures for marina and slipway management are followed. 4.2. Observations of management plan effects and possible implementation improvements are identified and communicated to appropriate personnel. 4.3. Active, positive involvement in implementation of the environment management plan is consistently applied.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

Look for evidence that confirms skills in:

- identifying sources of potential pollution
- minimising risks of pollution
- containing pollution

#### Required knowledge

Look for evidence that confirms knowledge of:

- identification of pollutants
- procedures to minimise risk of pollution
- procedures for containment of pollution
- overview of applicable environmental legislation

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

A person who demonstrates competency in this unit must be able to control pollution through the assessment of potential for pollution, limitation, capture and disposal of pollutants in the marine environment and adherence to good practice codes of conduct. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

#### Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling associated with a marine environment, or other units requiring the exercise of the skills and knowledge covered by this unit.

#### Method of assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and



**EVIDENCE GUIDE**

	documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
<b>Guidance information for assessment</b>	

**Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<b>Pollutants</b>	<p>Any substance or emission which is deemed to be an undesirable contaminant including:</p> <ul style="list-style-type: none"> <li>• waste water including bilge/black/grey/storm/cleaning water</li> <li>• paint including fumes and overspray</li> <li>• anti fouling flakes or solution</li> <li>• sand or grit from blasting/cleaning</li> <li>• fuel or oil spills</li> <li>• discharges of emulsified oil</li> <li>• domestic waste</li> <li>• noise</li> <li>• smoke and fumes</li> </ul> <p>Note that some of these pollutants contain heavy metals, various hydrocarbons/solvents and other toxicants</p>
<b>Marina</b>	Buildings, wharves and surroundings where vessels are built, stored and maintained
<b>Slipway</b>	Areas where vessels are removed from the water for repair, maintenance or storage

**Unit Sector(s)**

<b>Unit sector</b>	
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**Co-requisite units**

<b>Co-requisite units</b>		

**Competency field**

<b>Competency field</b>	Boating services
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# **MSMPER200 Work in accordance with an issued permit**

## **Modification History**

Release 1. Supersedes and is equivalent to MSAPMPER200C Work in accordance with an issued permit

## **Application**

This unit of competency covers the skills and knowledge required to work in accordance with an issued permit. It aims to ensure that people working under a permit to work understand the system, know the limitations of the permit under which they are working and comply with all the requirements of the permit. The people to whom this unit applies may be called 'permit recipients' or 'permit holders' by some organisations. Some organisations call 'permits' 'clearances'.

This unit of competency applies to persons who are required to conduct work activities under the authority of an issued permit to work and within the context and requirements of that permit. This typically applies to all work done by maintenance staff and contractors and also to any other non-process work performed on the plant.

This unit of competency applies to an individual working alone or as part of a team/work group and working in liaison with other team members, as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Nil

## **Competency Field**

Work Control Systems

## **Unit Sector**

## **Elements and Performance Criteria**

Elements describe the essential outcomes

Performance criteria describe the performance needed to demonstrate achievement of the element

- |   |   |     |   |
|---|---|-----|---|
| 1 | <b>Apply for permit</b>                 | 1.1 | Confirm the scope and location of the work to be done   |
|   |   | 1.2 | Identify the need for a work permit for the work to be carried out  |
|   |   | 1.3 | Identify the type of work permit required   |
|   |   | 1.4 | Collate information required for the issue of the permit  |
|   |   | 1.5 | Apply for the permit following the organisation's requirements  |
|   |   |     |   |
| 2 | <b>Identify the scope of the permit</b> | 2.1 | Check that work to be done complies with the permit type  |
|   |   | 2.2 | Check that the scope and location of work comply with the permit issued   |
|   |   | 2.3 | Identify hazards and check that the hazard controls specified on the permit are consistent with the hazard analysis   |
|   |   | 2.4 | Check that preparations specified on the permit have been completed   |
|   |   | 2.5 | Sign onto/receive the permit  |
|   |   |     |   |
| 3 | <b>Prepare for permitted work</b>       | 3.1 | Maintain safe working conditions and environment by using available isolation procedures and safety equipment   |
|   |   | 3.2 | Monitor plant conditions and hazards to ensure work under the permit remains safe   |
|   |   | 3.3 | Ensure that appropriate personal protective equipment (PPE) is selected and worn, and emergency equipment is available, as required by the permit and relevant procedures |
|   |   | 3.4 | Inspect work area to ensure safety and compliance with permit requirements and procedures   |

- |   |   |   |
|---|---|---|
| 4 | <b>Work in accordance with an issued permit</b> | 4.1 Use required hazard reduction/control measures  |
|   |   | 4.2 Comply with requirements of the permit, including safety observer if required   |
|   |   | 4.3 Display issued permit on work site as required  |
|   |   | 4.4 Ensure compliance with scope, location and timeframe specified in the permit.   |
|   |   | 4.5 Seek variation to permit/new permit if job or work environment vary from that specified in the permit                     |
|   |   | 4.6 Suspend job and make worksite safe before leaving job   |
|   |   | 4.7 Formally seek and receive authorised extensions to the permit when required   |
|   |   | 4.8 Give end-of-day status report to permit issuer  |
|   |   |   |
| 5 | <b>Complete permit to work</b>                  | 5.1 Obtain new permit or have existing permit revalidated before work is recommenced  |
|   |   | 5.2 Check the work conducted against the issued permit to ensure that all the nominated work requirements have been satisfied |
|   |   | 5.3 Monitor general housekeeping to ensure that the site has been left in a clean and safe condition                          |
|   |   | 5.4 Ensure personal lock outs/tag outs/isolations are removed in accordance with procedures                                   |
|   |   | 5.5 Communicate status of the work conducted and the results of the permit to relevant personnel                              |
|   |   | 5.6 Complete documentation as required and have permit signed off when job is completed                                       |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

### Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards
- licence and certification requirements

### Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or more of the following:

- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- temporary instructions
- any similar instructions provided

### Work permits

Work permits include one or more of the following:

- cold work/general permit to work
- excavation
- hot work
- vehicle entry
- minor repairs
- working at heights
- confined space entry
- other special permits where there is an appropriate sign-off as required

### Information required for

Information required for the issue of the permit includes one or more of

- permit** the following:
- work description
  - tools to be used
  - process/methods of work/SOPs

Where hazardous materials are being used relevant material safety data sheets (MSDS) will also be required.

- Hazards** Hazards include one or more of the following:
- slips and trips
  - emergency equipment is unavailable
  - smoke, darkness and heat
  - heat, smoke, dust or other atmospheric hazards
  - electricity
  - gas
  - gases and liquids under pressure
  - structural hazards
  - structural collapse
  - industrial (machinery, equipment and product)
  - equipment or product mass
  - noise, rotational equipment or vibration
  - limited head spaces or overhangs
  - work where a fall by a person from one level to another is reasonably likely to cause injury
  - working in restricted or confined spaces, or in environments subjected to heat, noise, dusts or vapours
  - flammability and explosivity
  - hazardous products and materials
  - unauthorised personnel
  - sharp edges, protrusions or obstructions, swarf and scrap
  - spills or leaks
  - extreme weather
  - other hazards that might arise
  - unsafe conditions developing through failure to conform with the provisions of a work permit
  - hazards created by the nature or location of the work
  - hazards created by the proximity of the work to other work or normal operations

- Display issued** The permit holder must keep the issued permit with them on site. It must

**permit**

be displayed or ready to be shown as required by the site/job requirements, including one or more of the following:

- displayed in a mounting provided by the site
- accessible in a folder which is on the worksite
- carried in overall pockets in a manner which allows it to be readily shown on request

## **Unit Mapping Information**

Release 1. Supersedes and is equivalent to MSAPMPER200C Work in accordance with an issued permit

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=d1287d36-dff4-4e9f-ad2c-9d6270054027>



## **Assessment Requirements for MSMPER200 Work in accordance with an issued permit**

### **Modification History**

Release 1. Supersedes and is equivalent to MSAPMPER200C Work in accordance with an issued permit

### **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria, and demonstrate the ability to:

- identify type and scope of permit relevant to the job
- interpret and implement permit conditions
- identify changes to conditions which may lead to the permit being revoked before the job is completed
- monitor hazards and hazard controls.

### **Knowledge Evidence**

Evidence must be provided that demonstrates knowledge of:

- different types of permits and the work they cover, including three (3) or more of:
  - cold work/general permit to work
  - excavation
  - hot work
  - vehicle entry
  - minor repairs
  - working at heights
  - confined space entry
  - other permit types as used on site
- the impact of the regulatory framework and organisation procedures under which the permit operates upon the particular job requiring the permit
- hazards associated with tasks covered by the permit and related hazard controls
- types of tests/inspections required for the issue of work permits including one (1) or more of:
  - atmospheric, oxygen/breathability
  - temperature
  - humidity
  - combustibles, oxygen, enriched or reduced
  - electricity
  - stored pressure/energy

- flammability/explosivity
- toxicity
- electricity
- stored energy/pressure.

## Assessment Conditions

- Competency must be achieved before performing this work unsupervised. Therefore this unit will typically be assessed off the job. Where assessment is undertaken on the job, appropriate supervision and safety precautions must be provided.
- The unit should be assessed holistically and the judgement of competence based on a holistic assessment of the evidence.
- The collection of performance evidence:
  - should provide evidence of the ability to perform over the range of situations which might be expected to be encountered, including typical disruptions to normal, smooth work conditions
  - will typically include the use of appropriate tools, equipment and safety gear requiring demonstration of preparation, operation, completion and responding to problems
  - may use industry-based simulation particularly where safety, lack of opportunity or significant cost is an issue.
- Off-the-job assessment must sufficiently reflect realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from one or more of:
  - walk-throughs
  - demonstration of skills
  - industry-based case studies/scenarios
  - ‘what ifs’.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept).
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- As a minimum, assessors must satisfy the Standards for Registered Training Organisations 2015 assessor requirements.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=d1287d36-dff4-4e9f-ad2c-9d6270054027>

## MSMPER205 Enter confined space

### Modification History

Release 2. Adjustment to Assessment Requirements to meet industry requirements. Equivalent outcomes.

Release 1. Supersedes and is equivalent to MSAPMPER205C Enter confined space

### Application

This unit of competency is required by persons who are required to enter a confined space, as defined by the Australian Standard *AS 2865-2009 Confined spaces*, or its authorised update or replacement.

This unit of competency covers the skills and knowledge required for safe entry to confined spaces under a work permit and for maintaining safety while working in the confined space. The term 'work permit' (or 'permit') includes all written authorities as defined by *AS 2865-2009 Confined spaces*. It applies to persons required to enter confined spaces for any purpose, including maintenance, cleaning, inspection or other reasons.

Work in/entry to confined spaces shall conform to relevant legislation and *AS 2865-2009 Confined spaces*, or its authorised update or replacement.

*AS 2865-2009 Confined spaces* defines a confined space as:

'An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following:

- (a) An oxygen concentration outside the safe oxygen range.
- (b) A concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation.
- (c) A concentration of flammable airborne contaminant that may cause injury from fire or explosion.
- (d) Engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning.'

Entry to a confined space is defined by *AS 2865-2009 Confined spaces* as: 'when a person's head or upper body is within the boundary of the confined space'.

**NOTE:** Inserting an arm for the purpose of atmospheric testing is not considered as entry to a confined space.'

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

MSMPER200 Work in accordance with an issued permit

## Competency Field

Work control systems

## Unit Sector

## Elements and Performance Criteria

Elements describe the essential outcomes

Performance criteria describe the performance needed to demonstrate achievement of the element

- |   |                                 |     |  |
|---|---------------------------------|-----|--|
| 1 | Assess confined space for entry | 1.1 | Confirm the purpose of the required entry  |
|   |                                 | 1.2 | Check the documented risk assessment associated with the entry to the confined space |
|   |                                 | 1.3 | Identify and assess hazards within/around the confined space                         |
|   |                                 | 1.4 | Identify hazard controls and check they are functional and appropriate.              |
|   |                                 | 1.5 | Check the incident/emergency response plan is appropriate to the job                 |
|   |                                 | 1.6 | Rehearse own role in an incident/emergency response                                  |
|   |                                 | 1.7 | Confirm and verify that the conditions of the permit reflect the risk assessment     |
|   |                                 | 1.8 | Ensure the confined space is ready for entry   |
| 2 | Use safety                      | 2.1 | Secure the worksite  |

	equipment and personal protective equipment (PPE)	2.2	Select, fit and wear designated PPE
		2.3	Select, test and use required instruments and monitors
		2.4	Challenge test atmosphere/atmospheric monitoring instrument if required before entry
		2.5	Confirm test/monitoring results show entry is safe
3	Work in accordance with confined space requirements	3.1	Enter confined space safely
		3.2	Work in compliance with permit requirements
		3.3	Arrange re-authorisation/reissue of permits as required
		3.4	Complete confined space working documentation
		3.5	Maintain communications with all relevant personnel
		3.6	Monitor atmosphere within the confined space as required by the permit
		3.7	Monitor environment around the confined space for relevant changes
		3.8	Take appropriate action if there is a change in risk/work environment
4	Conclude confined space operations in accordance with procedures	4.1	Recover, clean, service and store equipment
		4.2	Complete required final documentation
		4.3	Report any issues

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

### Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards
- licence and certification requirements
- *AS 2865-2009 Confined spaces*

All operations to which this unit applies are subject to stringent health, safety and environment (HSE) requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

### Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or more of the following:

- permit to work system
- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- temporary instructions
- any similar instructions provided for the smooth running of the plant

### Confined space permit

The confined space permit must meet the requirements of *AS 2865-2009 Confined spaces*, its authorised replacement or other

appropriate standard.

Conditions of the permit include:

- hazard controls
- PPE
- instruments and monitors to be used
- re-authorisation/reissue requirements
- other specifications for the work

## Ready for entry

Checking the confined space is ready for entry includes checking:

- isolations are complete and appropriate
- isolation complies with regulations, standards and procedures
- atmosphere is safe (or if necessary relevant measures are in place to ensure safe entry into an unsafe atmosphere)
- safe entry and exit methods are in place
- other items to ensure compliance with procedures, permits, relevant legislation and *AS 2865-2009 Confined spaces*.

Where the confined space is not ready for entry appropriate steps must be taken, including reporting deficiencies and/or refusing to enter the space.

## Secure worksite

Securing the worksite includes selecting and erecting/deploying one or more of the following:

- signs
- barriers
- other requirements as defined in the confined space entry permit requirements, *AS 2865-2009 Confined spaces* and other relevant requirements

## Tools and equipment

Tools and equipment include one or more of the following:

- instruments and monitors:
- instruments used for pre-entry testing appropriate to the hazards
- continuous monitors appropriate for the hazards
- other devices used to test the confined space atmosphere
- PPE, such as:
  - eye protection



- ear protection
- gloves
- clothing
- respiratory protection
- helmets
- safety footwear
- lifelines and harnesses
- personal monitors and alarms
- other relevant PPE
- communication equipment
- voice/visual contact
- lifeline communication
- radio communication
- other relevant communication aids

**Re-authorisation/reissue of permits** Requirements for re-authorisation/reissue of permits are required by one or more of the following situations:

- there is any change to work scope or method
- the work situation/workplace conditions changes
- there are deviations from permit conditions
- there is a gap in work continuity
- other site rules require it

**Working documentation** Working documentation includes one or more of the following:

- entry/exit/re-entry logs
- other documentation required by AS 2865-2009 *Confined spaces* (e.g. Section 2.9)
- other documentation required by the permit
- other documentation required by the site

**Appropriate action if there is a change in risk** Where there is a change in risk/work environment appropriate action includes one or more of the following:

- seeking revalidation of the permit
- evacuating the confined space
- instigating/undertaking testing
- raising the alarm
- initiating the emergency/incident response plan
- other relevant action defined in permit conditions or site procedures

**Final documentation**

Final documentation includes one or more of the following:

- signing-off of permit
- documentation related to equipment used
- other required records

**Reporting of issues**

Reporting of issues includes:

- feedback about the work and methods of improving the work process
- signs and symptoms of operational stress
- equipment malfunctions
- wear and tear of equipment and tools
- condition of safety/rescue equipment
- observations about the condition of the confined space
- other issues that might arise

**Hazards**

Hazards include one or more of the following:

- heat, smoke, dust or other atmospheric hazards
- sharp edges, protrusions or obstructions
- limited head spaces or overhangs
- equipment or product mass
- slippery surfaces, spills or leaks
- noise, rotational equipment or vibration
- high/low oxygen content
- hazardous atmospheres (e.g. combustible and toxic)
- entrapment
- engulfment
- heat stress
- claustrophobia
- external hazards that may impact on the safety of those working in the confined space (e.g. exhaust fume or other hazardous vapours being drawn into the confined space by ventilation fans)
- other hazards as identified in *AS 2865-2009 Confined spaces*
- electricity
- gases and liquids under pressure
- structural hazards/collapse
- equipment failures

- industrial (machinery, equipment and product)
- equipment or product mass
- working where there is a reasonable risk of a fall
- flammability and explosivity
- unauthorised personnel
- extreme weather
- other hazards that might arise

## Unit Mapping Information

Release 2. Adjustment to Assessment Requirements to meet industry requirements.  
Equivalent outcomes.

Release 1. Supersedes and is equivalent to MSAPMPER205C Enter confined space

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=d1287d36-dff4-4e9f-ad2c-9d6270054027>

# Assessment Requirements for MSMPER205 Enter confined space

## Modification History

Release 2. Adjustment to Assessment Requirements to meet industry requirements. Equivalent outcomes.

Release 1. Supersedes and is equivalent to MSAPMPER205C Enter confined space

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and demonstrate the ability to:

- identify hazards and apply relevant hazard controls
- undertake all checks and preparation in accordance with permit conditions and site procedures
- check that hazard controls are in place and operational
- confirm the permit conditions reflect risk assessment and confined space is ready for entry
- enter the confined space and carry out actions specified in the permit/standard procedures, including all safety procedures
- monitor the conditions of work under the permit
- interpret and respond to gas test/monitoring results
- initiate incident/emergency response plan
- select, use and maintain equipment, including:
  - instruments and monitors
  - personal protective equipment (PPE)
- use communication equipment and processes applicable to confined space work
- communicate effectively with team/work group and other personnel in the language of the workplace
- complete required workplace forms.

## Knowledge Evidence

Evidence must be provided that demonstrates knowledge of:

- organisation procedures, including:
  - work permit systems
  - safety, emergency and hazard controls
  - incident response
- hazards that may arise in relation to the confined space, including:
  - their possible causes
  - potential consequences
  - appropriate risk controls

- communication protocols relevant to confined space requirements
- tests relevant to confined space entry and the interpretation of test results, including at least one (1) of:
  - atmospheric/oxygen/breathability
  - flammability/explosivity
  - toxicity
  - temperature
  - humidity.

## Assessment Conditions

- Competency must be achieved before performing this work unsupervised. Therefore this unit will typically be assessed off the job. Where assessment is undertaken on the job appropriate supervision and safety precautions must be provided.
- It is appropriate to train and assess the prerequisite unit *MSMPER200 Work in accordance with an issued permit* concurrently. It may also be appropriate to cluster other related units and deliver and assess concurrently.
- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.
- The collection of performance evidence will require a 'practical assessment' which:
  - requires entry, compliant with Section 3.4.29 of *AS 2865-2009 Confined spaces*, on more than one occasion into confined spaces which are reasonable facsimiles of an industrial confined space
  - requires the conduct of a simple task ('work'), while within each confined space
  - requires the entry to be under a confined space entry permit, the permitting system and the permit itself to be reasonable facsimiles of industrial permits and systems
  - requires the person to undertake all checks and complete all documentation that is required for the confined space entry.
- The confined space used should be a reasonable facsimile of an industrial confined space. The use of breathing apparatus and black out goggles is not required for this unit.
- Assessment must sufficiently reflect realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept).
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.

- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- As a minimum, assessors must satisfy the Standards for Registered Training Organisations 2015 assessor requirements.

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=d1287d36-dff4-4e9f-ad2c-9d6270054027>

## PSPGEN038 Identify and treat risks

### Modification History

Release	Comments
1	<p>This unit was released in PSP Public Sector Training Package release 1.0 and meets the Standards for Training Packages.</p> <p>This unit supersedes and is equivalent to PSPGOV417A Identify and treat risks.</p> <ul style="list-style-type: none"><li>• Unit code updated</li><li>• Content and formatting updated to comply with the new standards</li><li>• All PC transitioned from passive to active voice</li></ul>

### Application

This unit describes the skills required to identify and treat risk using the organisation's risk management procedures and treatments. It applies to the risks inherent in all aspects of everyday work in the public sector as well as to specific functional activities and projects related to the particular mandate of the organisation. It includes establishing the risk context, analysing and evaluating risks and monitoring and reviewing the risk treatment plan.

This unit applies to those working in generalist or specialist roles within the public sector.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work independently, performing complex tasks in a range of familiar and unfamiliar contexts.

No licensing, legislative or certification requirements apply to unit at the time of publication.

### Competency Field

General

## Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section.
<b>1. Establish the risk context</b>	<p>1.1 Establish the nature and extent of the work activity within the broader organisational context.</p> <p>1.2 Identify and document outcomes to be achieved.</p> <p>1.3 Analyse relationship between the activity and its environment and identify critical factors in the environment that may impact on the achievement of outcomes.</p> <p>1.4 Identify and consult stakeholders to understand their opinions, concerns and needs.</p> <p>1.5 Determine risk evaluation criteria for the activity.</p>
<b>2. Identify risks</b>	<p>2.1 Select method/s for identifying risks in accordance with risk management policy and procedures, budgetary and time constraints relative to the type of activity to be undertaken.</p> <p>2.2 Identify and document sources of risk as required.</p> <p>2.3 Identify and record risk events related to each source of risk.</p> <p>2.4 Undertake consultation to ensure all possible risks are identified.</p>
<b>3. Analyse risks</b>	<p>3.1 Analyse and rate the probability of identified risks occurring and consequences.</p> <p>3.2 Consider current control measures for any of the identified risks in the risk analysis, and analyse and include residual risks if necessary.</p> <p>3.3 Determine levels of risk in accordance with risk matrix used by the organisation.</p> <p>3.4 Consult as required to confirm risk levels, and document analysis.</p>
<b>4. Evaluate risks</b>	<p>4.1 Evaluate risks by comparing the level of risk with risk evaluation criteria established at the beginning of the risk management process.</p> <p>4.2 Consider the importance of the activity, its outcomes and the degree of control over the risks.</p> <p>4.3 Consider potential and actual losses which may arise from the risk.</p> <p>4.4 Take into account benefits and opportunities presented by the risk.</p> <p>4.5 Identify risks as acceptable or unacceptable in accordance with risk evaluation criteria, and obtain approval.</p> <p>4.6 Prioritise unacceptable risks and document the reason/s for</p>



	acceptance of risks.
<b>5. Treat risks</b>	<p>5.1 Determine options for treating risks.</p> <p>5.2 Select the best treatment option and undertake a cost-benefit analysis.</p> <p>5.3 Prepare, approve and communicate a risk treatment plan to those who will be involved in implementation.</p> <p>5.4 Negotiate changes required to operational structure, procedures or staffing in order to implement risk treatments.</p> <p>5.5 Organise resources and implement risk treatment plan.</p>
<b>6. Monitor and review risk treatment plan</b>	<p>6.1 Monitor changes in the organisational environment and factors impacting on the organisation for their impact on risks and existing risk treatments.</p> <p>6.2 Monitor and adjust risk treatments for unacceptable risks as required.</p> <p>6.3 Monitor acceptable risks to ensure these risk levels do not increase over time.</p> <p>6.4 Consult and collect, analyse and use data relating to risks and risk treatments to improve risk management in own area of operation.</p> <p>6.5 Review risk treatment plan in accordance with timetable for review of plan and updated as required.</p> <p>6.6 Provide input into formal reviews of risk in the organisation to improve risk management outcomes.</p>

## Foundation Skills

Foundation skills are embedded within the elements and performance criteria of this unit.

## Unit Mapping Information

This unit supersedes and is equivalent to PSPGOV417A Identify and treat risks.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

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Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

# Assessment Requirements for PSPGEN038 Identify and treat risks

## Modification History

Release	Comments
1	<p>These Assessment Requirements were released in PSP Public Sector Training Package release 1.0 and meet the Standards for Training Packages.</p> <ul style="list-style-type: none"><li>• Assessment Requirements created drawing upon specified assessment information from superseded unit</li></ul>

## Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- applying legislation, regulations and policies relating to risk management
- researching and analysing the wider context affecting the organisation
- communicating and consulting with a diverse range of stakeholders
- estimating and arranging resources needed for implementation of risk treatments

## Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- public sector legislation including WHS and environment, regulations, policies, procedures and guidelines relating to risk management
- AS/NZS ISO 31000:2009 risk management – principles and guidelines
- HB 436:2004 (guidelines to AS/NZS 4360:2004) Risk Management Guidelines Companion to AS/NZS 4360:2004
- the organisation's risk management framework
- the relationship of risk to context – how the context may define the risks
- the importance of consultation and communication at every stage of the risk management cycle
- risk management as a core activity of everyday work in the public sector
- the diversity of risks in the public sector

## Assessment Conditions

This unit contains no specific industry-mandated assessment conditions. Guidance on suggested and recommended conditions and methods can be found in the Implementation Guide.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

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Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

## PSPGEN042 Exercise delegations

### Modification History

Release	Comments
1	<p>This unit was released in PSP Public Sector Training Package release 1.0 and meets the Standards for Training Packages.</p> <p>This unit supersedes and is equivalent to PSPGOV421A Exercise delegations.</p> <ul style="list-style-type: none"><li>• Unit code updated</li><li>• Content and formatting updated to comply with the new standards</li><li>• All PC transitioned from passive to active voice</li></ul>

### Application

This unit describes the skills required to exercise delegations in the public sector. It includes confirming the delegation, applying other interacting legislation, policy and guidelines.

This unit applies to those working in generalist and specialist roles within the public sector.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work independently performing complex tasks in a range of familiar and unfamiliar contexts.

No licensing, legislative or certification requirements apply to unit at the time of publication.

### Competency Field

General

## Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section.
<b>1. Confirm delegation</b>	<p>1.1 Access and use current information relating to enabling legislation, standards, instructions and delegated authority to maintain up to date knowledge of requirements.</p> <p>1.2 Confirm delegation provided under legislation and the boundaries of that authority.</p> <p>1.3 Identify and confirm rights, responsibilities and accountabilities under the delegation.</p> <p>1.4 Confirm all levels of authority under the delegation with management and staff to ensure referrals as limits of authority are reached.</p>
<b>2. Apply other legislation, policies and instructions</b>	<p>2.1 Identify other legislation, policies or instructions that impact on authority under a delegation and confirm these requirements.</p> <p>2.2 Resolve or refer apparently conflicting legislative directions.</p>
<b>3. Exercise delegations</b>	<p>3.1 Document decisions and keep records to provide audit information of delegated authority exercised.</p> <p>3.2 Identify circumstances requiring the exercise of delegations that are outside own limits and obtain approvals.</p> <p>3.3 Identify risks associated with the exercise of delegations and strategies to manage risks.</p>

## Foundation Skills

Foundation skills are embedded within the elements and performance criteria of this unit.

## Unit Mapping Information

This unit supersedes and is equivalent to PSPGOV421A Exercise delegations.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

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Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

# Assessment Requirements for PSPGEN042 Exercise delegations

## Modification History

Release	Comments
1	<p>These Assessment Requirements were released in PSP Public Sector Training Package release 1.0 and meet the Standards for Training Packages.</p> <ul style="list-style-type: none"><li>• Assessment Requirements created drawing upon specified assessment information from superseded unit</li></ul>

## Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- applying legislation, regulations and policies relating to delegations
- using information technology to access relevant legislation and procedures
- reading complex written materials, including legislation, instructions, and standards, and applying them to work practices
- scanning techniques to locate main ideas in legislation, policy documents and instructions
- using questioning strategies to clarify understanding
- using communication strategies involving exchanges of often complex oral information

## Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- public sector legislation including WHS and environment, regulations, policies, procedures and guidelines relating to delegations
- the range of delegations applicable in the public sector
- instructions and standards relating to delegations
- organisational structure and levels of authority/delegations

## Assessment Conditions

This unit contains no specific industry-mandated assessment conditions. Guidance on suggested and recommended conditions and methods can be found in the Implementation Guide.



Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

## PSPGOV314A Contribute to conflict management

### Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

### Unit Descriptor

This unit covers the requirement to contribute to conflict management in the workplace between self and others, such as staff or clients. It includes recognising the presence of conflict, dealing with emotions, overcoming barriers to communication, gathering the facts, agreeing on and implementing action. It does not include managing conflict between two other parties, formal negotiation, counselling or conducting mediation.

In practice, contributing to conflict management may overlap with other generalist or specialist public sector work activities such as acting ethically, complying with legislation, working effectively, working with diversity, using workplace communication strategies, etc.

This is one of 4 units of competency in the *Working in Government* and *Human Resource Management* Competency Fields that deal with conflict. Related units are:

- PSPGOV411A Deal with conflict
- PSPGOV508A Manage conflict
- PSPHR603B Provide advisory and mediation services
- 
- No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

### Application of the Unit

Not applicable.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

#### 1. Recognise the presence of conflict

- 1.1 ***Conflict situations*** and/or the potential for conflict are recognised and confirmed.
- 1.2 The signs, stages and ***causes of conflict*** are identified.
- 1.3 ***Conflict situations*** are avoided where appropriate, and assistance sought when necessary.
- 1.4 Records of actual/potential conflict are completed in accordance with organisational policy and procedures.

#### 2. Deal with emotions

- 2.1 Own behaviour and feelings about the situation are reflected on.
- 2.2 Own emotions are recognised and managed.
- 2.3 The other party's emotions are acknowledged and dealt with in a manner that prevents escalation.

#### 3. Overcome barriers to communication

- 3.1 Barriers to effective communication are identified.
- 3.2 Factors and issues relevant to the situation are identified, clarified and confirmed using appropriate ***communication techniques***.
- 3.3 Third party support is sought if necessary in accordance with ***legislation, policy and procedures***.
- 3.4 ***Social and cultural differences*** are taken into account in the communication style and approach taken.

**ELEMENT****PERFORMANCE CRITERIA****4. Gather the facts**

- 4.1 The other party is encouraged to relate the facts as they see them.
- 4.2 Information from the other party, as well as emotions or behaviour, is assessed.
- 4.3 Facts from own point of view are shared with the other party objectively .
- 4.4 Additional information is gathered and included where possible, to ensure all perspectives are considered.

**5. Agree on and implement action**

- 5.1 *Strategies* to solve the problem/issue are determined in consultation with the other party.
- 5.2 Where necessary, approval on agreed strategies is obtained in accordance with organisational policy and procedures, and strategies are implemented.
- 5.3 Progress is monitored with other party to confirm the effectiveness of the agreed action.
- 5.4 Records and reports are completed in accordance with legislation, organisational policy and procedures.
- 5.5 Where agreement cannot be reached on strategies for resolution, the problem/issue is referred in accordance with organisational policy and procedures.

**Required Skills and Knowledge**

This section describes the essential skills and knowledge and their level, required for this unit.

**Skill requirements**

Look for evidence that confirms skills in:

- using a range of communication techniques with a diverse workforce and client base including assertiveness, listening, non-verbal communication, language style, problem solving
- using problem solving to deal with unexpected issues or attitudes
- dealing with difficult situations and people
- responding to diversity, including gender and disability
- applying procedures relating to occupational health and safety and environment in the context of conflict resolution

**Knowledge requirements**

Look for evidence that confirms knowledge and understanding of:

- legislation, regulations, organisational policies, procedures and guidelines relating

to managing conflict in the public sector workplace, including equal employment opportunity, diversity, anti-discrimination, harassment, occupational health and safety, privacy, confidentiality, freedom of information

- types of conflict in the workplace and typical causes
- conflict theory including signs, stages, levels, factors involved, results
- group processes and roles people play
- organisational structures and workplace culture
- different social and cultural practices
- conflict resolution skills and strategies
- personal power and positional power
- grievance procedures in the public sector
- equal employment opportunity, equity and diversity principles
- public sector legislation such as occupational health and safety and environment in the context of conflict resolution

## Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

### Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
  - PSPETHC301B Uphold the values and principles of public service
  - PSPGOV301B Work effectively in the organisation
  - PSPGOV302B Contribute to workgroup activities
  - PSPGOV308B Work effectively with diversity
  - PSPGOV312A Use workplace communication strategies
  - PSPLEGN301B Comply with legislation in the public sector
  - PSPOHS301A Contribute to workplace safety

### Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of Employability Skills as they relate to this unit
- contribution to conflict management in a range of (3 or more)

	contexts (or occasions, over time)
<b>Resources required to carry out assessment</b>	<p>These resources include:</p> <ul style="list-style-type: none"><li>• legislation, policy, procedures and protocols relating to the public sector</li><li>• grievance procedures in the public sector</li><li>• strategies and guidelines for dealing with workplace conflict</li><li>• case studies and workplace scenarios to capture the range of situations likely to be encountered when contributing to conflict management</li></ul>
<b>Where and how to assess evidence</b>	<p>Valid assessment of this unit requires:</p> <ul style="list-style-type: none"><li>• a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when contributing to conflict management, including coping with difficulties, irregularities and breakdowns in routine</li><li>• contribution to conflict management in a range of (3 or more) contexts (or occasions, over time)</li></ul> <p>Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:</p> <ul style="list-style-type: none"><li>• people with disabilities</li><li>• people from culturally and linguistically diverse backgrounds</li><li>• Aboriginal and Torres Strait Islander people</li><li>• women</li><li>• young people</li><li>• older people</li><li>• people in rural and remote locations</li></ul> <p>Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:</p> <ul style="list-style-type: none"><li>• case studies</li><li>• portfolios</li><li>• questioning</li><li>• scenarios</li><li>• simulation or role plays</li><li>• authenticated evidence from the workplace and/or training courses</li></ul>
<b>For consistency of assessment</b>	<p>Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments</p>

## Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

<b><i>Conflict situations</i></b> may relate to:	<ul style="list-style-type: none"> <li>• conflicts with work colleagues</li> <li>• refusals to follow directions/guidance</li> <li>• customer complaints/dissatisfaction</li> <li>• disagreements with members of the public</li> <li>• bystander behaviour</li> <li>• drug or alcohol affected persons</li> <li>• persons suffering emotional distress</li> </ul>
<b><i>Causes of conflict</i></b> may include:	<ul style="list-style-type: none"> <li>• personality clashes</li> <li>• poor communication</li> <li>• competing needs</li> <li>• cross-cultural issues</li> <li>• abuse of power</li> <li>• workplace bullying</li> <li>• customer dissatisfaction</li> <li>• gender issues</li> <li>• inter-generational issues</li> </ul>
<b><i>Conflict solutions</i></b> may include:	<ul style="list-style-type: none"> <li>• unsafe situations</li> <li>• escalating situations</li> <li>• situations presenting physical danger</li> <li>• situations beyond one's level of expertise or comfort zone</li> </ul>
<b><i>Communication techniques</i></b> may include:	<ul style="list-style-type: none"> <li>• verbal and non-verbal language</li> <li>• questioning and listening</li> <li>• cooperative language</li> <li>• control of emotions, voice and body language</li> <li>• constructive feedback</li> <li>• reflection</li> <li>• summarising</li> <li>• re-phrasing</li> <li>• paraphrasing</li> <li>• presenting options</li> <li>• using language and concepts suited to the occasion and the other party</li> <li>• showing a willingness to compromise</li> </ul>
<b><i>Legislation, policies and</i></b>	<ul style="list-style-type: none"> <li>• State/Territory or Commonwealth legislation, regulations,</li> </ul>

<b><i>procedures</i></b> may include:	<p>organisational policies, procedures and guidelines relating to the conflict management in the public sector, including equal employment opportunity, diversity, anti-discrimination, harassment, occupational health and safety, privacy, confidentiality, freedom of information</p> <ul style="list-style-type: none"> <li>• public sector standards</li> <li>• codes of practice</li> <li>• codes of ethics</li> <li>• security standards</li> </ul>
<b><i>Social and cultural differences</i></b> may include:	<ul style="list-style-type: none"> <li>• beliefs and values</li> <li>• social conventions</li> <li>• family relationships</li> <li>• codes of conduct</li> <li>• cultural observances</li> <li>• verbal and non-verbal language</li> </ul>
<b><i>Strategies</i></b> may include:	<ul style="list-style-type: none"> <li>• a partnership approach</li> <li>• working cooperatively on solving the problem</li> <li>• third party assistance</li> <li>• mediation</li> </ul>

## Unit Sector(s)

Not applicable.

## Competency field

Working in Government.



## PSPREG003 Apply regulatory powers

### Modification History

Release	Comments
1	<p>This unit was released in PSP Public Sector Training Package release 1.0 and meets the Standards for Training Packages.</p> <p>This unit supersedes and is equivalent to PSPREG401C Exercise regulatory powers.</p> <ul style="list-style-type: none"><li>• Unit code updated</li><li>• Content and formatting updated to comply with new standards</li><li>• All PC transitioned from passive to active voice</li></ul>

### Application

This unit describes the skills required to cover the exercise of powers under the organisation's enabling legislation and other relevant legislation for regulation, monitoring, inspection and investigation.

This unit applies to those working in public sector roles conducting regulatory activities.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work independently as part of a team, performing routine tasks involving a range of familiar and unfamiliar contexts.

No licensing, legislative or certification requirements apply to unit at the time of publication.

### Competency Field

Regulatory

## Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section.
<b>1. Establish regulatory powers</b>	<p>1.1 Access and use current information relating to enabling legislation and regulations to maintain up-to-date knowledge of requirements.</p> <p>1.2 Confirm powers provided under the legislation and the boundaries of those powers.</p> <p>1.3 Identify and confirm compliance requirements of the legislation, related regulations, standards, codes of practice and policy.</p> <p>1.4 Identify and confirm acts and omissions that comprise non-compliance or offences under the legislation.</p>
<b>2. Apply enabling legislation</b>	<p>2.1 Identify and analyse circumstances where regulatory powers will be exercised to determine response or measures to apply.</p> <p>2.2 Identify circumstances requiring the exercise of regulatory powers that are outside own limits and refer to others.</p> <p>2.3 Identify risks associated with the exercise of regulatory powers and strategies to manage risks.</p> <p>2.4 Apply enabling legislation consistent with the boundaries and powers contained therein.</p>
<b>3. Utilise other legislation and standards</b>	<p>3.1 Identify other legislation and standards which impact on powers and confirm their requirements.</p> <p>3.2 Resolve or refer apparently conflicting legislative directions.</p>
<b>4. Work with other organisations</b>	<p>4.1 Identify organisations that have jurisdictions which may overlap and establish and maintain relationships.</p> <p>4.2 Identify organisations available to provide assistance and advice or take referrals and establish relationships for mutual benefit.</p> <p>4.3 Follow organisational protocols and procedures when working with other organisations.</p> <p>4.4 Refer compliance matters to other organisations for action when required.</p> <p>4.5 Follow lead agency protocols and/or lines of authority during operations involving more than one organisation.</p>

## Foundation Skills

Foundation skills are embedded within the elements and performance criteria of this unit.

## Unit Mapping Information

This unit supersedes and is equivalent to PSPREG401C Exercise regulatory powers.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

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<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

# Assessment Requirements for PSPREG003 Apply regulatory powers

## Modification History

Release	Comments
1	<p>These Assessment Requirements were released in PSP Public Sector Training Package release 1.0 and meet the Standards for Training Packages.</p> <ul style="list-style-type: none"><li>Assessment Requirements created drawing upon specified assessment information from superseded unit</li></ul>

## Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- undertaking research and analysis
- using information technology to access relevant legislation and procedures
- reading complex written materials and applying them to work practices
- using scanning techniques
- engaging in discussion involving exchanges of often complex oral information
- choosing regulatory responses and/or measures to fit the circumstances and justifying those responses against legislation, guidelines, policy and regulations

## Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- full range of regulatory powers and the limits to those powers
- enabling legislation
- offences under the legislation
- aspects of criminal law, administrative law, industrial law, contract law
- statutory time limits
- terminology used in legislation and procedures
- organisational policies, guidelines and regulations
- public sector legislation including, health and safety and environment relating to the exercise of regulatory powers

## Assessment Conditions

This unit contains no specific industry-mandated assessment conditions. Guidance on suggested and recommended conditions and methods can be found in the Implementation Guide.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

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<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bebbece7-ff48-4d2c-8876-405679019623>

# PSPREG201A Carry out inspections and monitoring under guidance

## Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

## Unit Descriptor

This unit covers the requirements to carry out inspections and monitoring activities in accordance with relevant legislation and regulations, working under guidance. It includes confirming and preparing for inspections and monitoring activities, carrying out inspections and monitoring activities, acting on routine non-compliance and providing reports.

In practice, carrying out inspections and monitoring under guidance may overlap with other public sector work activities such as handling workplace information, communicating, using technology, working in a public sector environment, working safely, etc.

This unit is one of five units in the *Regulatory Competency* field that deal with inspection and monitoring. Related units are:

- PSPREG301A Undertake routine inspections and monitoring
- PSPREG413A Undertake inspections and monitoring
- PSPREG503A Supervise and carry out complex inspections and monitoring
- PSPREG603A Manage and lead inspection

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

## Application of the Unit

Not applicable.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm and prepare for inspections and monitoring activities	<p>1.1 <i>Tasks</i> are clarified and confirmed with <b><i>other staff members</i></b> in accordance with organisational requirements.</p> <p>1.2 <b><i>Procedures</i></b>, timeframes, resources and equipment requirements are confirmed in accordance with organisational and task requirements.</p> <p>1.3 Legislative requirements, risk management practices and occupational health and safety requirements are confirmed with senior staff.</p> <p>1.4 Communication strategies and development opportunities to make clients aware of their obligations under relevant <b><i>legislation</i></b> are identified with assistance from other staff members.</p> <p>1.5 <b><i>Resources/equipment</i></b> are obtained and prepared in accordance with organisational and task requirements.</p>
2. Carry out inspections and monitoring activities	<p>2.1 <b><i>Inspections and monitoring</i></b> activities are carried out under guidance in accordance with organisational and legislative requirements, including occupational health and safety.</p> <p>2.2 <b><i>Risk management</i></b> strategies are implemented as required in accordance with set procedures and timelines.</p> <p>2.3 Resources/equipment are used and maintained in accordance</p>

**ELEMENT****PERFORMANCE CRITERIA**

- with organisational and task requirements.
- 3. Act on routine non-compliance**
- 3.1 Information/education is provided to achieve client compliance in accordance with organisational guidelines and legislative requirements relating to the seriousness of the possible breach.
- 3.2 Further **action** as a result of failure to achieve compliance is taken in accordance with organisational guidelines and legislative requirements relating to the seriousness of the possible breach.
- 3.3 Guidance is obtained to interpret legislation/regulations, and contraventions accompanied by recommended action are reported in accordance with organisational policy and procedures.
- 3.4 Serious or complex situations are referred for advice or resolution in accordance with organisational policy and procedures.
- 3.5 Assistance is obtained to determine the elements of offences to be prosecuted under relevant legislation, and information/evidence is **collected** and provided in accordance with legislation, procedures and rules of evidence.
- 3.6 When required, court attendance and conduct requirements are fulfilled in compliance with organisational guidelines.
- 4. Provide reports**
- 4.1 **Records** are maintained in accordance with organisational requirements.
- 4.2 Reports are provided in a timely manner and meet organisational requirements for format and content.

**Required Skills and Knowledge**

This section describes the essential skills and knowledge and their level, required for this unit.

**Skill requirements**

Look for evidence that confirms skills in:

- undertaking observation and analysis
- communicating with a diverse range of clients and staff
- responding to diversity, including gender and disability
- writing reports using standard formats
- using computers for word processing and recording of statistical data
- operating workplace equipment
- applying public sector legislation such as occupational health and safety and



environment in the context of inspection and monitoring

### Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- enabling legislation and other public sector legislation including occupational health and safety, environment, privacy
- organisational policy and procedures
- inspection/examination procedures
- monitoring procedures
- elements of an offence
- responses to routine non-compliance
- risk management practices
- equity and diversity principles
- workplace and industry environment

## Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

### Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
  - PSPGOV201B Work in a public sector environment
  - PSPGOV202B Use routine workplace communication techniques
  - PSPGOV203B Deliver a service to clients
  - PSPGOV204B Access and use resources
  - PSPGOV206B Handle workplace information
  - PSPGOV207B Use technology in the workplace
  - PSPGOV208A Write routine workplace materials
  - PSPOHS201B Follow workplace safety procedures

### Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit

- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see Employability Summaries in Qualifications Framework)
- inspections and monitoring undertaken under guidance in a range of (3 or more) contexts (or occasions, over time)

**Resources required to carry out assessment**

These resources include:

- legislation, policy, procedures and protocols relating to inspection and monitoring
- case studies and workplace scenarios to capture the range of inspection and monitoring situations likely to be encountered

**Where and how to assess evidence**

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when carrying out inspections and monitoring, including coping with difficulties, irregularities and breakdowns in routine
- inspections and monitoring undertaken under guidance in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- demonstration
- observation
- portfolios
- questioning
- scenarios
- simulation or role plays
- authenticated evidence from the workplace and/or training

courses

**For consistency of assessment**

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

## Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

***Tasks*** may include:

- inspections/examinations
- monitoring
- surveillance
- basic audit activities
- other compliance assurance activities

***Other staff members*** may include:

- supervisors
- senior policy officers
- senior inspectors
- line managers
- project managers
- program managers
- inspection specialists

***Procedures*** may include:

- observation procedures
- recording, such as surveillance forms, databases
- handling procedures
- sampling procedures
- rejection procedures
- storage procedures
- disinfection procedures
- treatment procedures
- work instructions
- organisational guidelines and code of conduct
- incident reporting procedures
- safety procedures
- emergency procedures

**Legislation** may include:

- evacuation procedures
- Commonwealth legislation and regulations, for example:
  - Commonwealth Quarantine Act 1908, proclamations and regulations
  - Crimes Act 1914 and Criminal Code Act 1995
  - Customs Act 1901 and regulations
  - Wildlife Protection Act 1982
  - Export Control Act 1982
  - Imported Foods Act 1996
  - Occupational Health and Safety Act 1988
- State/Territory and Local Government legislation and regulations, such as those relating to:
  - agriculture
  - horticulture
  - conservation and land management
  - fisheries
  - environmental protection
  - building
  - water
  - emergencies
  - international legislation/codes of behaviour

**Resources and equipment** may include:

- inspection equipment
- maps, plans
- satellite imagery
- aerial photographs
- survey plans
- spatial data and information
- cameras
- personal protective equipment - respirators, gloves, overalls, boots, hearing protection, goggles, masks etc
- test kit equipment
- recording equipment
- measuring equipment
- storage equipment/facilities
- entry authority/warrant
- Global Positioning System (GPS) equipment
- compass
- communication equipment
- computers
- vehicles - 2 or 4 wheel drive

***Inspections and***

***monitoring*** may relate to:

- aircraft
- airfreight
- animal products
- animals
- cargo
- cereals
- collection of biological specimens
- disposal of organic waste
- fresh produce
- goods
- land condition, such as:
  - topography
  - salinity
  - erosion
  - weed infestation
  - vermin infestation
  - fire hazard
  - over grazing
- land improvements, such as:
  - fences
  - buildings
  - sporting or playground equipment
  - irrigation infrastructure
  - sewerage infrastructure
  - waterfront occupations
  - community structures
- land usage
- leases and other tenures, to ensure compliance with conditions
- licence/permit compliance (e.g. vegetation clearing)
- live fish
- livestock
- mail
- mineral samples
- passenger baggage
- people
- pests
- plant products
- plants

- premises
  - properties
  - reserves and their use/s
  - survey activities to maintain readiness for district emergency plans
  - vector monitoring
  - vessels
- Risk management strategies*** may include:
- monitoring
  - treatment
  - containment
  - control
  - eradication
  - destruction
  - biosecurity strategies
- Action on non-compliance*** may include:
- advice
  - warning
  - formal notification of intent
  - infringement notices
  - on-the-spot fines
  - court prosecution
- Collection of evidence*** may include:
- observation
  - interviewing
  - seizure
  - sampling
  - specimen collection
  - recording
  - photographing
  - diagrammatic evidence
  - notes
  - maintenance of case files
  - determination of land ownership
- Records*** may include:
- notes
  - case files
  - statistics
  - forms (application forms, disease notification forms, etc)
  - notices (seizure notice, infringement notice, etc)
  - invoices
  - receipts
  - commercial documentation such as bills of lading, airway

bills

## **Unit Sector(s)**

Not applicable.

## **Competency field**

Regulatory.

## PUALAW003B Give evidence in a judicial or quasi-judicial setting

### Modification History

Release	TP version	Comments
2	PUA12 V1	Layout adjusted. Application revised.
1	PUA00 V8.1	Primary release on TGA.

### Unit Descriptor

This unit covers the competency to prepare evidence, present evidence and follow up on the outcomes of proceedings.

### Application of the Unit

This unit applies to workers who are called to present evidence as an expert witness in relation to specific incidents. This may include detailing incident events in relation to operational and organisational procedures. It does not apply to workers who have a specific and ongoing role in regards to the presentation of evidence.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

This unit contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency.

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for proceedings	<p>1.1 <b><i>Arrangements, role and involvement</i></b> in proceedings are confirmed.</p> <p>1.2 <b><i>Documentation and exhibits</i></b> are prepared in accordance with legislative requirements and <b><i>organisation's policies and procedures</i></b>.</p>
2. Present evidence	<p>2.1 <b><i>Proceedings</i></b> and <b><i>protocols</i></b> relevant to the jurisdiction involved are adhered to throughout the proceedings.</p> <p>2.2 Rules of evidence relevant to the jurisdiction are adhered to.</p> <p>2.3 Evidence is presented in a clear, concise and articulate manner.</p> <p>2.4 Considered expert evidence is provided on request in accordance with organisation's policy and consistent with qualifications and expertise.</p>
3. Follow up outcomes of proceedings	<p>3.1 The outcomes of the proceedings are noted and filed, and reports completed where required according to organisation requirements.</p> <p>3.2 Any required actions are implemented in accordance with organisation policies and procedures.</p>

## Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

### Required Skills

- presenting evidence clearly and concisely
- taking notes

- word-processing
- writing reports

### Required Knowledge

- appeals systems
- exemptions and defences
- general principles of criminal liability
- legislative requirements of presenting evidence
- organisation policies and procedures relating to preparation of documents and evidence and providing expert opinion
- procedures and protocols in different judicial/quasi-judicial systems
- role of legal personnel in judicial/quasi-judicial systems
- types of evidence admissible in judicial/quasi-judicial systems
- types of offences
- use of notes in court/tribunal/commission

## Evidence Guide

### Critical aspects for assessment and evidence required to demonstrate competency in this unit

All documentation and evidence at hand.

Accurate and articulate presentation of evidence.

### Consistency in performance

Evidence should be gathered over a period of time in a range of actual or simulated workplace environments.

### Context of and specific resources for assessment

#### Context of assessment

On the job or in a simulated environment. Written or verbal tests may be used as supporting evidence.

#### Specific resources for assessment

No special requirements.

## Range Statement

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

- Documentation and exhibits***
- reports
  - photographs

may include:

- items of evidence
- media footage
- reports of incidents
- radio/telephone records
- logs

*Witnesses* may include:

- those directly involved
- bystanders and experts

*Court protocols:*

- voice clarity
- language
- impartiality
- respect for people and offices held
- standards of dress
- forms of address

*Organisation's policy and procedures* may vary between sectors and organisations and may include:

- legislation relevant to the proceedings
- legislation relevant to the organisation
- operational performance standards
- organisational personnel practices and guidelines
- organisational quality standards

*Proceeding* may include:

- rules of court
- judicial and quasi judicial tribunals

*Arrangements, role and involvement* may include:

- confirmation of time
- date and location of proceedings
- confirmation of evidence required to be presented

## Unit Sector(s)

Not applicable.

## RIIWHS202E Enter and work in confined spaces

### Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 5.0.

### Application

This unit describes the skills and knowledge required to enter and work in confined spaces in the resources and infrastructure industries.

It applies to those working in operational roles. They generally work under supervision to undertake a prescribed range of functions involving known routines and procedures and take responsibility for the quality of work outcomes.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories and industry sectors. Users must check requirements with relevant body before applying the unit.

*Note: The terms Occupational Health and Safety (OHS) and Work Health and Safety (WHS) are equivalent and generally either can be used in the workplace. In jurisdictions where the National Model WHS Legislation has not been implemented RTOs are advised to contextualise the unit of competency by referring to the existing State/Territory OHS legislative requirements.*

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Plan and prepare for working in confined space	1.1 Obtain, interpret and confirm work requirements 1.2 Access, interpret and apply documentation required to enter and work in confined spaces 1.3 Identify and address potential risks, hazards and environmental issues, and implement control measures according to workplace procedures 1.4 Obtain and confirm authorisation of a confined space entry permit that meets regulatory requirements 1.5 Select and wear appropriate personal protective equipment for

ELEMENT	PERFORMANCE CRITERIA
	<p>planned work activities</p> <p>1.6 Obtain and interpret emergency procedures with the stand-by person, and be prepared for emergency situations</p> <p>1.7 Identify, obtain and implement signage and barrier requirements according to workplace procedures</p> <p>1.8 Select tools and equipment for the tasks, check for serviceability and rectify or report any faults to relevant personnel</p> <p>1.9 Position rescue equipment by the entry permit</p>
2. Work in confined space	<p>2.1 Gain access to confined space</p> <p>2.2 Test and monitor the atmosphere for harmful elements according to workplace procedures</p> <p>2.3 Correctly apply tagging and lock-out procedures</p> <p>2.4 Enter the confined space according to workplace procedures</p> <p>2.5 Maintain ongoing communication with the stand-by person</p> <p>2.6 Comply with entry permit requirements</p> <p>2.7 Monitor and adhere to allocated entry time</p>
3. Exit confined space	<p>3.1 Exit confined space according to workplace procedures</p> <p>3.2 Recover tools, equipment and materials</p> <p>3.3 Conduct inspection of the confined spaces according to workplace procedures</p> <p>3.4 Remove tagging and lock-out procedures</p> <p>3.5 Complete confined space entry permit requirements according to workplace procedures</p>
4. Clean up	<p>4.1 Clear work area and dispose of materials according to workplace procedures</p> <p>4.2 Remove, clean and store barriers and signs</p> <p>4.3 Conduct equipment inspections to identify faults according to manufacturer specifications and workplace procedures and report to relevant personnel</p> <p>4.4 Conduct routine operational servicing, lubrication and housekeeping activities according to workplace procedures</p> <p>4.5 Process written maintenance records according to workplace procedures</p>

## Foundation Skills

*This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.*

SKILL	DESCRIPTION
Reading	<ul style="list-style-type: none"><li>Identifies and interprets information from workplace procedures, documentation and regulations</li></ul>
Writing	<ul style="list-style-type: none"><li>Produces and completes written documents required for workplace procedures</li></ul>
Self-management	<ul style="list-style-type: none"><li>Monitors and minimises own exposure to worksite risks and hazards during activities</li></ul>
Oral communication	<ul style="list-style-type: none"><li>Uses a range of communication techniques and systems to communicate with others</li></ul>

## Unit Mapping Information

Supersedes and is equivalent to RIIWHS202D Entering and working in confined spaces.

## Links

Companion Volume implementation guides is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

# Assessment Requirements for RIIWHS202E Enter and work in confined spaces

## Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 5.0.

## Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- enter and work in confined spaces on at least two occasions, including:
  - obtaining the required entry permit and instructions for performing work in confined spaces
  - interpreting and applying workplace procedures
  - applying tagging and lock out procedures
  - selecting, wearing and caring for personal protective equipment
  - using atmospheric monitoring devices prior to entering the confined space
  - entering the confined space
  - working in the confined space
  - using atmospheric monitoring devices during confined space activity
  - applying safe materials handling methods
  - exiting the confined space
  - removing tagging and lock out.

During the above, the candidate must:

- locate and apply relevant legislation, documentation, policies and procedures and confirm that the work activity is compliant
- implement the requirements, procedures and techniques for entering and working in confined spaces
- work effectively with others to enter and work in confined spaces in a way that meets all required outcomes
- communicate clearly and concisely with others to receive and clarify work instructions and to determine coordination requirements prior to commencing and during work activities.

## Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- key legislation relevant to enter and work in confined spaces
- key policies, procedures and documentation required to enter and work in confined spaces, including:
  - entry and exit procedures, risks and regulations
  - site and equipment safety requirements
  - site isolation and site control responsibilities and authorities
  - safety data sheets
  - incidence and emergency response documentation
- principles and techniques for identifying and responding to:
  - areas that constitute confined spaces
  - types of air contaminants and toxic gases
  - limitations of breathing apparatus
  - relevant hazards and emergencies
- equipment types, characteristics, technical capabilities and limitations
- principles and techniques for using confined space and industry terminology
- techniques for coordinating and communicating job activities with others.

## Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
  - personal protective equipment
  - equipment related to entering and working in confined spaces
  - relevant documentation
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment\* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

### Assessor requirements



Assessors must be able to clearly demonstrate current and relevant industry knowledge and experience to satisfy the mandatory regulatory standards as set out in the Standards for Registered Training Organisations (RTOs) 2015/Australian Quality Training Framework mandatory requirements for assessors current at the time of assessment and any relevant licensing and certification requirements. This includes:

- vocational competencies at least to the level being delivered and assessed
- current industry skills directly relevant to the training and assessment being provided
- current knowledge and skills in vocational training and learning that informs their training and assessment
- formal relevant qualifications in training and assessment
- having knowledge of and/or experience using the latest techniques and processes
- possessing the required level of RII training product knowledge
- having an understanding and knowledge of legislation and regulations relevant to the industry and to employment and workplaces
- demonstrating the performance evidence, and knowledge evidence outlined in this unit of competency, and
- the minimum years of current\*\* work experience after competency has been obtained as specified below in an industry sector relevant to the outcomes of the unit.

It is also acceptable for the appropriately qualified assessor to work with an industry expert to conduct assessment together and for the industry expert to be involved in the assessment judgement. The industry expert must have current industry skills directly relevant to the training and assessment being provided. This means the industry subject matter expert must demonstrate skills and knowledge from the minimum years of current work experience after competency has been obtained as specified below, including time spent in roles related to the unit being assessed:

Industry sector	AQF indicator level***	Required assessor or industry subject matter expert experience
Drilling, Metalliferous Mining, Coal Mining, Extractive (Quarrying) and Civil Infrastructure	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Infrastructure	3-6	3 years
Other sectors	Where this unit is being assessed outside of the resources and infrastructure sectors assessor and/or industry subject matter expert experience should be in-line with industry standards for the sector in which it is being assessed and where no industry standard is specified should comply with any relevant regulation.	

\*Guidance on simulated environments has been stipulated in the Companion Volume Implementation Guide located on VETNet.

\*\*Assessors can demonstrate current work experience through employment within industry in a role relevant to the outcomes of the unit; or, for external assessors this can be demonstrated through exposure to industry by conducting a minimum number of site assessments as determined by the relevant industry sector, across various locations.

\*\*\* While a unit of competency does not have an AQF level, where a unit is being delivered outside of a qualification the first numeric character in the unit code should be considered as the AQF indicator level for assessment purposes.

## **Links**

Companion Volume implementation guides is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

# **SITHCCC002 Prepare and present simple dishes**

## **Modification History**

Not applicable.

## **Application**

This unit describes the performance outcomes, skills and knowledge required to prepare and present a limited range of simple menu items following standard recipes. While some cooking may be involved, there is no requirement to use the full range of basic cookery methods.

The unit applies to operational personnel in kitchens and catering facilities who require some cooking and food preparation skills, but who are not qualified cooks. It may apply to a hospitality or catering organisation, such as cafes, kiosks, canteens and cafeterias or to organisations where catering forms only a small part of the business operation. Dishes prepared are simple in nature, and may include fast food, takeaway food and items that have been prepared off site and need re-thermalising.

It applies to individuals who work with very little independence and under close supervision. They follow predefined organisational procedures and report any discrepancies to a higher level staff member for action.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

SITXFSA001 Use hygienic practices for food safety

## **Competency Field**

Commercial Cookery and Catering

## **Unit Sector**

Hospitality

## **Elements and Performance Criteria**

### **ELEMENTS**

### **PERFORMANCE CRITERIA**

Elements describe the essential outcomes. Performance criteria describe the performance needed to demonstrate achievement of the element.

- |   |  |
|---|--|
| 1. Prepare for service.                       | 1.1. Review menu or product list and recipes to determine preparation requirements for <i>simple dishes</i> .<br>1.2. Check quantities and quality of food items and restock where necessary.<br>1.3. Complete food preparation prior to service.  |
| 2. Prepare food.                              | 2.1. Select and use equipment safely and hygienically according to manufacturer instructions.<br>2.2. Use appropriate cookery methods for dishes.<br>2.3. Re-heat pre-prepared foods at correct temperature for required length of time.<br>2.4. Prepare dishes with appropriate speed and timing.<br>2.5. Use portion control to maximise profitability and minimise waste. |
| 3. Present and store food in clean work area. | 3.1. Present food according to organisational guidelines.<br>3.2. Display food in appropriate <i>environmental conditions</i> .<br>3.3. Clean work area, and dispose of or store surplus and re-usable by-products according to organisational procedures, environmental considerations, and cost-reduction initiatives.   |

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

### SKILLS

### DESCRIPTION

- |                                    |  |
|------------------------------------|--|
| Reading skills to:                 | <ul style="list-style-type: none"><li>• read and interpret product information and organisational procedures regarding food preparation, display and storage requirements.</li></ul> |
| Writing skills to:                 | <ul style="list-style-type: none"><li>• prepare food item restocking orders.</li></ul>   |
| Numeracy skills to:                | <ul style="list-style-type: none"><li>• weigh and measure ingredients</li><li>• determine cooking times and temperatures.</li></ul>  |
| Planning and organising skills to: | <ul style="list-style-type: none"><li>• efficiently sequence the stages of food preparation.</li></ul>   |
| Technology skills to:              | <ul style="list-style-type: none"><li>• use food preparation and cooking equipment.</li></ul>  |

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

*Simple dishes* must include:

- dishes prepared off site and re-thermalised
- dishes containing a small number of ingredients
- dishes that require singular or limited cooking and preparation techniques.

*Environmental conditions* must ensure appropriate:

- atmosphere
- humidity
- light
- packaging
- temperature
- use of containers
- ventilation.

## Unit Mapping Information

SITHCCC102 Prepare simple dishes

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# Assessment Requirements for SITHCCC002 Prepare and present simple dishes

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- prepare six different simple dishes selecting one from each of the following categories of simple fresh and cooked dishes:
  - baked/roasted
  - deep-fried items
  - pasta and noodles
  - poached eggs
  - salads
  - sandwiches
- use each of the following applications at least once when preparing above simple dishes:
  - cleaning, peeling and slicing raw food
  - batters
  - coatings
  - garnishes
  - marinades
- use at least six different cookery methods from the following list when preparing above simple dishes:
  - baking
  - boiling
  - braising
  - deep and shallow frying
  - grilling
  - poaching
  - pressure cooking
  - steaming
- handle and prepare pre-prepared items requiring:
  - reconstituting
  - thawing
  - re-thermalising
- prepare each of the above simple dishes:

- within commercial time constraints and deadlines
- reflecting required quantities to be produced
- following procedures for portion control and food safety practices when handling, storing, preparing and serving different food types
- responding to special customer requests
- present simple prepared and pre-prepared food in line with organisational display and food safety requirements.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- characteristics of the simple dishes described in the performance evidence
- basic cookery methods for simple dishes described in the performance evidence
- methods for presenting types of food described in the performance evidence
- food safety practices for preparing and storing ingredients and simple dishes:
  - appropriate environmental conditions to ensure food safety
  - correct processes for re-heating pre-prepared foods
  - appropriate methods to optimise shelf life
- safe operational practices using essential functions and features of equipment used to prepare simple dishes.

## Assessment Conditions

Skills must be demonstrated in an operational commercial kitchen. This can be:

- an industry workplace
- a simulated industry environment, such as a training kitchen servicing customers.

Assessment must ensure access to:

- fixtures and large equipment:
  - commercial grade work benches (1.5 m/person)
  - commercial ovens with trays (one per two persons)
  - designated area for dry goods and perishables
  - double sink
  - gas, electric or induction stove tops (two burners per person)
  - food processors and mixers
  - fryers with baskets
  - grill
  - hotplate or griddle
  - microwave
  - refrigeration unit with shelving

- salamanders
- slicing machine
- small equipment:
  - assorted pots and pans
  - blenders
  - containers for hot and cold food
  - crockery
  - cutlery
  - cutting boards
  - food handler gloves
  - knife sharpening equipment
  - sharpening steels and stones
  - knives:
    - bread
    - chef
    - palette
    - utility
  - oven mitts
  - receptacles for presentation and display purposes
  - scales
  - scoops, skimmers and spiders
  - small utensils:
    - peelers, corers and slicers
    - tongs and serving utensils
  - thermometers
- cleaning materials and equipment:
  - cleaning cloths
  - commercial cleaning and sanitising agents and chemicals for cleaning commercial kitchens, equipment and food storage areas
  - dustpans and brooms
  - garbage bins and bags
  - hand towel dispenser and hand towels
  - mops and buckets
  - separate hand basin and antiseptic liquid soap dispenser for hand washing
  - sponges, brushes and scourers
  - tea towels
- organisational specifications:
  - equipment manufacturer instructions
  - mise en place lists and standard recipes
  - food safety plan



- guidelines relating to food disposal, storage and presentation requirements
- safety data sheets (SDS) for cleaning agents and chemicals
- variety of commercial ingredients used to prepare the dishes specified in the performance evidence
- industry-realistic ratios of kitchen staff to customers; these can be:
  - staff and customers in an industry workplace during the assessment process; or
  - individuals who participate in role plays or simulated activities, set up for the purpose of assessment, in a simulated industry environment operated within a training organisation.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# **SITHCCC005 Prepare dishes using basic methods of cookery**

## **Modification History**

Not applicable.

## **Application**

This unit describes the performance outcomes, skills and knowledge required to use a range of basic cookery methods to prepare dishes.

The unit applies to cooks working in hospitality and catering organisations. This could include restaurants, educational institutions, health establishments, defence forces, cafeterias, kiosks, cafes, residential caterers, in-flight and other transport caterers, and event and function caterers.

It applies to individuals who work with very little independence and under close supervision and guidance of more senior chefs. They follow predefined organisational procedures and report any discrepancies to a higher level staff member for action.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

SITXFSA001 Use hygienic practices for food safety

## **Competency Field**

Commercial Cookery and Catering

## **Unit Sector**

Hospitality

## **Elements and Performance Criteria**

### **ELEMENTS**

Elements describe the essential outcomes.

### **PERFORMANCE CRITERIA**

Performance criteria describe the performance needed to demonstrate achievement of the element.

1. Select ingredients.
  - 1.1. Confirm food production requirements from food preparation list and standard recipes.
  - 1.2. Calculate ingredient amounts according to requirements.
  - 1.3. Identify and select ingredients from stores according to recipe, quality, freshness and stock rotation requirements.
  - 1.4. Check perishable supplies for spoilage or contamination prior to preparation.
2. Select, prepare and use equipment.
  - 2.1. Select type and size of equipment suitable to requirements.
  - 2.2. Safely assemble and ensure cleanliness of equipment before use.
  - 2.3. Use equipment safely and hygienically according to manufacturer instructions.
3. Portion and prepare ingredients.
  - 3.1. Weigh and measure ingredients and create portions according to recipe.
  - 3.2. Prepare, cut and portion ingredients according to recipe and cooking style.
  - 3.3. Minimise waste to maximise profitability of food items prepared.
4. Cook dishes.
  - 4.1. Select and use cookery methods for dishes following standard recipes.
  - 4.2. Complete cooking process in a logical, planned and safe manner.
  - 4.3. Identify problems with the cooking process and take corrective action.
  - 4.4. Work cooperatively with colleagues to ensure timely preparation of dishes.
5. Present and store dishes.
  - 5.1. Present dishes on appropriate service-ware.
  - 5.2. Add garnishes and accompaniments according to standard recipes.
  - 5.3. Clean work area, and dispose of or store surplus and re-usable by-products according to organisational procedures, environmental considerations, and cost-reduction initiatives.

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

### SKILLS

### DESCRIPTION

Reading skills to:

- locate information in menus and standard recipes in order to determine food preparation requirements.

Oral communication skills to:

- listen and respond to colleagues' specific enquiries or problems.

- Numeracy skills to:
- calculate the number of portions
  - determine cooking times and temperatures.
- Teamwork skills to:
- ensure that individual contributions to the plating of a dish supports timely and quality food service.
- Self-management skills to:
- apply safety procedures when working in the kitchen
  - deal with pressure of work and kitchen conditions.

## Unit Mapping Information

SITHCCC201 Produce dishes using basic methods of cookery

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## Assessment Requirements for SITHCCC005 Prepare dishes using basic methods of cookery

### Modification History

Not applicable.

### Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- follow standard recipes for dishes that demonstrate use of each of the following major food types:
  - dairy products
  - dry goods
  - frozen goods
  - fruit
  - meat
  - poultry
  - seafood
  - vegetables
- demonstrate food safety practices for handling and storing each of the major food types
- use each of the following cookery methods and complete mise en place activities when preparing the above dishes:
  - baking
  - blanching
  - boiling
  - braising
  - deep-frying
  - grilling
  - poaching
  - roasting
  - shallow frying (pan-fry, sauté or stir-fry)
  - steaming
  - stewing
  - microwaving
- prepare the above dishes for at least six different customers:
  - within commercial time constraints and deadlines
  - reflecting required quantities to be produced
  - demonstrating portion control procedures

- responding to special customer requests and dietary requirements.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- major food types and their characteristics:
  - dairy products
  - dry goods
  - frozen goods
  - fruit
  - general food items:
    - batters
    - coatings
    - condiments and flavourings
    - garnishes
    - oils
    - sauces
  - meat
  - poultry
  - seafood
  - vegetables
- how the major food types are used in different dishes and the effects on them of the different cookery methods listed in the performance evidence
- meaning and role of mise en place in the process of preparing, cooking and presenting food
- essential culinary terms in, and key principles and practices of, the cookery methods described in the performance evidence
- contents of stock date codes and rotation labels
- safe operational practices using essential functions and features of equipment used in the above cookery methods.

## Assessment Conditions

Skills must be demonstrated in an operational commercial kitchen. This can be:

- an industry workplace
- a simulated industry environment, such as a training kitchen servicing customers.

Assessment must ensure access to:

- fixtures and large equipment:
  - commercial grade work benches (1.5 m/person)

- commercial ovens and trays (one per two persons)
- commercial refrigeration facilities:
  - cool room and/or fridge
  - freezer
- designated storage areas for dry goods and perishables
- double sink
- gas, electric or induction stove tops (two burners per person)
- commercial:
  - blenders and food mills
  - planetary mixers
- deep-fryer
- hot plate or griddle
- lifting and transporting equipment
- microwave
- salamander or other form of griller (one per four persons)
- small equipment:
  - baking sheets and trays
  - colander
  - containers for hot and cold food
  - cutting boards
  - food handler gloves
  - graters
  - juicers
  - knife sharpening equipment
  - sharpening steels and stones
  - knives:
    - bread knives
    - carving knives
    - filleting knives
    - palette knives
    - utility knives
  - measurers:
    - metric calibrated measuring jugs
    - measuring spoons
    - portion control scoops
  - mortar and pestle
  - mouli
  - oven mitts
  - pots and pans
  - service-ware:

- platters, dishes, and bowls
- cutlery and serving utensils
- salad spinner
- scoops, skimmers and spiders
- scales
- slicing machine
- stainless steel bowls
- small utensils:
  - flour and drum sieves
  - peelers, corers and slicers
  - strainers and chinois
  - scrapers
  - spatulas
  - pastry brush
  - tongs and serving utensils
  - whisks:
    - fine stainless steel wire
    - coarse stainless steel wire
- steamers
- spoons:
  - large plain and slotted metal spoons
  - ladles in a variety of sizes
  - wooden spoons
- temperature probes
- thermometers
- cleaning materials and equipment:
  - cleaning cloths
  - commercial cleaning and sanitising agents and chemicals for cleaning commercial kitchens, equipment and food storage areas
  - dustpans and brooms
  - garbage bins and bags
  - hand towel dispenser and hand towels
  - mops and buckets
  - separate hand basin and antiseptic liquid soap dispenser for hand washing
  - sponges, brushes and scourers
  - tea towels
- organisational specifications:
  - equipment manufacturer instructions
  - mise en place lists, menus and standard recipes
  - ordering and docketing paperwork



- food safety plan
- guidelines relating to food disposal, storage and presentation requirements
- safety data sheets (SDS) for cleaning agents and chemicals
- temperature recording charts
- work flow schedules
- cleaning schedules
- diverse and comprehensive range of perishable food supplies for commercial cookery and catering operations as specified in the performance evidence
- industry-realistic ratios of kitchen staff to customers; these can be:
  - staff and customers in an industry workplace during the assessment process; or
  - individuals who participate in role plays or simulated activities, set up for the purpose of assessment, in a simulated industry environment operated within a training organisation.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors; and:

- have achieved the Certificate III in Commercial Cookery or Certificate IV in Commercial Cookery to assess this unit as part of a Certificate III in Commercial Cookery or Certificate IV in Commercial Cookery qualification; and
- have worked in industry for at least three years where they have applied the skills and knowledge of this unit of competency.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# **SITHCCC011 Use cookery skills effectively**

## **Modification History**

Not applicable.

## **Application**

This unit describes the performance outcomes, skills and knowledge required to use a range of cookery skills during service and production periods. The unit integrates key technical and organisational skills covered in individual units and focuses on the way these must be applied in a commercial kitchen.

The unit applies to hospitality and catering operations, including restaurants, educational institutions, health establishments, defence forces, cafeterias, kiosks, cafes, residential caterers, in flight and other transport caterers, and event and function caterers. It applies to individuals who prepare a range of food items using standard recipes, but who may not be fully qualified cooks. Styles of menus may be classical, contemporary or ethnic and may be formal or informal according to organisational requirements.

This unit underpins the more advanced integrated unit: SITHCCC020 Work effectively as a cook, which applies to qualified cooks.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

SITXFSA001 Use hygienic practices for food safety

## **Competency Field**

Commercial Cookery and Catering

## **Unit Sector**

Hospitality

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

1. Organise and prepare for food service or production.

2. Cook menu items for food service or production.

3. Complete end of shift requirements.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1. Calculate ingredient quantities according to recipes and specifications.
- 1.2. Prepare a job checklist for food preparation and service that is clear, complete and appropriate to situation.
- 1.3. Follow instructions about menu requirements and job roles.
- 1.4. Follow a work schedule to maximise efficiency, taking into consideration roles and responsibilities of other team members.
- 1.5. Complete *food organisation and preparation* according to different food production and service requirements.
- 2.1. Select and use appropriate commercial equipment to produce menu items in line with manufacturer specifications.
- 2.2. Cook menu items according to menu type and service style, using appropriate cookery methods.
- 2.3. Work cooperatively as part of a kitchen team.
- 2.4. Follow workplace safety and hygiene procedures according to organisational and legislative requirements.
- 2.5. Maintain cleanliness and tidiness of the work environment.
- 3.1. Complete *end of shift procedures* according to organisational practices.
- 3.2. Store food items appropriately to minimise food spoilage, contamination and waste, and label according to organisational procedures.
- 3.3. Participate in post-shift debrief or handover.

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

### SKILLS

### DESCRIPTION

- Reading skills to:
- locate information in production instructions, task sheets in work schedules, and standard recipes.
- Writing skills to:
- write a list of tasks to be completed as part of the food production

- process.
- Numeracy skills to:
- measure familiar quantities of ingredients using simple measuring instruments.
- Problem-solving skills to:
- respond to problems in the preparation and cooking process.
- Learning skills to:
- identify organisational requirements that apply to own and workplace safety, productivity and hygiene procedures.
- Teamwork skills to:
- work cooperatively with others to support timely and quality food service
  - work safely in the kitchen, supporting a safe environment for self and others.
- Self-management skills to:
- respond to multiple demands simultaneously to support live service and production period
  - deal with pressure of work and kitchen conditions.
- Technology skills to:
- use a range of commercial kitchen equipment when preparing different menu types based on standard recipes.

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

***Food organisation and preparation*** must include:

- cleaning and preparing vegetables and other ingredients
- preparing and portioning food types, ingredients and dishes
- selecting and using service-ware and equipment.

***End of shift procedures*** must include:

- cleaning procedures
- post-shift debrief or handover
- preparing work area for the next food service or production period
- restocking
- storing food items
- updating stock inventory.

## Unit Mapping Information

SITHCCC207 Use cookery skills effectively

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# Assessment Requirements for SITHCCC011 Use cookery skills effectively

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- safely and hygienically prepare and serve menu items to industry and organisational quality standards for a minimum of twelve complete service periods (shifts) that cover a combination of:
  - breakfast
  - dinner
  - lunch
  - special function
- multi-task and integrate technical and other skills to respond to multiple demands simultaneously
- respond to special customer requests
- perform designated kitchen roles as part of a team to achieve production requirements during the above service periods
- work professionally undertaking tasks according to team responsibilities and organisational requirements
- prepare dishes appropriate to each of the above service periods within the typical workplace time constraints of a busy commercial kitchen.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- culinary terms commonly used in the industry and organisation
- characteristics of different foods from all main food categories prepared in the organisation
- features and interpretation of standard recipes
- basic principles and methods of cookery
- established roles and responsibilities in food preparation and production processes
- organisational procedures for:
  - planning, preparing and storing food
  - end of shift
  - workplace safety and hygiene

- essential principles and practices related to:
  - food safety and hygiene
  - kitchen safety and cleanliness
- safe operational practices using essential functions and features of equipment in use.

## Assessment Conditions

Skills must be demonstrated in an operational commercial kitchen. This can be:

- an industry workplace
- a simulated industry environment, such as a training kitchen servicing customers.

Assessment must ensure access to:

- fixtures and large equipment:
  - bain marie
  - commercial:
    - blenders and food mills
    - food processor
    - planetary mixers
  - commercial grade work benches (1.5 m/person)
  - commercial ovens with trays (one per two persons)
  - commercial refrigeration facilities:
    - cool room
    - freezer
    - fridge
  - deep-fryer
  - designated storage areas for dry goods and perishables
  - double sink
  - gas, electric or induction stove tops (two burners per person)
  - hot plate or griddle
  - microwave
  - lifting and transporting equipment
  - recording systems
  - salamander or other form of griller (one per four persons)
  - storage facilities:
    - shelving
    - trays
  - slicing machine
  - steamers
- small equipment:

- baking sheets and trays
- beaters
- containers for hot and cold food
- cutting boards
- food handler gloves
- graters
- juicers
- knife sharpening equipment
- sharpening steels and stones
- knives and cleavers:
  - bread knives
  - butcher and boning knives
  - chef knives
  - carving knives
  - large serrated cake knives
  - palette knives
  - filleting knives
  - utility knives
- measurers:
  - metric calibrated measuring jugs
  - measuring spoons
  - portion control scoops
- meat mallet
- moulds and forms
- mouli
- oven mitts
- pans and pots for small and large production:
  - stainless steel, cast iron, iron and non-stick fry pans
  - stainless stock pots
- piping bags and attachments
- poachers
- scoops, skimmers and spiders
- service-ware:
  - platters, dishes and bowls
  - cutlery and serving utensils
- small utensils:
  - flour and drum sieves
  - peelers, corers and slicers
  - strainers and chinois
  - scrapers



- spatulas
- pastry brush
- tongs and serving utensils
- whisks:
  - fine stainless steel wire
  - coarse stainless steel wire
- salad spinner
- scales
- sets of stainless steel bowls
- steamers
- spoons:
  - large plain and slotted metal spoons
  - ladles in a variety of sizes
  - serving spoons
  - wooden spoons
- temperature probes
- thermometers
- cleaning materials and equipment:
  - cleaning cloths
  - commercial cleaning and sanitising agents and chemicals for cleaning commercial kitchens, equipment and food storage areas
  - dustpans and brooms
  - garbage bins and bags
  - hand towel dispenser and hand towels
  - mops and buckets
  - separate hand basin and antiseptic liquid soap dispenser for hand washing
  - sponges, brushes and scourers
  - tea towels
- organisational specifications:
  - equipment manufacturer instructions
  - current commercial stock control procedures and documentation for ordering, monitoring and maintaining stock
  - mise en place lists, menus, standard recipes, and recipes for special dietary requirements
  - ordering and docketing paperwork
  - guidelines relating to food disposal, storage and presentation requirements
  - food safety plan
  - safety data sheets (SDS) for cleaning agents and chemicals
- diverse and comprehensive range of perishable food supplies for commercial cookery or catering operations

- industry-realistic ratios of kitchen staff to customers; these can be:
  - staff and customers in an industry workplace during the assessment process; or
  - individuals who participate in role plays or simulated activities, set up for the purpose of assessment, in a simulated industry environment operated within a training organisation.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors; and:

- have achieved the Certificate III in Commercial Cookery or Certificate IV in Commercial Cookery to assess this unit as part of a Certificate III in Commercial Cookery or Certificate IV in Commercial Cookery qualification; and
- have worked in industry for at least three years where they have applied the skills and knowledge of this unit of competency.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## SITHCCC102 Prepare simple dishes

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	New unit.  Covers content included in SITHCCC001B Organise and prepare food, SITHCCC002A Present food and SITHCCC031A Operate a fast food outlet.

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to prepare and present a limited range of simple menu items following standard recipes. While some cooking may be involved, there is no requirement to use the full range of basic cookery methods.

### Application of the Unit

This unit applies to individuals who require some cooking and food preparation skills, but who are not qualified cooks. It may apply to catering outlets such as kiosks, canteens and cafeterias or to organisations where catering forms only a small part of the business operation. Dishes prepared are simple in nature, and may include fast food, take away food and items that have been prepared off-site and need re-thermalising.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

### Pre-Requisites

This unit must be assessed after the following prerequisite unit:	
SITXFSA101	Use hygienic practices for food safety

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |                            |  |
|----------------------------|--|
| 1. Prepare for service.    | 1.1 Review menu or product list to determine preparation requirements for <b><i>simple dishes</i></b> .    |
|                            | 1.2 Check quantities and quality of food items and restock where necessary.                                |
|                            | 1.3 Complete <b><i>food preparation</i></b> prior to service.  |
| 2. Prepare food.           | 2.1 Select and use <b><i>equipment</i></b> safely and hygienically according to manufacturer instructions. |
|                            | 2.2 Use appropriate cookery methods for dishes.  |
|                            | 2.3 Re-heat pre-prepared foods at correct temperature for required length of time.                         |
|                            | 2.4 Prepare dishes with appropriate speed and timing.  |
|                            | 2.5 Use portion control to maximise profitability and minimise waste.                                      |
| 3. Present and store food. | 3.1 Present food according to organisational guidelines.   |
|                            | 3.2 Display and store food in appropriate <b><i>environmental conditions</i></b> .                         |

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to:
  - interact with customers in a polite and friendly manner
  - provide clear and accurate information
- literacy skills to:
  - interpret instructions, menus and recipes

- write orders
- numeracy skills to:
  - weigh and measure ingredients
  - determine cooking times and temperatures
- planning and organising skills to efficiently sequence the stages of food preparation
- problem-solving skills to adjust preparation and cooking to meet work requirements
- self-management skills to manage own speed and timing
- technology skills to use food preparation and cooking equipment.

### Required knowledge

- characteristics of a range of simple dishes
- basic cookery methods for simple dishes, including:
  - boiling
  - barbecuing
  - frying:
    - deep
    - shallow
  - grilling
  - microwaving
  - reheating
  - roasting
- presentation methods for different types of food
- equipment used to produce simple dishes:
  - essential features and functions
  - safe operational practices
- storage of ingredients and simple dishes:
  - correct environmental conditions to ensure food safety
  - appropriate methods to optimise shelf life.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- prepare a variety of simple dishes within commercial time constraints to meet multiple and diverse customer

requests

- integrate knowledge of:

preparation methods for simple dishes

- essential features and functions of food preparation equipment
- food safety practices.

### **Context of and specific resources for assessment**

Assessment must ensure use of:

an operational food preparation area with the fixtures, large and small equipment defined in the Assessment Guidelines; this can be a:

- real industry workplace
- simulated industry environment such as a training kitchen servicing customers
- industry-realistic ratios of staff to customers
- food preparation lists and standard recipes
- a variety of commercial ingredients.

### **Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the individual preparing and serving simple dishes
- evaluation of the taste of food produced by the individual
- written or oral questioning to assess knowledge of the product characteristics of a range of simple dishes, equipment, cookery methods and
- appropriate environmental storage conditions
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### **Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITHCCC101 Use food preparation equipment
- SITHCCC206 Rethermalise chilled and frozen foods.

## **Range Statement**

The range statement relates to the unit of competency as a whole. It allows for different work

environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Simple dishes*** may include:

- dishes prepared off-site and re-thermalised
- dishes containing a small number of ingredients
- dishes that require singular or limited cooking and preparation techniques:
  - finger food
  - fish and chips
  - fried chicken
  - hamburgers
  - hot dogs
  - kebabs
  - noodles
  - pasta
  - pies
  - pizza
  - pre-prepared soups
  - salads
  - sandwiches.

***Food preparation*** may include:

- displaying food items
- handling pre-prepared items:
  - reconstituting
  - thawing
  - rethermalising
- making:
  - batters
  - coatings
  - garnishes
  - salads
  - sandwiches
- preparing raw food:
  - cleaning
  - peeling
  - slicing.

***Equipment*** may include:

- bains marie
- blenders
- cooking ranges:
  - electric

- gas
- induction
- crockery
- cutlery
- food processors and mixers
- knives and knife sharpening equipment
- fryers
- grills and griddles
- microwaves
- ovens
- pans
- salamanders
- scales
- slicers
- steamers
- thermometers
- utensils.
- atmosphere
- humidity
- light
- packaging
- temperature
- use of containers
- ventilation.

*Environmental conditions* relates to appropriate:

## Unit Sector(s)

Hospitality

## Competency Field

Commercial Cookery and Catering



## SITHCCC201 Produce dishes using basic methods of cookery

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	E Replaces and is equivalent to SITHCCC005A Use basic methods of cookery. Title changed to better reflect the intent and content of the unit. Unit structure made consistent across all cooking units. Re-worked Elements, Performance Criteria, Required Skills and Knowledge to better articulate content. Any 'must' statements in Range moved to Required Knowledge and Critical aspects for assessment.

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to use a range of basic cookery methods to prepare dishes.

### Application of the Unit

This unit applies to hospitality and catering organisations, and to cooks who usually work under the guidance of more senior chefs.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

### Pre-Requisites

This unit must be assessed after the following prerequisite unit:	
SITXFSA101	Use hygienic practices for food safety

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |                                       |   |
|---------------------------------------|---|
| 1. Select ingredients.                | 1.1 Confirm <b><i>food production requirements</i></b> from food preparation list and standard recipes.<br>1.2 Calculate ingredient amounts according to requirements.<br>1.3 Identify and select ingredients from stores according to recipe, quality, freshness and stock rotation requirements.  |
| 2. Select, prepare and use equipment. | 2.1 Select <b><i>equipment</i></b> of correct type and size.<br>2.2 Safely assemble and ensure cleanliness of equipment before use.<br>2.3 Use equipment safely and hygienically according to manufacturer instructions.  |
| 3. Assemble and prepare ingredients.  | 3.1 Weigh and measure ingredients and create portions according to recipe.<br>3.2 Prepare, cut and portion ingredients according to recipe and cooking style.<br>3.3 Minimise waste and store reusable by-products.   |
| 4. Cook dishes.                       | 4.1 Use cookery methods for <b><i>dishes</i></b> following standard recipes.<br>4.2 Complete cooking process in a logical and safe manner.<br>4.3 Identify problems with the cooking process and take corrective action.<br>4.4 Work cooperatively with colleagues to ensure timely preparation of dishes.<br>4.5 Present dishes according to recipe. |

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

**Required skills**

- initiative and enterprise skills to minimise wastage
- literacy skills to read menus, recipes and task sheets
- numeracy skills to:
  - calculate the number of portions
  - weigh and measure ingredients
  - determine cooking times and temperatures
- planning and organising skills to work in a logical and planned way
- problem-solving skills to respond to problems in the cooking process
- self-management skills to:
  - work safely in the kitchen
  - deal with pressure of work and kitchen conditions
- technology skills to use food preparation and cooking equipment.

**Required knowledge**

- characteristics of different food types, their use in different dishes and the effects of different cookery methods on those foods, including:
  - dairy products
  - dry goods
  - fruit
  - general food items:
    - batters
    - coatings
    - condiments and flavourings
    - garnishes
    - oils
    - sauces
  - meat
  - poultry
  - seafood
  - vegetables
- the meaning and role of mise en place in the process of preparing, cooking and presenting food
- culinary terms and principles and practices of different cookery methods including:
  - baking
  - blanching
  - boiling
  - braising
  - deep-frying
  - grilling

- poaching
- roasting
- shallow frying:
  - pan-frying
  - sauté
  - stir-frying
- steaming
- stewing
- microwaving
- contents of stock date codes and rotation labels
- equipment used for cookery methods:
  - essential features and functions
  - safe operational practices.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Evidence of the ability to:

- follow standard recipes for dishes that together use all of the following ingredients:
  - dairy products
  - dry goods
  - fruit
  - general food items
  - meat
  - poultry
  - seafood
  - vegetables
- complete mise en place activities for different dishes
- use a range of cookery methods to prepare dishes including:
  - baking
  - blanching
  - boiling
  - braising

- deep-frying
- grilling
- poaching
- roasting
- shallow frying:
  - pan-frying
  - sauté
  - stir-frying
- steaming
- stewing
- microwaving
- produce food for multiple customers within commercial time constraints
- integrate knowledge of:
  - major food types, culinary terminology and equipment as they relate to the required methods of cookery
  - features, functions and safe use of food preparation equipment
  - food safety practices for handling and storing different food types.

### **Context of and specific resources for assessment**

Assessment must ensure use of:

- an operational commercial kitchen with the fixtures, large and small equipment and workplace documentation defined in the Assessment
- Guidelines, including items for all defined cookery methods; this can be a:
  - real industry workplace
  - simulated industry environment such as a training kitchen servicing customers
- food preparation lists and standard recipes
- a variety of commercial ingredients
- industry-realistic ratios of kitchen staff to customers.

### **Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the individual cooking dishes
- evaluation of the taste and visual appeal of dishes prepared by the individual
- use of projects that allow assessment of the individual's ability to produce a variety of dishes for different

occasions

- use of visual and taste recognition exercises so the individual can identify ingredient and product characteristics
- written or oral questioning to assess knowledge of culinary terms, quality indicators for dishes, equipment and cookery methods
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### **Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITHCCC204 Produce vegetable, fruit, egg and farinaceous dishes
- SITHCCC207 Use cookery skills effectively.

## **Range Statement**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Food production requirements*** may include:

- deadlines
- portion control
- quantities to be produced
- special customer requests
- special dietary requirements.

***Equipment*** may include:

- bains marie
- blenders
- cooking ranges:
  - electric
  - gas
  - induction
- crockery
- cutlery
- food processors and mixers
- knives and knife sharpening equipment
- fryers
- grills and griddles

- microwaves
- ovens
- pans
- salamanders
- scales
- slicers
- steamers
- thermometers
- utensils.

*Dishes* may include:

- appetisers
- breakfast items
- café-style items
- dishes of limited complexity:
  - containing a small number of ingredients
  - requiring a single cookery method
- fast food
- partially-prepared items
- pasta dishes.

## Unit Sector(s)

Hospitality

## Competency Field

Commercial Cookery and Catering

## SITHCCC207 Use cookery skills effectively

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	E Replaces and is equivalent to SITHCCC027A Prepare, cook and serve food for food service. Title changed to allow for application in broader catering contexts. Four prerequisite units removed. SITXFSA101 Use hygienic practices for food safety retained as a prerequisite. 'Service' broadened to any production context. Minor adjustments to expression of content to streamline and improve unit.

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to use a range of cookery skills for live service or production periods. The unit integrates key technical and organisational skills. It brings together the skills and knowledge covered in individual units and focuses on the way these must be applied in a commercial kitchen. This unit underpins the more advanced integrated unit SITHCCC309 Work effectively as a cook, which applies to qualified cooks.

### Application of the Unit

This unit applies to hospitality and catering operations and to individuals who prepare a range of food items, but who may not be fully qualified cooks. Styles of menus may be classical, contemporary or ethnic and may be formal or informal according to organisational requirements.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

### Pre-Requisites

This unit must be assessed after the following prerequisite unit:
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SITXFSA101	Use hygienic practices for food safety
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## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |  |  |
|--|--|
| <p>1. Organise and prepare for food service or production.</p> | <p>1.1 Calculate commodity quantities according to recipes and specifications.</p> <p>1.2 Prepare a jobs checklist for food that is clear, complete and appropriate to the situation.</p> <p>1.3 Follow instructions about menu requirements and job roles.</p> <p>1.4 Follow a work schedule to maximise efficiency, taking into consideration roles and responsibilities of other team members.</p> <p>1.5 Complete food organisation and preparation according to different food production and service requirements.</p> |
| <p>2. Cook menu items for food service or production.</p>      | <p>2.1 Select and use appropriate commercial equipment to produce menu items.</p> <p>2.2 Cook menu items according to menu type and service style, using appropriate cookery methods.</p> <p>2.3 Work cooperatively as part of a kitchen team.</p> <p>2.4 Follow workplace safety and hygiene procedures according to organisation and legislative requirements.</p> <p>2.5 Maintain cleanliness and tidiness of the work environment.</p>   |
| <p>3. Complete end of shift requirements.</p>                  | <p>3.1 Complete end of shift procedures according to organisational practices.</p> <p>3.2 Store food items appropriately to minimise food spoilage, contamination and wastage, and label them according to organisational procedures.</p> <p>3.3 Participate in post shift debrief or handover.</p>  |

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication and teamwork skills to work cooperatively with others
- literacy skills to read menus, recipes and task sheets
- planning and organising skills to work in a logical and planned way
- problem-solving skills to:
  - respond to problems in the cooking process
  - deal with pressure of work and kitchen conditions
- numeracy skills to weigh and measure ingredients
- self-management skills to:
  - work safely in the kitchen
  - deal with pressure of work and kitchen conditions
- technology skills to use kitchen equipment.

### Required knowledge

- culinary terms commonly used in the industry and organisation
- characteristics of different foods from all main food categories prepared in the organisation
- features of standard recipes
- procedures for organising and preparing food
- basic principles and methods of cookery
- features and functions of commercial kitchen equipment
- principles and practices of planning and organising work
- principles and practices related to food safety
- principles and practices related to kitchen safety.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Evidence of the ability to:

- prepare and serve multiple items for a minimum of 12 complete service periods (shifts)
- use cookery methods appropriate to menu items
- produce a range of menu items to industry and

organisational quality standards

- use safe food hygiene and work practices
- multi-task and integrate technical and other skills to respond to multiple demands simultaneously
- work as part of a team in a positive and courteous manner
- prepare dishes within the typical workplace time constraints of a busy commercial kitchen
- integrate knowledge of relevant organisational policies and procedures.

### **Context of and specific resources for assessment**

Assessment must ensure use of:

- an operational commercial kitchen with the fixtures, large and small equipment and workplace documentation defined in the Assessment
- Guidelines; this can be a:
  - real industry workplace
  - commercial kitchen operated within a training organisation that services customers
- industry-realistic ratios of kitchen staff to customers
- food preparation lists and standard recipes
- a variety of commercial ingredients.

### **Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the individual working as part of a kitchen team
- sampling of menu items produced by the individual
- evaluation of customer feedback about menu items and speed and timing of service
- written or oral questioning to assess knowledge about ingredients, cookery techniques, equipment and food hygiene
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### **Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- any Asian cookery, commercial cookery, kitchen operations or patisserie unit relevant to the job role.

## Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Food organisation and preparation*** may include:

- cleaning and preparing vegetables and other commodities
- cooking soups and other precooked items
- preparing and portioning:
  - meat
  - poultry
  - seafood
- preparing:
  - desserts
  - dressings
  - garnishes
  - sauces
  - stocks
- selecting and using serveware and equipment.

***Food production and service requirements*** may include:

- different menu types:
  - a la carte
  - buffet
  - pre-ordered items
  - set menu
- different service periods:
  - breakfast
  - dinner
  - lunch
  - special function.

***End of shift procedures*** may include:

- cleaning procedures
- debriefing sessions
- preparations for the next food service or production period
- quality reviews
- restocking
- storage of food items.

## **Unit Sector(s)**

Hospitality

## **Competency Field**

Commercial Cookery and Catering

# **SITHKOP001 Clean kitchen premises and equipment**

## **Modification History**

Not applicable.

## **Application**

This unit describes the performance outcomes, skills and knowledge required to clean food preparation areas, storage areas, and equipment in commercial kitchens to ensure the safety of food. It requires the ability to work safely and to use resources efficiently to reduce negative environmental impacts.

This unit is particularly important within a food safety regime and applies to all hospitality and catering organisations with kitchen premises, including permanent or temporary kitchens or smaller food preparation areas. These can be found within restaurants, cafes, kiosks, cafeterias, clubs, hotels, attractions and in catering facilities.

The unit applies to kitchen personnel who work with very little independence and under close supervision, including kitchen attendants and stewards. It can also apply to cooks and chefs in small organisations.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

SITXFSA001 Use hygienic practices for food safety

## **Competency Field**

Kitchen Operations

## **Unit Sector**

Hospitality

## **Elements and Performance Criteria**

### **ELEMENTS**

### **PERFORMANCE CRITERIA**

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Clean and sanitise kitchen equipment.	1.1. Select and prepare cleaning agents and chemicals according to cleaning schedule and product instructions. 1.2. Clean and sanitise kitchen equipment to ensure safety of food that is prepared and served to customers. 1.3. Store cleaned equipment in designated place.
2. Clean service-ware and utensils.	2.1. Sort service-ware and utensils and load dishwasher with appropriate items. 2.2. Hand wash any items not appropriate for dishwasher. 2.3. Dispose of broken or chipped service-ware within scope of responsibility, and report losses to supervisor. 2.4. Ensure that sufficient supplies of clean, undamaged crockery are available at all times during the service period.
3. Clean and sanitise kitchen premises.	3.1. Clean and sanitise kitchen surfaces and <b>food preparation and storage areas</b> according to cleaning schedule to ensure the safety of food that is prepared and served to customers. 3.2. Clean areas of any animal and pest waste and report incidents of infestation. 3.3. Follow safety procedures in the event of a chemical accident. 3.4. Sort and remove linen according to organisational procedures. 3.5. Sort and promptly dispose of kitchen waste to avoid cross-contamination with food stocks.
4. Work safely and reduce negative environmental impacts.	4.1. Use cleaning agents, chemicals and cleaning equipment safely and according to manufacturer instructions. 4.2. Use personal protective equipment and safe manual handling techniques when cleaning equipment and premises. 4.3. Reduce negative environmental impacts through efficient use of energy, water and other resources. 4.4. Sort general kitchen waste from recyclables and dispose of them in designated recycling bins. 4.5. Safely dispose of kitchen waste, especially hazardous substances, to minimise negative environmental impacts.

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

<b>SKILLS</b>	<b>DESCRIPTION</b>
Reading skills to:	<ul style="list-style-type: none"> <li>• read and interpret workplace documents and diagrams in:               <ul style="list-style-type: none"> <li>• safety and waste disposal procedures</li> <li>• safety data sheets (SDS) and product instructions for cleaning agents and chemicals.</li> </ul> </li> </ul>
Writing skills to:	<ul style="list-style-type: none"> <li>• complete orders to replace out of stock cleaning materials.</li> </ul>
Oral communication skills to:	<ul style="list-style-type: none"> <li>• report infestation incidents, providing specific information regarding pest waste and discussing approach to treatment.</li> </ul>
Numeracy skills to:	<ul style="list-style-type: none"> <li>• follow simple dilution requirements for chemicals and cleaning products, and calculate ratios in order to make them up.</li> </ul>
Learning skills to:	<ul style="list-style-type: none"> <li>• locate key information in cleaning schedules and procedures manuals.</li> </ul>
Planning and organising skills to:	<ul style="list-style-type: none"> <li>• efficiently sequence the stages of cleaning kitchen equipment and premises.</li> </ul>
Self-management skills to:	<ul style="list-style-type: none"> <li>• manage own speed, timing and productivity</li> <li>• recognise a chemical accident and follow safety procedures to avoid food contamination.</li> </ul>
Technology skills to:	<ul style="list-style-type: none"> <li>• use automatic dishwashers and reassemble kitchen equipment after cleaning.</li> </ul>

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

***Food preparation and storage areas*** must include:

- benches and working surfaces
- cool rooms
- cupboards
- pantry
- freezers
- fridges
- microwaves
- ovens
- storerooms
- stoves.



## **Unit Mapping Information**

SITHKOP101 Clean kitchen premises and equipment

## **Links**

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# Assessment Requirements for SITHKOP001 Clean kitchen premises and equipment

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- efficiently follow cleaning schedules to clean food preparation and food storage areas in a commercial kitchen on at least six different occasions
- clean each of the following large and small equipment items on at least six occasions according to cleaning schedules:
  - cooking equipment:
    - large and small pots
    - fry pans
    - deep-fryers
    - baking trays
  - dishwashers
  - garbage bins
  - glasswashers
  - measures:
    - scales
    - temperature probes
  - mechanical food preparation equipment:
    - commercial mixers: food processors, blenders and attachments
    - mincers
    - slicing machines
  - ovens
- clean and replenish the following commercial service-ware and utensils on at least six occasions:
  - cutting boards
  - containers
  - cooking utensils
  - crockery and dishes
  - cutlery
  - glassware
  - graters and peelers

- knives
- sort soiled linen and prepare for collection by laundry staff according to organisational procedures on at least six occasions:
  - cleaning cloths
  - clothing
  - napkins
  - serving cloths
  - tablecloths
  - tea towels
- perform the above cleaning work demonstrating use of:
  - different types of cleaning agents and chemicals for kitchens and equipment
  - cleaning, sanitising and disinfecting methods for kitchens and equipment
  - correct and environmentally sound disposal methods for waste and hazardous substances
  - efficient use of energy, water and other resources
- complete above cleaning tasks:
  - within commercial time constraints
  - selecting and using correct personal protective equipment.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- hygiene and cross-contamination issues for kitchens and the importance and purpose of cleaning regimes
- different types of cleaning and sanitising products and chemicals for kitchens and equipment:
  - automatic dishwasher:
    - liquid
    - powder
    - tablets
  - bleach
  - cleaning agents for specialised surfaces
  - deodorisers
  - dishwashing liquid
  - disinfectants
  - floor cleaners
  - glass cleaner
  - pesticides
  - stainless steel cleaner and polish
  - window cleaner

- uses of different types of cleaning and sanitising products and chemicals for kitchens and equipment
- safe practices for using and storing different types of cleaning and sanitising products, chemicals and hazardous substances
- safe operational practices using essential functions and features of equipment used to clean kitchen premises and equipment
- content of safety data sheets (SDS) for cleaning agents and chemicals, or plain English workplace documents or diagrams that interpret the content of SDS
- cleaning, sanitising and disinfecting methods that avoid risk to food for the following food preparation and storage areas:
  - kitchen floors, shelves and walls
  - kitchen equipment, service-ware and utensils
- purpose of the following personal protective equipment used when cleaning:
  - face masks
  - gloves
  - goggles
  - rubber aprons
- safe manual handling techniques for cleaning equipment and premises, especially bending, lifting and carrying heavy equipment
- environmental impacts of cleaning commercial kitchens and equipment and minimal impact practices to reduce them, especially those that relate to water and energy use
- correct and environmentally sound disposal methods for kitchen waste:
  - broken service-ware
  - food waste
  - hazardous substances:
    - animal fat
    - chemicals
    - cleaning agents
    - cooking oils
    - ghee
    - grease
  - pest waste
  - recyclables:
    - glass bottles and jars
    - plastics
    - paper and cardboard
    - tin or aluminium containers
    - fruit and vegetable matter
  - used or out of date ingredients and food items
- organisation-specific information:
  - contents of cleaning schedules

- contents of safety procedures for chemical accidents
- procedures for disposing of contaminated food
- reporting mechanisms for infestations
- standards of presentation for the premises.

## Assessment Conditions

Skills must be demonstrated in an operational commercial kitchen. This can be:

- an industry workplace
- a simulated industry environment, such as a training kitchen servicing customers.

Assessment must ensure access to:

- commercial kitchen with food preparation and storage areas with floor, walls and shelves
- fixtures and large equipment:
  - bain marie or hot box
  - commercial:
    - blenders and food mills
    - mixers and attachments
  - commercial dishwasher
  - commercial grade work benches
  - commercial ovens with timer and trays:
    - convection
    - deck
    - microwave
  - commercial refrigeration facilities:
    - cool room
    - freezer
    - fridge
  - electronic equipment used for stock control
  - deep-fryer
  - double sink
  - gas, electric or induction stove tops
  - salamander or other form of griller
  - storage facilities:
    - shelving
    - trays
  - slicing machine
- small equipment:
  - cutting, chopping and slicing implements

- cutting boards
- graters
- knives and cleavers:
  - butcher and boning knives
  - butter spreading knives
  - bread knives
  - carving knives
  - large serrated cake knives
  - filleting knives
  - utility knives
- measurers:
  - metric calibrated measuring jugs
  - measuring spoons
  - portion control scoops and markers
- meat:
  - bats
  - cleavers
  - hooks
  - thermometers
  - mincers
  - saws
- scales (1 gram increments) and scales for weighing large quantities
- scoops, skimmers and spiders
- service-ware:
  - platters, dishes and bowls
  - cutlery and serving utensils
- small utensils:
  - flour and drum sieves
  - peelers, corers and slicers
  - strainers and chinois
  - scrapers
  - spatulas
  - pastry brush
  - tongs and serving utensils
- whisks:
  - fine stainless steel wire
  - coarse stainless steel wire
- spoons:
  - large plain and slotted metal spoons
  - ladles in a variety of sizes

- serving spoons
- wooden spoons
- temperature probes
- thermometers
- personal protective equipment specified in the knowledge evidence
- cleaning materials and equipment:
  - cleaning cloths
  - commercial cleaning and sanitising agents and chemicals for cleaning commercial kitchens, equipment and food storage areas
  - dishwashers
  - dustpans and brooms
  - floor scrubbers or polishers
  - garbage bins and bags
  - mops and buckets
  - pressurised steam and water cleaners
  - sponges, brushes and scourers
  - swabs
  - tea towels
  - waste sink for mops
- organisational specifications:
  - equipment manufacturer manuals
  - current commercial stock control procedures and documentation for ordering, monitoring and maintaining cleaning stock
  - commercial cleaning schedules
  - food preparation lists
  - ordering and docketing paperwork
  - safety procedures for chemical accidents
  - SDS for cleaning agents and chemicals and plain English workplace documents or diagrams that interpret the content of SDS.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## SITHKOP101 Clean kitchen premises and equipment

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	<p>N</p> <p>Replaces but is not equivalent to SITHCCC004B Clean and maintain kitchen premises.</p> <p>Title simplified. Unit has tighter focus on cleaning kitchens to avoid food safety issues. Some Performance Criteria removed which duplicated content of related unit SITHACS101 Clean premises and equipment. Re-worked Elements, Performance Criteria, Required Skills and Knowledge to more fully articulate content.</p> <p>Moved to new competency field – Kitchen Operations to better reflect the content of this unit.</p>

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to clean food preparation, storage areas and equipment in commercial kitchens to ensure the safety of food. It requires the ability to work safely and to use resources efficiently to reduce negative environmental impacts.

### Application of the Unit

This unit is particularly important within a food safety regime and applies to all hospitality and catering organisations with kitchen premises including permanent or temporary kitchens or smaller food preparation areas. These can be found within restaurants, cafes, kiosks, cafeterias, clubs, hotels, attractions and in catering facilities.

It applies to kitchen personnel who work with very little independence and under close supervision including kitchen attendants and stewards. It can also apply to cooks and chefs in small organisations.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.



## Pre-Requisites

This unit must be assessed after the following prerequisite unit:	
SITXFSA101	Use hygienic practices for food safety

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Clean and sanitise kitchen equipment.</li> </ol> | <ol style="list-style-type: none"> <li>1.1 Select and prepare <b><i>cleaning agents and chemicals</i></b> according to product instructions.</li> <li>1.2 Clean and sanitise <b><i>kitchen equipment</i></b> to ensure safety of food prepared and served to customers.</li> <li>1.3 Store cleaned equipment in designated place.</li> </ol>   |
| <ol style="list-style-type: none"> <li>2. Clean serviceware and utensils.</li> </ol>       | <ol style="list-style-type: none"> <li>2.1 Sort <b><i>serviceware and utensils</i></b> and load dishwasher with appropriate items.</li> <li>2.2 Hand wash any items not appropriate for dishwasher.</li> <li>2.3 Dispose of broken or chipped serviceware, within scope of responsibility, and report losses to supervisors.</li> <li>2.4 Ensure that sufficient supplies of clean, undamaged crockery are available at all times during the service period.</li> </ol>  |
| <ol style="list-style-type: none"> <li>3. Clean and sanitise kitchen premises.</li> </ol>  | <ol style="list-style-type: none"> <li>3.1 Follow organisational cleaning schedules.</li> <li>3.2 Clean and sanitise <b><i>kitchen surfaces</i></b> and <b><i>food preparation and storage areas</i></b> to ensure the safety of food prepared and served to customers.</li> <li>3.3 Clean areas of animal and pest waste and report incidents of infestation.</li> <li>3.4 Follow <b><i>safety procedures</i></b> in the event of a chemical accident.</li> <li>3.5 Sort and remove <b><i>linen</i></b> according to organisational procedures.</li> <li>3.6 Sort and promptly dispose of <b><i>kitchen waste</i></b> to avoid cross</li> </ol> |

contamination with food stocks.

4. Work safely and reduce negative environmental impacts.
  - 4.1 Use cleaning agents, chemicals and ***cleaning equipment*** safely and according to manufacturer instructions.
  - 4.2 Use ***personal protective equipment*** and safe manual handling techniques when cleaning equipment and premises.
  - 4.3 Reduce negative environmental impacts through efficient use of energy, water and other resources.
  - 4.4 Sort general waste from ***recyclables*** and dispose of them in designated recycling bins.
  - 4.5 Safely dispose of all kitchen waste, especially ***hazardous substances***, to minimise negative environmental impacts.

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to report and discuss the disposal of broken serviceware and infestation incidents
- literacy skills to:
  - read and comprehend workplace documents or diagrams that interpret the content of:
    - cleaning schedules
    - safety procedures
    - Material Safety Data Sheets (MSDS) and product instructions for cleaning agents and chemicals
    - manufacturer's instructions for equipment
  - write simple notes to report broken serviceware
- numeracy skills to calculate the dilution requirements for chemicals and cleaning products
- planning and organising skills to efficiently sequence the stages of cleaning kitchen equipment and premises
- problem-solving skills to:
  - identify and dispose of unsafe chipped or broken serviceware
  - identify and report on pest infestations
  - recognise a chemical accident and follow safety procedures to avoid food contamination
- self-management skills to manage own speed, timing and productivity
- teamwork skills to support cooking staff by cleaning equipment, serviceware and utensils continuously for their availability
- technology skills to use automatic dishwashers and reassemble kitchen equipment after cleaning.

## Required knowledge

- hygiene and cross-contamination issues for kitchens and the importance and purpose of cleaning regimes
- different types of cleaning and sanitising products, chemicals for kitchens and equipment:
  - uses
  - safe use
  - safe storage
- safe practices for using and storing hazardous substances
- content of MSDS for cleaning agents and chemicals or plain English workplace documents or diagrams that interpret the content of MSDS
- cleaning sanitising and disinfecting methods for:
  - kitchen floors, shelves and walls
  - kitchen equipment, serveware and utensils
- correct use of personal protective equipment
- safe manual handling techniques for cleaning equipment and premises, especially bending, lifting and carrying heavy equipment
- environmental impacts of cleaning commercial kitchens and equipment and minimal impact practices to reduce these especially those that relate to water and energy use
- correct and environmentally sound disposal methods for kitchen waste including hazardous substances and recyclable glass and plastic bottles and containers
- equipment used to clean kitchen premises and equipment:
  - essential features and functions
  - safe operational practices
- for the specific organisation:
  - contents of cleaning schedules
  - contents of safety procedures for chemical accidents
  - reporting mechanisms for infestations
  - standards of presentation for the premises.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### **Critical aspects for assessment and evidence required to demonstrate competency in**

Evidence of the ability to:

- efficiently clean food preparation, storage areas, large and small equipment, serveware and utensils in

**this unit**

commercial kitchens on multiple occasions according to cleaning schedules

- work safely and use resources efficiently to reduce negative environmental impacts
- integrate knowledge of:
  - different types of cleaning agents and chemicals for kitchens and equipment
  - cleaning sanitising and disinfecting methods for kitchens and equipment
  - correct and environmentally sound disposal methods for waste and hazardous substances
- complete cleaning tasks within commercial time constraints.

**Context of and specific resources for assessment**

Assessment must ensure use of:

- an operational commercial kitchen with the fixtures, large and small equipment and workplace documentation defined in the Assessment Guidelines; this can be a:
  - real industry workplace
  - simulated industry environment such as a training kitchen servicing customers
- equipment used to clean kitchen premises and equipment
- a variety of commercial cleaning and sanitising agents and chemicals for cleaning commercial kitchens
- commercial cleaning schedules
- safety procedures for chemical accidents
- MSDS for cleaning agents and chemicals and or plain English workplace documents or diagrams that interpret the content of MSDS.

**Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the individual cleaning a fully equipped commercial kitchen and storage areas
- inspection of areas cleaned by the individual
- written or oral questioning to assess knowledge of:
  - the importance and purpose of cleaning regimes
  - different types of cleaning agents and chemicals
  - cleaning sanitising and disinfecting methods
  - disposal methods for waste and hazardous substances

- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### **Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- BSBSUS201A Participate in environmentally sustainable work practices
- BSBWOR202A Organise and complete daily work activities
- BSBWOR203B Work effectively with others
- SITXWHS101 Participate in safe work practices
- SITXWHS301 Identify hazards, assess and control safety risks
- TLIE1005A Carry out basic workplace calculations.

## **Range Statement**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

### ***Cleaning agents and chemicals*** include:

- automatic dishwasher:
  - liquid
  - powder
  - tablets
- bleach
- cleaning agents for specialised surfaces
- deodorisers
- dishwashing liquid
- disinfectants
- floor cleaners
- glass cleaner
- pesticides
- stainless steel cleaner and polish
- window cleaner.

### ***Kitchen equipment*** includes:

- appliances
- cooking equipment
- dishwashers

- extraction fans
  - garbage bins
  - glasswashers
  - measures
  - mechanical food preparation equipment:
    - bowl choppers
    - commercial mixers food processors, blenders and attachments
    - mincers
    - slicing machines
  - ovens
  - scales
  - thermometers.
- Serviceware and utensils*** may include:
- chopping boards
  - containers
  - cooking utensils
  - crockery
  - cutlery
  - dishes
  - glassware
  - graters
  - knives
  - pans
  - pots.
- Kitchen surfaces*** include:
- floors
  - shelves
  - walls.
- Food preparation and storage areas*** include:
- benches and working surfaces
  - cool rooms
  - cupboards
  - freezers
  - fridges
  - microwaves
  - ovens
  - storerooms
  - stoves.
- Safety procedures*** may relate to:
- disposal of contaminated food
  - first aid
  - treatment of food preparation area and equipment to avoid any risk to food.
- Linen*** may include:
- cleaning cloths

- clothing
  - napkins
  - serving cloths
  - tablecloths
  - tea towels.
- Kitchen waste*** may include:
- animal fat
  - any used or out of date ingredient or food item
  - broken serveware
  - cooking oils
  - food waste
  - ghee
  - grease
  - hazardous substances
  - oils
  - pest waste.
- Cleaning equipment*** may include:
- cloths
  - dishwashers
  - brooms, brushes and dustpans
  - buckets
  - cleaning cloths
  - floor scrubbers or polishers
  - mops
  - pressurised steam and water cleaners
  - swabs
  - waste sink for mops.
- Personal protective equipment*** may include:
- face masks
  - gloves
  - goggles
  - rubber aprons.
- Recyclables*** may include:
- glass bottles and jars
  - plastics
  - paper and cardboard
  - tin or aluminium containers
  - fruit and vegetable matter.
- Hazardous substances*** may include:
- animal fat
  - chemicals
  - cleaning agents
  - cooking oils
  - ghee
  - grease.

## **Unit Sector(s)**

Hospitality

## **Competency Field**

Kitchen Operations



## SITXCCS006 Provide service to customers

### Modification History

Not applicable.

### Application

This unit describes the performance outcomes, skills and knowledge required to communicate effectively with and provide quality service to both internal and external customers. It requires the ability to establish rapport with customers, determine and address customer needs and expectations, and respond to complaints.

The unit applies to those frontline service personnel who deal directly with customers on a daily basis and who operate with some level of independence and under limited supervision.

This includes individuals working in a range of tourism, travel, hospitality and events contexts.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

### Pre-requisite Unit

Nil

### Competency Field

Client and Customer Service

### Unit Sector

Cross-Sector

### Elements and Performance Criteria

#### ELEMENTS

Elements describe the essential outcomes.

1. Communicate with internal

#### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1. Communicate with customers in a professional manner

- and external customers. within designated response times using appropriate verbal and non-verbal communication.
- 1.2. Observe and respond to non-verbal communication of customers.
  - 1.3. Use active listening and questioning to facilitate effective two-way communication.
  - 1.4. Select a ***medium of communication*** appropriate for the customer and ***situation***.
2. Follow defined organisational standards when delivering service.
    - 2.1. Practise high standards of personal presentation and hygiene according to organisational requirements.
    - 2.2. Follow organisational customer service policies and procedures.
    - 2.3. Adhere to professional standards expected of service industry personnel.
  3. Provide service to customers.
    - 3.1. Establish rapport with customer to promote goodwill and trust during service delivery.
    - 3.2. Identify customer needs and expectations, including customers with special needs.
    - 3.3. Promptly meet all reasonable customer needs and requests.
    - 3.4. Identify and anticipate operational problems and take action to minimise the effect on customer satisfaction.
    - 3.5. Recognise and act upon opportunities to deliver additional levels of service beyond customer's immediate request.
  4. Respond to customer complaints.
    - 4.1. Proactively recognise customer dissatisfaction and take swift action to avoid escalation to a complaint.
    - 4.2. Respond to customer complaints in a professional manner.
    - 4.3. Identify solutions in consultation with customer.
    - 4.4. Resolve complaints according to own level of responsibility and organisational policy.
    - 4.5. Escalate complex service issues to higher level staff for action.
  5. Provide internal feedback on customer service practices.
    - 5.1. Provide ongoing internal feedback on service practices, policies and procedures, and suggest improvements.
    - 5.2. Identify individual and recurring complaints and provide internal feedback to avoid future occurrence.

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

SKILLS	DESCRIPTION
Reading skills to:	<ul style="list-style-type: none"><li>interpret messages, notes, letters, online communications, and policies and procedures.</li></ul>
Writing skills to:	<ul style="list-style-type: none"><li>record clear and concise messages, notes, emails, faxes and letters.</li></ul>
Self-management skills to:	<ul style="list-style-type: none"><li>deal with customer enquiries in a logical sequence while accommodating other work commitments.</li></ul>
Technology skills to:	<ul style="list-style-type: none"><li>use electronic communication media.</li></ul>

## Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

**Medium of communication** must include consideration of:

- assistive technology
- email or other electronic communication
- face-to-face communication
- fax
- written messages for restaurant bookings or phone messages
- standard forms and pro formas
- telephone
- use of interpreters
- two-way communication systems.

**Situation** must involve consideration of the following factors:

- access of the sender and receiver to necessary equipment and technology
- degree of formality required
- required format
- technical and operational features to fulfil the need
- technical skills required to use the medium
- urgency and timeframes.

## Unit Mapping Information

SITXCCS303 Provide service to customers

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# Assessment Requirements for SITXCCS006 Provide service to customers

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- identify customer requirements and provide quality customer service to three different internal and three different external customers to meet requirements
- provide service to above customers in line with organisational customer service standards and within designated organisational response times
- demonstrate procedures to respond to and resolve three different customer complaints according to organisational policies and procedures
- demonstrate effective communication with the above internal and external customers, including any with special needs
- seek formal and informal feedback from customers on above service.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- principles of quality customer service and positive communication
- appropriate non-verbal communication for customer service:
  - body language
  - culturally specific communication customs and practices
  - dress and accessories
  - gestures and mannerisms
  - use of space
  - voice tonality and volume
- methods for enhancing service delivery in response to staff and customer feedback
- specific industry sector:
  - professional service standards expected of service industry personnel
  - attitudes and attributes expected by the service industries to work with customers
  - standards of personal presentation and hygiene
  - different customer service and communication expectations, especially those with special service needs
- particular organisation:

- types of customers
  - external
  - internal
  - new
  - regular or repeat
  - visitors
- designated response times for acknowledging customers and their enquiry
- personal presentation and hygiene standards
- customer service policies and procedures, in particular those for:
  - acknowledging and greeting customers
  - complaint and dispute management
  - empowerment of different levels of personnel to resolve complaints, disputes, service issues and customer compensation
  - loyalty programs
  - presentation standards for customer environment, customer service personnel, and documents and promotional materials
  - pricing guarantees
  - product quality
  - refunds and cancellation fees
  - response times
  - service guarantees
  - training staff for customer service and complaint handling
- awareness of special needs, customs and practices of various social and cultural groups of customers in regards to:
  - modes of greeting, farewelling and conversation
  - body language and body gestures
  - formality of language
  - clothing
- methods of collecting feedback:
  - formal:
    - surveys
    - interviews
    - structured questioning
  - informal:
    - observation
    - casual discussion
- essential features, conventions and usage of different types of communication techniques and equipment.

## Assessment Conditions

Skills must be demonstrated in an operational business environment where customers are served. This can be:

- an industry workplace
- a simulated industry environment.

Assessment must ensure access to:

- organisational policies, procedures and templates relating to:
  - customer service standards
  - designated response times
  - presentation standards
  - procedures for dealing with customer complaints
  - customer surveys and feedback collection
  - recording and reporting customer feedback
- internal and external customers with different cultural backgrounds and special service needs with whom the individual can interact; these can be:
  - customers in an industry workplace during the assessment process; or
  - individuals who participate in role plays or simulated activities, set up for the purpose of assessment, in a simulated industry environment operated within a training organisation.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## SITXCCS303 Provide service to customers

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	N Replaces but is not equivalent to SITXCOM001A Work with colleagues and customers. Title changed to better reflect the intent and content of the unit. Updated and re-categorised to Client and Customer Service.

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to communicate effectively with and provide quality service to both internal and external customers. It requires the ability to establish rapport with customers, determine and address customer needs and expectations and respond to complaints.

### Application of the Unit

This unit applies to all tourism, hospitality and event sectors.

It applies to those frontline service personnel who deal directly with customers on a daily basis and who operate with some level of independence and under limited supervision. They work in reception areas, in an office, back-of-house and on tour or on site. This includes food and beverage attendants, concierge staff, guides, front office personnel, tour coordinators, event coordinators and retail travel consultants.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

### Pre-Requisites

Not applicable.



## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |  |  |
|--|--|
| 1. Communicate with internal and external customers. | 1.1 <b><i>Communicate</i></b> with <b><i>customers</i></b> in a polite, professional and friendly manner within designated response times.<br>1.2 Use appropriate language and tone in both written and spoken communication.<br>1.3 Use appropriate <b><i>non-verbal communication</i></b> .<br>1.4 Observe and respond to non verbal communication of customers.<br>1.5 Use active listening and questioning to facilitate effective two way communication.<br>1.6 Select a <b><i>medium of communication</i></b> appropriate for the audience and <b><i>situation</i></b> . |
| 2. Deliver service according to defined standards.   | 2.1 Practise high standards of <b><i>personal presentation</i></b> and hygiene according to organisational requirements.<br>2.2 Follow organisational customer service <b><i>policies and procedures</i></b> .<br>2.3 Adhere to professional standards expected of service industry personnel.   |
| 3. Provide service to customers.                     | 3.1 Establish rapport with the customer to promote goodwill and trust during service delivery.<br>3.2 Identify customer needs and expectations, including <b><i>customers with special needs</i></b> .<br>3.3 Promptly meet all reasonable customer needs and requests.<br>3.4 Identify and anticipate operational problems and take action to minimise the effect on customer satisfaction.<br>3.5 Recognise and act upon opportunities to deliver additional levels of service beyond the customer's immediate request.  |
| 4. Respond to customer complaints.                   | 4.1 Proactively recognise customer dissatisfaction and take swift action to avoid escalation to a complaint.<br>4.2 Respond to <b><i>customer complaints</i></b> positively, sensitively and   |

- politely.
- 4.3 Seek solutions by consulting the customer.
- 4.4 Resolve complaints according to individual empowerment and organisational policy.
- 4.5 Refer complex service issues to a higher level staff member for action.
- 4.6 Maintain a positive and cooperative manner at all times.
- 5. Provide internal feedback on customer service practices.
  - 5.1 Provide ongoing internal feedback on service practices, policies and procedures, and suggest improvements.
  - 5.2 Identify individual and recurring complaints and provide internal feedback to avoid future occurrence.

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to:
  - interact with customers in a polite, professional and friendly manner
  - develop rapport
  - respond to customers with diverse and special needs and expectations
  - discuss customer complaints with colleagues and supervisors
- literacy skills to:
  - read and interpret messages, notes, emails, letters, online communications and policies and procedures
  - write clear and concise messages, notes, emails, faxes letters and online communications
- problem-solving skills to recognise customer dissatisfaction and resolve or refer complaints
- self-management skills to deal with customer enquiries in a logical sequence
- teamwork skills to provide feedback on service practices, policies and procedures and suggest improvements
- technology skills to use electronic communication media.

### Required knowledge

- the principles of quality customer service and positive communication
- appropriate voice tonality and volume
- appropriate body language for customer service
- value of staff and customer feedback in enhancing service delivery
- for the specific industry sector:
  - professional service standards expected of service industry personnel

- attitudes and attributes expected by the service industries to work with customers
- standards of personal presentation and hygiene
- different customer service and communication expectations especially those with special service needs
- for the particular organisation:
  - types of internal and external customers
  - designated response times for acknowledging customers and their enquiry
  - personal presentation and hygiene standards
  - customer service policies and procedures including those for complaint handling
- the essential features, conventions and usage of different types of communication media.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Evidence of the ability to:

- provide quality customer service on multiple occasions and cover a range of diverse customer service situations, including the resolution of complaints
- communicate effectively with a variety of internal and external customers including those with special needs
- demonstrate knowledge of professional service standards expected of service industry personnel
- complete service within commercial time constraints and designated response times so that all customers are served effectively.

#### **Context of and specific resources for assessment**

Assessment must ensure use of:

- a real or simulated tourism, hospitality or event industry customer service environment where customers are served
- current commercial customer service policies and procedures including those for complaint handling
- customers with whom the individual can interact.

#### **Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation, using role plays, of the individual:

- serving customers
- dealing with complaints
- providing feedback on customer service practices
- use of problem-solving exercises so the individual can identify reasons for complaints and provide suggested solutions
- written or oral questioning to assess knowledge of:
  - professional service standards expected of service industry personnel
  - personal presentation standards
  - customer service policies and procedures
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### **Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITHACS303 Provide accommodation reception services
- SITHFAB307 Provide table service of food and beverage
- SITTGDE401 Coordinate and operate tours
- SITTTOP403 Operate tours in a remote area
- SITTTSL303 Sell tourism products and services
- SITXCCS302 Provide club reception services
- SITXCOM201 Show social and cultural sensitivity.

## **Range Statement**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Ways to *communicate* with customers may be:

- by telephone
- by written format:
  - handwritten
  - electronic
  - hard copy letter
- face-to-face
- formal
- informal using abbreviations
- verbal
- varied according to the needs of the customer, including:
  - use of an interpreter
  - use of appropriate voice tonality and volume
  - use of basic gestures
  - use of languages other than English including Australian Indigenous languages
  - use of visual aids:
    - photographs
    - sketches
    - product information sheets.

*Customers* may be:

- committees
- external:
  - business to business
  - corporate
  - e-business
  - government
  - online
  - the media
  - retail
- internal:
  - colleagues
  - managers
  - members of a team
  - staff from other departments, branches or locations
  - supervisors
- new or regular
- visitors.

*Non-verbal communication* may involve:

- body language
- culturally specific communication customs and practices

- dress and accessories
  - gestures and mannerisms
  - use of space
  - voice tonality and volume.
- Medium of communication** may include:
- assistive technology, e.g. telephone typewriter (TTY)
  - email or other electronic communication
  - face-to-face
  - fax
  - simple written messages, such as restaurant bookings or phone messages
  - standard forms and pro formas
  - telephone
  - through interpreters
  - two-way communication systems.
- Situation** may involve:
- access of the sender and receiver to necessary equipment
  - degree of formality required
  - required format
  - technical and operational features to fulfil the need
  - technical skills required to use the medium
  - urgency and timeframes.
- Personal presentation** may involve:
- attire, shoes and accessories
  - complying with organisational policy for personal presentation
  - hair and grooming
  - hands and nails
  - impacts on different types of customers
  - jewellery
  - personal hygiene
  - specific requirements for particular work functions
  - wearing of:
    - clothes that do not offend organisation customer base
    - clothes to suit different work locations
    - promotional clothing for special events
    - uniform items within the organisational policy directives.
- Policies and procedures** may relate to:
- acknowledging and greeting customers:
    - addressing the person by name
    - modes of greeting and farewelling
  - complaint and dispute management
  - empowerment of different levels of personnel to

resolve:

- complaints
- disputes
- service issues
- customer compensation
- loyalty programs
- presentation standards for:
  - customer environment
  - customer service personnel
  - documents and promotional materials
- pricing guarantees
- product quality
- refunds and cancellation fees
- response times
- service guarantees
- training staff for:
  - customer service
  - complaint handling
- use of standard letters and pro formas.

***Customers with special needs*** may include:

- aged people
- parents with young children
- pregnant women
- those with a disability
- those with special cultural or language needs
- unaccompanied children.

***Customer complaints*** may involve:

- customers with unmet expectations of products and services
- difficult or demanding customers
- incorrect pricing or quotes
- other team members or suppliers not providing special requests
- misunderstandings or communication barriers
- problems or faults with the product
- problems with the service, such as delays or incorrect orders.

## Unit Sector(s)

Cross-Sector

## **Competency Field**

Client and Customer Service



## **SITXFSA001 Use hygienic practices for food safety**

### **Modification History**

Not applicable.

### **Application**

This unit describes the performance outcomes, skills and knowledge required to use personal hygiene practices to prevent contamination of food that might cause food-borne illnesses. It requires the ability to follow predetermined organisational procedures and to identify and control food hazards.

The unit applies to all organisations with permanent or temporary kitchen premises or smaller food preparation or bar areas.

This includes restaurants, cafes, clubs, hotels, and bars; tour operators; attractions; function, event, exhibition and conference catering; educational institutions; aged care facilities; correctional centres; hospitals; defence forces; cafeterias, kiosks, canteens and fast food outlets; residential catering; in-flight and other transport catering.

It applies to food handlers who directly handle food or food contact surfaces such as cutlery, plates and bowls during the course of their daily work activities. This includes cooks, chefs, caterers, kitchen stewards, kitchen hands, bar, and food and beverage attendants, and sometimes room attendants and front office staff.

Food handlers must comply with the requirements contained within the Australia New Zealand Food Standards Code.

In some States and Territories businesses are required to designate a food safety supervisor who is required to be certified as competent in this unit through a registered training organisation.

Food safety legislative and knowledge requirements may differ across borders. Those developing training to support this unit must consult the relevant state or territory food safety authority to determine any accreditation arrangements for courses, trainers and assessors.

### **Pre-requisite Unit**

Nil

## Competency Field

Food Safety

## Unit Sector

Cross-Sector

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

1. Follow hygiene procedures and identify food hazards.
2. Report any personal health issues.
3. Prevent food contamination.
4. Prevent cross-contamination by washing hands.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1.Follow organisational hygiene procedures.
- 1.2.Report unsafe practices that breach hygiene procedures promptly.
- 1.3.Identify food hazards that may affect the health and safety of customers, colleagues and self.
- 1.4.Remove or minimise the hygiene hazard and report as appropriate for follow-up.
- 2.1.Report personal health issues likely to cause a hygiene risk.
- 2.2.Report incidents of food contamination resulting from personal health issues.
- 2.3.Cease participation in food handling activities where own health issue may cause food contamination.
- 3.1.Maintain clean clothes, wear required personal protective clothing, and only use organisation-approved bandages and dressings.
- 3.2.Prevent food contamination from clothing and other items worn.
- 3.3.Prevent unnecessary direct contact with ready to eat food.
- 3.4.Ensure hygienic personal contact with food and food contact surfaces.
- 3.5.Use hygienic cleaning practices that prevent food-borne illnesses.
- 4.1.Wash hands at appropriate times and follow hand washing procedures consistently.
- 4.2.Wash hands using appropriate facilities.

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

### SKILLS

### DESCRIPTION

Reading skills to:

- interpret organisational documents or diagrams relating to:
  - organisational food safety programs
  - hygiene and food safety procedures
  - hazard analysis and critical control points (HACCP) practices.

Oral communication skills to:

- report hygiene hazards and non-compliant organisational practices accurately.

## Unit Mapping Information

SITXFSA101 Use hygienic practices for food safety

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# Assessment Requirements for SITXFSA001 Use hygienic practices for food safety

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- demonstrate use of safe food handling practices in food handling work functions in line with organisational hygiene procedures on at least three occasions
- demonstrate procedures to:
  - identify food hazards
  - report unsafe practices
  - report incidents of food contamination.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- basic aspects of commonwealth, state or territory food safety laws, standards and codes as follows:
  - meaning of contaminant, contamination and potentially hazardous foods as defined by the Australia New Zealand Food Standards Code
  - employee and employer responsibility to participate in hygienic practices
  - reasons for food safety programs and what they must contain
  - role of local government regulators
  - ramifications of failure to observe food safety law and organisational policies and procedures
- health issues likely to cause a hygiene risk relevant to food safety:
  - airborne diseases
  - food-borne diseases
  - infectious diseases
- hygiene actions that must be adhered to in order to avoid food-borne illnesses
- hand washing practices:
  - before commencing or recommencing work with food
  - immediately after:
    - handling raw food
    - smoking, coughing, sneezing or blowing the nose

- eating or drinking
- touching the hair, scalp or any wound
- using the toilet
- basic aspects of hazard analysis and critical control points (HACCP) method of controlling food safety
- specific industry sector and organisation:
  - major causes of food contamination and food-borne illnesses
  - sources and effects of microbiological contamination of food
  - workplace hygiene hazards when handling food and food contact surfaces
  - basic content of organisational food safety programs
  - contents of organisational hygiene and food safety procedures
  - hygienic work practices for individual job roles and responsibilities.

## Assessment Conditions

Skills must be demonstrated in an operational food preparation area. This can be:

- an industry workplace
- a simulated industry environment.

Assessment must ensure access to:

- fixtures:
  - work benches
  - refrigeration unit
  - sink
  - storage facilities
- small equipment:
  - assorted pots and pans
  - containers for hot and cold storage
  - crockery
  - cutlery
  - cutting boards
  - food handler gloves
  - glassware
  - knives
  - packaging materials
  - receptacles for presentation and display purposes
  - small utensils:
    - tongs
    - serving utensils
- appropriate facilities for handwashing:

- designated hand washing sink
- antiseptic liquid soap
- single use towels
- warm running water
- food ingredients and ready to eat food items
- current plain English regulatory documents distributed by the commonwealth, state, territory or local government food safety authority
- Australia New Zealand Food Standards Code
- current commercial food safety programs, policies and procedures used for managing food safety.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# SITXFSA101 Use hygienic practices for food safety

## Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	E Replaces and is equivalent to SITXOHS002A Follow workplace hygiene procedures. Updated and re-categorised to Food Safety.

## Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to use personal hygiene practices to prevent contamination of food that might cause food-borne illnesses. It requires the ability to follow predetermined organisational procedures and to identify and control food hazards.

## Application of the Unit

This unit applies to all tourism, hospitality and catering organisations with permanent or temporary kitchen premises or smaller food preparation or bar areas.

This includes restaurants, cafes, clubs, hotels, bars, tour operators, attractions, function, event, exhibition and conference caterers, educational institutions, aged care facilities, correctional centres, hospitals, defence forces, cafeterias, kiosks, canteens, fast food outlets, residential caterers, in-flight and other transport caterers.

It applies to food handlers which can be any person who directly handles food or food contact surfaces food such as cutlery, plates and bowls. People at many levels use this skill in the workplace during the course of their daily activities, including cooks, chefs, caterers, kitchen stewards, kitchen hands, bar and food and beverage attendants and sometimes room attendants and front office staff.

## Licensing/Regulatory Information

Food handlers must comply with the requirements contained within the Australia New Zealand Food Standards (ANZFS) Code (the Code).

In some states and territories businesses are required to designate a food safety supervisor who is required to be certified as competent in this unit through a registered training organisation.

## Pre-Requisites

Not applicable.

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |   |   |
|---|---|
| 1. Follow hygiene procedures and identify food hazards. | 1.1 Follow organisational <b><i>hygiene procedures</i></b> .  |
|   | 1.2 Promptly report <b><i>unsafe practices</i></b> that breach hygiene procedures.  |
|   | 1.3 Identify <b><i>food hazards</i></b> that may affect the health and safety of customers, colleagues and self.                  |
|   | 1.4 Remove or minimise the hygiene hazard and report to appropriate person for follow up.   |
| 2. Report any personal health issues.                   | 2.1 Report any personal <b><i>health issues</i></b> likely to cause a hygiene risk.   |
|   | 2.2 Report incidents of food contamination resulting from personal health issues.   |
|   | 2.3 Cease participation in food handling activities where a health issue may cause food contamination.                            |
| 3. Prevent food contamination.                          | 3.1 Maintain clean clothes, wear required personal protective clothing and only use organisation-approved bandages and dressings. |
|   | 3.2 Prevent food contamination from clothing and <b><i>other items worn</i></b> .   |
|   | 3.3 Prevent unnecessary direct contact with ready to eat food.  |
|   | 3.4 Avoid <b><i>unhygienic personal contact</i></b> with food or <b><i>food contact surfaces</i></b> .                            |



- 3.5 Avoid *unhygienic cleaning practices* that may cause food-borne illnesses.
4. Prevent cross contamination by washing hands.
- 4.1 *Wash hands at appropriate times* and follow hand washing procedures consistently.
- 4.2 Wash hands using *appropriate facilities*.

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to verbally report hygiene hazards and poor organisational practice
- literacy skills to comprehend workplace documents or diagrams that interpret the content of:
  - organisational food safety program
  - hygiene and food safety procedures
  - Hazard Analysis and Critical Control Points (HACCP) practices
- problem-solving skills to identify and report hygiene hazards.

### Required knowledge

- basic aspects of national, state or territory food safety laws, standards and codes. This would include:
  - meaning of contaminant, contamination and potentially hazardous foods as defined by the Code
  - hygiene actions that must be adhered to by businesses to avoid food-borne illnesses
  - employee responsibility to participate in hygienic practices
  - reasons for food safety programs and what they must contain
  - role of local government regulators
  - ramifications of failure to observe food safety law and organisational policies and procedures
- basic aspects of HACCP method of controlling food safety
- for the specific industry sector and organisation:
  - major causes of food contamination and food-borne illnesses
  - sources and effects of microbiological contamination of food
  - workplace hygiene hazards when handling food and food contact surfaces
  - basic content of organisational food safety program
  - the contents of hygiene and food safety procedures
  - hygienic work practices for individual job roles and responsibilities.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- integrate the use of predetermined hygiene procedures and food safety practices within day-to-day food handling work functions
- integrate, into daily work activities, knowledge of the basic aspects of food safety standards and codes and the ramifications of disregarding this.

#### Context of and specific resources for assessment

Assessment must ensure use of:

- an operational commercial food preparation area, bar or kitchen with the fixtures, large and small equipment and workplace documentation defined in the Assessment Guidelines; this can be a:
  - real industry workplace
  - simulated industry environment such as a training kitchen servicing customers
- food ingredients and ready to eat food items
- current plain English regulatory documents distributed by the national, state, territory or local government food safety authority
- the Code
- current commercial food safety programs, policies and procedures used for the management of food safety.

#### Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate using hygienic work practices during an integrated assessment of operative functions, such as cleaning and tidying bars, cooking at a camp site, preparing meals in a commercial kitchen, storing unused foodstuffs
- use of problem-solving exercises so the individual can respond to a range of situations where food hazards exist
- written or oral questioning to assess knowledge of the content of hygiene procedures and food safety standards and codes
- review of portfolios of evidence and third-party workplace

reports of on-the-job performance by the individual.

**Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITXFSA201 Participate in safe food handling practices
- SITXFSA202 Transport and store food
- any commercial cookery, commercial catering, patisserie, Asian cookery or food and beverage unit involving food preparation.

**Range Statement**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Hygiene procedures:***

- may cover:
  - cleaning and sanitising practices to avoid contamination of food
  - food storage
  - handling and disposal of garbage
  - personal hygiene
  - regular hand washing
  - safe and hygienic handling of food and beverages
  - safe handling and disposal of linen and laundry
  - suitable dress and personal protective equipment and clothing
  - use of cleaning equipment, clothes and materials to avoid contamination of food
- may be:

- Unsafe practices*** may include:
- covered by staff training programs
  - documented in the organisational food safety program
  - required by the national food safety code.
  - being asked to participate in unhygienic work practices
  - food handling practices that may result in the contamination of food
  - ignoring the direction of:
    - hygiene signage
    - supervisors
    - managers
  - lack of:
    - required hygiene signage
    - training in hygiene procedures
  - outdated practices not in keeping with current organisational procedures
  - poor personal hygiene and cleaning practices that may result in cross-contamination of food and other items
  - practices inconsistent with organisational food safety program
  - seeing others using unhygienic work practices
  - use of broken or malfunctioning equipment.
- Food hazards*** may include:
- airborne dust
  - colleagues without appropriate training or understanding of good hygiene practices, policies and procedures
  - contaminated food
  - contaminated garbage
  - dirty equipment and utensils
  - equipment not working correctly, such as fridge and temperature probes
  - items, such as linen, tea towels and towels that may be contaminated with human waste, such as blood and body secretions
  - use of practices not in keeping with current organisational activities
  - vermin.
- Health issues*** may relate to:
- airborne diseases
  - food borne diseases
  - infectious diseases.
- Other items worn*** may include:
- bandages
  - hair accessories
  - jewellery
  - watches.

***Unhygienic personal contact*** may involve:

- transferring micro-organisms by:
  - blowing nose
  - coughing
  - drinking
  - eating
  - scratching skin and hair
  - sneezing
  - spitting
  - touching wounds
- transmitting tobacco products by smoking.

***Food contact surfaces*** may include:

- chopping boards
- containers
- cooking utensils
- crockery
- cutlery
- glassware
- pots and pans
- sinks
- workbenches.

***Unhygienic cleaning practices*** may involve:

- cleaning food contact surfaces with linen, tea towels and towels that may be contaminated with human waste:
  - blood
  - body secretions
  - faeces
- using dirty:
  - cleaning cloths
  - tea towels
- spreading bacteria from bathroom or bedroom areas to mini-bar or kitchen areas in an accommodation facility.

***Wash hands at appropriate times*** might include:

- before commencing or recommencing work with food
- immediately after:
  - handling raw food
  - smoking, coughing, sneezing, blowing the nose, eating, drinking, and touching the hair, scalp or any wound
  - using the toilet.

***Appropriate facilities*** for hand washing may include:

- designated hand washing sink
- liquid soap
- single use towels
- warm running water.

## **Unit Sector(s)**

Cross-Sector

## **Competency Field**

Food Safety

## SITXINV002 Maintain the quality of perishable items

### Modification History

Release	Comments
Release 2	Pre-requisite added: SITXFSA001 Use hygienic practices for food safety

### Application

This unit describes the performance outcomes, skills and knowledge required to maintain the quality of perishable supplies for food and beverage, commercial cookery or catering operations. It requires the ability to store perishable supplies in optimum conditions to minimise wastage and avoid food contamination.

It does not include general stock control processes which are covered by SITXINV001 Receive and store stock.

The unit is particularly important within a food safety regime and applies to hospitality and catering organisations, including hotels, restaurants, clubs, educational institutions, health establishments, defence forces, cafeterias, residential caterers, in flight and other transport caterers, event and function caterers.

Personnel at many levels use this skill in the workplace during the course of their daily activities, including cooks, chefs, caterers, and kitchen attendants.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

### Pre-requisite Unit

SITXFSA001 Use hygienic practices for food safety

### Competency Field

Inventory

## Unit Sector

Cross-Sector

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

1. Store supplies in appropriate conditions.

2. Maintain perishable supplies at optimum quality.

3. Check perishable supplies and dispose of spoilt stock.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1. Conduct temperature checks on delivered goods ensuring they are within specified tolerances.
- 1.2. Record temperature results according to organisational procedures.
- 1.3. Identify deficiencies with delivered food items, and reject supply within scope of own responsibility, or report findings.
- 1.4. Choose and prepare correct environmental conditions for the storage of perishable supplies.
- 1.5. Date code perishable supplies to maximise their use.
- 1.6. Promptly store supplies in appropriate storage area to minimise wastage and avoid food contamination.
- 2.1. Regularly check and adjust environmental conditions of all storage areas and equipment to maintain perishable supplies at optimum quality.
- 2.2. Conduct temperature checks according to food safety procedures, and protect supplies from spoilage.
- 2.3. Protect supplies from damage of cross-contamination and pests.
- 2.4. Rotate perishable supplies for maximum use according to expiration dates.
- 3.1. Regularly check perishable supplies for quality.
- 3.2. Inspect items for animal and pest damage and report incidents of infestation.
- 3.3. Identify deficiencies, and report findings or dispose of any non-usable supplies within scope of own responsibility.
- 3.4. Safely dispose of spoilt stock and waste to minimise negative environmental impacts.



## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

SKILLS	DESCRIPTION
Writing skills to:	<ul style="list-style-type: none"><li>• write stock rotation labels and simple documents that record temperature results.</li></ul>
Oral communication skills to:	<ul style="list-style-type: none"><li>• make simple verbal reports on the disposal of perished supplies.</li></ul>
Numeracy skills to:	<ul style="list-style-type: none"><li>• read a thermometer correctly to measure temperatures</li><li>• estimate times for regular temperature checks.</li></ul>
Technology skills to:	<ul style="list-style-type: none"><li>• use thermometers and adjust temperature and humidity controls on storage equipment.</li></ul>

## Unit Mapping Information

SITXINV202 Maintain the quality of perishable items

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## Assessment Requirements for SITXINV002 Maintain the quality of perishable items

### Modification History

Release	Comments
Release 2	Pre-requisite added: SITXFSA001 Use hygienic practices for food safety

### Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- conduct temperature and quality checks on each of the following delivered goods to establish whether they are within allowable tolerances:
  - cold or chilled foods
  - frozen foods
  - raw foods
  - reheated foods or ingredients
- maintain quality of at least six of the following range of perishable supplies for food and beverage, commercial cookery or catering operations:
  - beverages
  - dairy products
  - frozen goods
  - fruit
  - meat
  - poultry
  - seafood
  - vegetables
- identify spoilt stock and dispose of according to organisational procedures.

### Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- contents of stock date codes and rotation labels
- meaning of:
  - wastage to a commercial catering organisation and reasons to avoid it

- contaminant, contamination and potentially hazardous foods as defined by the Australia New Zealand Food Standards Code
- reasons for protecting food from contamination
- different types of contamination:
  - microbiological
  - chemical
  - physical
- methods of rejecting contaminated food
- potential deficiencies of delivered perishable food items:
  - contaminated food
  - food that is intended to be:
    - frozen but has thawed
    - chilled but has reached a dangerous temperature zone
  - packaged food that is exposed through damaged packaging
- correct environmental storage conditions for each of the main food types specified in the Performance Evidence:
  - correct application of humidity and temperature controls
  - correct ventilation
  - protecting perishables from exposure to:
    - heating or air conditioning
    - accidental damage through people traffic
    - environmental heat and light
  - sanitary cleanliness
  - storing perishables:
    - in dry stores
    - in cool rooms
    - in freezers
    - in refrigerators
    - sanitised and hygienic conditions
    - at room temperature
- food safety procedures and standards for storage of perishable supplies:
  - appropriate containers
  - labelling and coding
  - first in first out methods
  - storage environments
  - temperature, humidity, light and ventilation specifications for storage
  - cleaning and sanitising processes for food storage areas
  - quarantining the storage of items that are likely to be the source of contamination of food:
    - chemicals

- clothing
  - personal belongings
- indicators of spoilage and contamination of perishable supplies:
  - degradation of flavour, aroma, colour and texture
  - enzymic browning
  - drying and hardening
  - crystallisation
  - infestation of animal and pest waste
  - mould
  - exposed packaged food through damaged packaging
  - odour
- indicators of quality of perishable items:
  - currency of best by or use by dates
  - freshness
  - size
  - weight
- correct and environmentally sound disposal methods for kitchen waste and hazardous substances.

## Assessment Conditions

Skills must be demonstrated in an operational environment that makes use of perishable food and beverage supplies. This can be:

- an industry workplace
- a simulated industry environment, such as a training kitchen or food and beverage outlet serving customers.

Assessment must ensure access to:

- commercial refrigeration facilities:
  - freezer
  - fridge
- computers, printers and stock control software systems
- electronic equipment used for stock control
- containers for hot and cold storage
- designated:
  - delivery area
  - storage areas for dry goods and perishables
- recording systems
- proformas used by the workplace

- diverse and comprehensive range of perishable food supplies for commercial cookery or catering operations for the groups selected from the list in the Performance Evidence
- organisation specifications:
  - current commercial stock control procedures and documentation for the ordering, monitoring and maintenance of stock
  - temperature recording charts
- thermometers.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## **SITXINV004 Control stock**

### **Modification History**

Not applicable.

### **Application**

This unit describes the performance outcomes, skills and knowledge required to process stock orders, maintain stock levels, minimise stock losses, manage stocktakes and maintain all documents that relate to the administration of any type of stock.

The unit applies to all tourism, travel, hospitality and event sectors. The unit is relevant to organisations where stock control is an integral and essential part of business operations, and where there are complex ordering and control issues to be considered. The unit is not appropriate for situations where stock management is very simple, such as controlling stationery supplies in a small office.

The unit applies to stock control personnel who operate independently, have responsibility for others and make a range of decisions on the overall administration of stock.

It applies to all tourism, travel, hospitality and event sectors.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Nil

### **Competency Field**

Inventory

### **Unit Sector**

Cross-Sector

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- |  |  |
|--|--|
| 1. Maintain stock levels and records.  | 1.1. Use stock control systems and equipment to administer all stock control and ordering processes.<br>1.2. Monitor and maintain stock levels to meet organisational requirements.<br>1.3. Monitor stock security and adjust procedures as required.<br>1.4. Inform colleagues of their individual stock ordering responsibilities.<br>1.5. Maintain records of stock levels and create reports according to organisational procedures.<br>1.6. Monitor stock performance, and identify and report fast or slow-selling items.<br>1.7. Monitor and adjust stock reorder cycles. |
| 2. Process stock orders.               | 2.1. Process orders for stock according to organisational procedures.<br>2.2. Maintain stock levels and record current accurate details.<br>2.3. Check and record incoming stock against purchase and supply agreements.   |
| 3. Minimise stock losses.              | 3.1. Regularly check storage of stock and ensure its protection.<br>3.2. Identify, record and report stock losses.<br>3.3. Identify avoidable losses and establish reasons for them.<br>3.4. Recommend solutions and implement procedures to prevent future losses.  |
| 4. Follow-up orders.                   | 4.1. Monitor delivery of stock to ensure agreed deadlines are met.<br>4.2. Liaise with suppliers to ensure continuity of supply.<br>4.3. Resolve routine supply problems or refer to appropriate person for action.<br>4.4. Distribute stock within the organisation according to required allocations.  |
| 5. Organise and administer stocktakes. | 5.1. Organise stocktakes at appropriate intervals.<br>5.2. Allocate stocktaking responsibilities to staff and supervise the operation of the stocktake.<br>5.3. Produce accurate stocktake reports within designated timelines.  |

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

SKILLS	DESCRIPTION
Reading skills to:	<ul style="list-style-type: none"><li>interpret supplier purchasing agreements, purchase orders, records of incoming stock and organisational procedures.</li></ul>
Writing skills to:	<ul style="list-style-type: none"><li>prepare detailed reports on stock levels, performance, losses and stocktakes.</li></ul>
Oral communication skills to:	<ul style="list-style-type: none"><li>discuss reasons for stock losses with staff.</li></ul>
Numeracy skills to:	<ul style="list-style-type: none"><li>calculate:<ul style="list-style-type: none"><li>supplier costs and complex order costs</li><li>complex details of stock on hand and stock losses and produce complex numerically-based reports</li></ul></li><li>reconcile incoming stock and invoices against purchase orders.</li></ul>
Teamwork skills to:	<ul style="list-style-type: none"><li>direct staff on ordering responsibilities and supervise staff participation in stocktakes.</li></ul>
Planning and organising skills to:	<ul style="list-style-type: none"><li>efficiently order and maintain stock so that stock levels meet organisational requirements.</li></ul>
Technology skills to:	<ul style="list-style-type: none"><li>use a computer, keyboard and stock control software</li><li>use electronic stock control equipment.</li></ul>

## Unit Mapping Information

SITXINV401 Control stock

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>



# Assessment Requirements for SITXINV004 Control stock

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- order, control and administer continuous and efficient supply relating to at least six different types of stock items
- use stock control procedures to monitor and maintain stock levels for the above items over a stock life cycle period that includes a stocktake
- produce and distribute stock control reports
- complete above stock order and reporting activities within commercial time constraints.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- principles of stock control:
  - rotation and replenishment
  - product life cycle and maximising the use of all stock
  - checking for slow moving items
  - segregation of non-food items from food items that have potential to cross-contaminate
- stock control systems:
  - bin card system
  - imprest system
  - integrated point-of-sale system
  - ledger system
- stock control procedures, template documents and reports for:
  - ordering
  - levels
  - loss
  - performance
  - monitoring of quality
  - receipt
  - reorder cycles
  - rotation

- security
- stocktakes
- valuation
- wastage
- storage requirements for different kinds of stock
- use of stock control equipment and software where appropriate
- specific industry sector:
  - types of computer stock control systems used, their functions and features
  - electronic equipment used for stock control; their functions and features
  - stock security systems
  - types of storage and their suitability for different kinds of stock
  - methods to monitor and maintain stock levels
- specific organisation:
  - relevant stock and product life and storage requirements for specific goods
  - departmental or individual stock ordering responsibilities
  - full content of stock control and security procedures
  - sources of information on negotiated cost of supply, contractual arrangements and preferred supplier arrangements
  - full content of stock ordering procedures and documents
  - stock reorder cycles
  - stock level reports
  - stock performance reports
  - stock loss reports
  - full content of stocktake procedures, documents and reports
  - reasons for stock loss and damage and methods to control these
- considerations in the protection of stock:
  - avoiding cross contamination
  - correctly applying humidity and temperature controls
  - correct ventilation
  - securing stock
  - storing stock in correct location and conditions to avoid damage
  - treating pest and vermin infestations.

## Assessment Conditions

Skills must be demonstrated in an operational tourism, travel, hospitality or events environment where stock levels are monitored and maintained. This can be:

- an industry workplace
- a simulated industry environment.

Assessment must ensure access to:

- computers, printers and stock control software systems
- electronic equipment used for stock control
- diverse and comprehensive range of tourism, travel, hospitality or event industry stock items that are monitored and maintained
- current commercial stock control procedures and documentation for the ordering, monitoring and maintenance of stock.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

## SITXINV202 Maintain the quality of perishable items

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.1	Editorial correction to modification history.
1.0	<p>N</p> <p>Replaces but is not equivalent to SITHCCC003B Receive and store kitchen supplies.</p> <p>There was confused intent with, and duplication across, the two units SITXINV001A Receive and store stock and SITHCCC003B Receive and store kitchen supplies. The unit SITXINV001A Receive and store stock covered stock control for all types of stock. This unit now only covers the particular skills and knowledge required to store perishable supplies in optimum conditions to minimise wastage and avoid food safety hazards.</p> <p>New title applied for clarity.</p> <p>Moved to Inventory competency field to better reflect the content of this unit.</p>

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to maintain the quality of perishable supplies for commercial cookery or catering operations. It requires the ability to store perishable supplies in optimum conditions to minimise wastage and avoid food contamination.

It does not include general stock control processes which are covered by the unit SITXINV201 Receive and store stock.

### Application of the Unit

This unit is particularly important within a food safety regime and applies to hospitality and catering organisations including hotels, restaurants, clubs, educational institutions, health establishments, defence forces, cafeterias, residential caterers, in-flight and other transport caterers, event and function caterers.

People at many levels use this skill in the workplace during the course of their daily activities including cooks, chefs, caterers, and kitchen attendants.

## Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

## Pre-Requisites

This unit must be assessed after the following prerequisite unit:	
SITXFSA101	Use hygienic practices for food safety

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |  |   |
|--|---|
| <p>1. Store supplies in appropriate conditions.</p>        | <p>1.1 Conduct <b><i>temperature checks</i></b> on delivered goods ensuring they are within specified tolerances.</p> <p>1.2 Record temperature results according to organisational procedures.</p> <p>1.3 Identify any <b><i>deficiencies</i></b>, with delivered food items, <b><i>reject supply</i></b> within scope of responsibility or report findings.</p> <p>1.4 Choose and prepare correct <b><i>environmental conditions</i></b> for the storage of perishable <b><i>supplies</i></b>.</p> <p>1.5 Date code all perishable supplies to maximise use.</p> <p>1.6 Promptly store supplies in appropriate storage area to minimise wastage and avoid food contamination.</p> |
| <p>2. Maintain perishable supplies at optimum quality.</p> | <p>2.1 Regularly check and adjust the environmental conditions of all storage areas and equipment to maintain perishable supplies at optimum quality.</p> <p>2.2 Conduct temperature checks according to food safety</p>  |

- procedures and protect supplies from spoilage.
- 2.3 Protect supplies from damage of cross-contamination and pests.
- 2.4 Rotate perishable supplies for maximum use according to expiration dates.
3. Check perishable supplies and dispose of spoilt stock.
- 3.1 Regularly check all perishable supplies for *quality*.
- 3.2 Inspect items for animal and pest damage and report incidents of infestation.
- 3.3 Identify any deficiencies, report findings or dispose of any non-usable supplies within scope of responsibility.
- 3.4 Safely dispose of spoilt stock and waste to minimise negative environmental impacts.

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to make simple verbal reports on the disposal of perished supplies
- literacy skills to:
  - read and comprehend date code and stock rotation labels
  - write date code and stock rotation labels and simple documents that record temperature results
- numeracy skills to:
  - use a thermometer correctly to measure temperatures
  - estimate times for regular temperature checks
- planning and organising skills to regularly check and adjust the environmental conditions of storage areas
- problem-solving skills to:
  - evaluate quality of stored supplies and make adjustments to their storage conditions to ensure a quality product
  - monitor storage temperatures and adjust according to identified discrepancies
  - identify unsafe and perished supplies and dispose of them
- teamwork skills to report incidents of spoilage to supervisors
- technology skills to use thermometers and adjust temperature and humidity controls on storage equipment.

### Required knowledge

- contents of stock date codes and rotation labels
- meaning of:
  - wastage to a commercial catering organisation and reasons to avoid it

- contaminated food as defined by the Australia New Zealand Food Standards (ANZFS) Code
- reasons for protecting food from contamination
- different types of contamination:
  - microbiological
  - chemical
  - physical
- methods of rejecting contaminated food
- correct environmental storage conditions for the main food types used in a commercial kitchen:
  - beverages
  - dairy products
  - canned products
  - dry goods
  - food
  - frozen goods
  - fruit
  - meat
  - oils
  - poultry
  - seafood
  - vacuumed sealed items
  - vegetables
- food safety procedures and standards for storage of perishable supplies:
  - appropriate containers
  - labelling and coding
  - first in first out methods
  - storage environments
  - temperature, humidity, light and ventilation specifications for storage
  - cleaning and sanitising processes for food storage areas
  - quarantining the storage of items that are likely to be the source of contamination of food, including chemicals, clothing and personal belongings
- indicators of spoilage and contamination of perishable supplies:
  - degradation of flavour, aroma, colour and texture
  - enzymic browning
  - drying and hardening
  - crystallisation
  - infestation of animal and pest waste
  - mould
  - exposed packaged food through damaged packaging

- odour
- correct and environmentally sound disposal methods for kitchen waste and hazardous substances.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Evidence of the ability to:

- maintain the quality of a diverse range of perishable supplies for commercial cookery or catering operations including these main food groups:
  - beverages
  - dairy products
  - canned products
  - dry goods
  - frozen goods
  - fruit
  - meat
  - oils
  - poultry
  - seafood
  - vacuumed sealed items
  - vegetables
- integrate knowledge of:
  - correct environmental storage conditions for the main food types
  - food safety procedures and standards for storage of perishable supplies
  - indicators of spoilage and contamination of perishable supplies
- integrate checks on perishable supplies with other duties and within commercial time constraints.

#### **Context of and specific resources for assessment**

Assessment must ensure use of:

- an operational commercial kitchen with the fixtures, large and small equipment and workplace documentation defined in the Assessment Guidelines;



this can be a:

- real industry workplace
- simulated industry environment such as a training kitchen servicing customers
- thermometers and temperature recording charts
- a diverse and comprehensive range of perishable food supplies.

### Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the individual date coding perishable supplies and storing them in appropriate environmental conditions
- evaluation of temperature records completed by the individual
- problem solving exercise to assess the individual's ability to identify a range of spoilt and contaminated food items
- written or oral questioning to assess knowledge of correct environmental storage conditions, food safety procedures and standards and indicators of spoilage and contamination
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### Guidance information for assessment

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITHCCC104 Package prepared foodstuffs
- SITHCCC205 Produce cook-chill and cook freeze foods
- SITHCCC206 Rethermalise chilled and frozen foods
- SITXINV201 Receive and store stock
- SITXWHS101 Participate in safe work practices
- TLIE1005A Carry out basic workplace calculations.

## Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate,

accessibility of the item, and local industry and regional contexts) may also be included.

**Temperature checks** may relate to:

- cold or chilled foods
- frozen foods
- ingredients
- raw foods
- reheated foods or ingredients.

**Deficiencies** may include:

- contaminated food
- food that is intended to be:
  - frozen but has thawed
  - chilled but has reached a dangerous temperature zone
- packaged food that is exposed through damaged packaging.

To **reject supply** may involve:

- rejecting supply immediately on delivery by supplier
- rejecting supply of goods delivered under concession and not formally received
- quarantining contaminated food from other food until the rejection is finalised
- returning food to the supplier
- disposing of contaminated food with consent of the supplier.

**Environmental conditions** may involve:

- correct application of humidity and temperature controls
- correct ventilation
- protecting perishables from exposure to:
  - heating or air conditioning
  - accidental damage through people traffic
  - environmental heat and light
- sanitary cleanliness
- storing perishables:
  - in dry stores
  - in cool rooms
  - in freezers
  - in refrigerators
  - sanitised and hygienic conditions
  - at room temperature.

**Supplies** include:

- beverages
- dairy products
- canned products
- dry goods
- food
- frozen goods

- fruit
- meat
- oils
- poultry
- seafood
- stock on hand
- vacuumed sealed items
- vegetables.
- currency of best by or use by dates
- freshness
- size
- weight.

*Quality* may include:

## **Unit Sector(s)**

Cross-Sector

## **Competency Field**

Inventory

## SITXINV401 Control stock

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comment
1.0	N Replaces but is not equivalent to SITXINV002A Control and order stock. Title simplified. Re-worked Elements, Performance Criteria, Required Skills and Knowledge to more fully articulate content. Technology skills and knowledge added. Prerequisites removed.

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to process stock orders, maintain stock levels, minimise stock losses, manage stocktakes and maintain all documents that relate to the administration of any type of stock.

### Application of the Unit

This unit applies to the tourism, travel, hospitality and event industry sectors.

The unit is relevant to organisations where stock control is an integral and essential part of business operations, and where there are complex ordering and control issues to be considered. The unit is not appropriate for situations where stock management is very simple, such as controlling stationery supplies in a small office.

It applies to stock control personnel who operate independently, have responsibility for others and make a range of decisions on the overall administration of stock.

### Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

### Pre-Requisites

Not applicable.

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Not applicable.

## Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |                                       |   |
|---------------------------------------|---|
| 1. Maintain stock levels and records. | 1.1 Use <b><i>stock control systems</i></b> and equipment to administer all stock control and ordering processes.<br>1.2 Monitor and maintain <b><i>stock</i></b> levels to meet organisational requirements.<br>1.3 Monitor stock security and adjust procedures as required.<br>1.4 Inform colleagues of their individual stock ordering responsibilities.<br>1.5 Maintain records of stock levels and create reports according to organisational procedures.<br>1.6 Monitor stock performance, and identify and report fast or slow selling items.<br>1.7 Monitor and adjust stock reorder cycles. |
| 2. Process stock orders.              | 2.1 <b><i>Process orders</i></b> for stock according to organisational procedures.<br>2.2 Maintain stock levels and record current accurate details.<br>2.3 Check and record incoming stock against purchase and supply agreements.   |
| 3. Minimise stock losses.             | 3.1 Regularly check the storage of stock and ensure its <b><i>protection</i></b> .<br>3.2 Identify, record and report <b><i>stock losses</i></b> .<br>3.3 Identify avoidable losses and establish reasons for them.<br>3.4 Recommend solutions and implement procedures to prevent future losses.   |
| 4. Follow up orders.                  | 4.1 Monitor the delivery of stock to ensure agreed deadlines are met.<br>4.2 Liaise with suppliers to ensure continuity of supply.<br>4.3 Resolve routine supply problems or refer to appropriate person for action.  |

- 4.4 Distribute stock within the organisation according to required allocations.
- 5. Organise and administer stocktakes.
  - 5.1 Organise stocktakes at appropriate intervals.
  - 5.2 Allocate stocktaking responsibilities to staff and supervise the operation of the stocktake.
  - 5.3 Produce accurate stocktake reports within designated timelines.

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to:
  - liaise with suppliers about deliveries and discrepancies
  - discuss reasons for stock losses with staff
  - provide clear directions to staff about their stocktaking responsibilities
- critical thinking skills to analyse stock performance, and identify fast or slow-selling items
- literacy skills to:
  - read and interpret supplier purchasing agreements, purchase orders, records of incoming stock and organisational procedures
  - write detailed reports on stock levels, performance, losses and stocktakes
- numeracy skills to calculate supplier costs and complex order costs, reconcile incoming stock and invoices against purchase orders, calculate complex details of stock on hand and stock losses and produce complex numerically based reports
- planning and organising skills to efficiently order and maintain stock so that stock levels meet organisational requirements
- problem-solving skills to identify reasons for stock losses, recommend solutions and implement procedures to prevent future losses
- teamwork skills to direct staff on ordering responsibilities and supervise staff participation in stocktakes
- technology skills to use:
  - a computer and keyboard
  - the system capabilities and functions of a stock control system
  - electronic equipment used for stock control.

### Required knowledge

- principles of stock control, including:
  - rotation and replenishment
  - product life cycle and maximising the use of all stock
  - checking for slow moving items

- segregation of non-food items from food items that have potential to cross-contaminate
- for the specific industry sector:
  - different types of computer stock control systems used, their functions and features
  - electronic equipment used for stock control; their functions and features
  - stock security systems
  - types of storage and their suitability for different kinds of stock

methods to monitor and maintain stock levels

- for the specific organisation:
  - relevant stock, including product life and storage requirements for specific goods
  - departmental or individual stock ordering responsibilities
  - full content of stock control and security procedures
  - sources of information on negotiated cost of supply, contractual arrangements and preferred supplier arrangements
  - full content of stock ordering procedures and documents
  - stock reorder cycles
  - stock level reports
  - stock performance reports
  - stock loss reports
  - full content of stocktake procedures, documents and reports
- reasons for stock loss and damage and methods to control these.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Evidence of the ability to:

- order, control and administer continuous and efficient supply of a diverse range of stock
- monitor and maintain stock levels over a stock life-cycle period which includes a stocktake
- produce and distribute multiple and diverse stock control reports
- complete stocktakes
- integrate, into daily work activities, knowledge of stock control procedures
- complete stock order and reporting activities within

commercial time constraints.

### **Context of and specific resources for assessment**

Assessment must ensure use of:

- a real or simulated tourism, hospitality or event industry stock control environment where stock levels are monitored and maintained
- computers, printers and stock control software systems currently used by the tourism, hospitality or event industry
- electronic equipment used for stock control
- a diverse and comprehensive range of tourism, hospitality or event industry stock items that are monitored and maintained
- current commercial stock control procedures and documentation for the ordering, monitoring and maintenance of stock.

### **Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation, using role plays, of the individual:
  - resolving stock delivery issues with suppliers
  - supervising the operation of a stocktake
- projects and activities that allow assessment of the individual's ability to:
  - process stock orders
  - monitor and maintain stock levels over a stock life-cycle period which includes a stocktake
- review of reports prepared by the individual:
  - stock level
  - stock performance
  - stock loss
- use of problem-solving activities so the individual can suggest methods for minimising stock losses
- written or oral questioning to assess knowledge of the principles of stock control, procedures for stock management and stocktakes
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

### **Guidance information for assessment**

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:



- BSBWRT401A Write complex documents
- SITXMGT401 Monitor work operations
- SITXWHS401 Implement and monitor work health and safety practices.

## Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Stock control systems*** may involve:

- bin cards
- imprest
- integrated point-of-sale systems
- ledgers
- stock control procedures, template documents and reports for:
  - ordering
  - levels
  - loss
  - performance
  - monitoring of quality
  - receipt
  - reorder cycles
  - rotation
  - security
  - stocktakes
  - valuation
  - wastage
- storage requirements for different kinds of stock
- use of :
  - electronic stock control equipment
  - stock control software systems.

***Stock*** may include:

- alcohol
- cleaning agents and chemicals
- customer travel products:
  - luggage labels
  - travel bags

- travel wallets
- tickets
- vouchers
- event supplies
- food:
  - dairy products
  - dry goods
  - frozen goods
  - fruit
  - meat
  - poultry
  - seafood
  - vegetables
- fuel:
  - aircraft
  - coaches
  - hire cars
  - vessels
- general stores
- housekeeping supplies
- linen
- merchandise
- non-alcoholic beverages:
  - mixers
  - juice
  - soft drink
  - tea coffee
- uniforms.

***Process orders*** may involve:

- any method of ordering:
  - electronic
  - email
  - on-line
  - telephone
  - face-to-face
- placing an order for future delivery
- purchasing goods face-to-face and taking immediate delivery.

***Protection*** may involve:

- avoiding cross contamination
- correct application of humidity and temperature controls
- correct ventilation

- Stock losses* may involve:
- securing stock
  - storing stock in correct location and conditions to avoid damage
  - treating pest and vermin infestations.
  - inappropriate storage conditions
  - lack of rotation leading to product deterioration
  - overstocking
  - pests or vermin
  - theft.

## **Unit Sector(s)**

Cross-Sector

## **Competency Field**

Inventory

## **SITXWHS001 Participate in safe work practices**

### **Modification History**

Not applicable.

### **Application**

This unit describes the performance outcomes, skills and knowledge required to incorporate safe work practices into own workplace activities. It requires the ability to follow predetermined health, safety and security procedures and to participate in organisational work health and safety (WHS) management practices.

The unit applies to all tourism, travel, hospitality and event sectors and to any small, medium or large organisation.

All personnel at all levels use this skill in the workplace during the course of their daily activities.

The unit incorporates the requirement for all employees under state and territory WHS legislation, to participate in the management of their own health and safety, that of their colleagues and anyone else in the workplace. They must cooperate with their employer and follow practices to ensure safety at work.

No occupational licensing, certification or specific legislative requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Nil

### **Competency Field**

Work Health and Safety

### **Unit Sector**

Cross-Sector

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1. Work safely.

#### 2. Follow procedures for emergency situations.

#### 3. Participate in organisational WHS practices.

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1.Follow organisational health and safety procedures.

1.2.Incorporate safe work practices into own workplace activities.

1.3.Follow safety directions of supervisors, managers and workplace safety warning signs.

1.4.Use personal protective equipment and clothing or designated uniform.

1.5.Promptly report unsafe work practices, issues and breaches of health, safety and security procedures.

1.6.Identify and remove hazards from immediate workplace area and report all workplace hazards as they arise.

2.1.Recognise emergency and potential emergency situations.

2.2.Follow organisational security and emergency procedures.

2.3.Seek assistance from colleagues or authorities during emergency situations.

2.4.Complete emergency incident reports accurately, following organisational procedures.

3.1.Participate in WHS management practices developed by the organisation to ensure a safe workplace.

3.2.Actively participate in the WHS consultation processes.

3.3.Report WHS issues and concerns as they arise.

## Foundation Skills

Foundation skills essential to performance in this unit, but not explicit in the performance criteria are listed here, along with a brief context statement.

### SKILLS

### DESCRIPTION

Oral communication skills to:

- report hazards and emergency incidents according to organisational procedures.

Reading skills to:

- interpret workplace safety signs, procedures and emergency evacuation plans.

Writing skills to:

- complete basic template reports about hazards and emergency incidents according to organisational procedures.

## Unit Mapping Information

SITXWHS101 Participate in safe work practices

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>

# Assessment Requirements for SITXWHS001 Participate in safe work practices

## Modification History

Not applicable.

## Performance Evidence

Evidence of the ability to complete tasks outlined in elements and performance criteria of this unit in the context of the job role, and:

- demonstrate the use of predetermined health, safety and security procedures and safe work practices in work functions on at least three occasions
- demonstrate correct procedures to respond in line with organisational security and emergency procedures during one emergency or potential emergency situation, seeking assistance where appropriate
- participate in one of the following work health and safety (WHS) consultation activities:
  - discussion with, or formal report to, WHS representatives regarding a WHS matter
  - discussion with supervisor or manager regarding a WHS matter
  - staff meeting that involves WHS discussion.

## Knowledge Evidence

Demonstrated knowledge required to complete the tasks outlined in elements and performance criteria of this unit:

- basic aspects of the relevant state or territory occupational health and safety (OHS) or WHS legislation:
  - actions that must be adhered to by businesses
  - employer responsibilities
  - employee responsibilities to participate in WHS practices
  - employee responsibility to ensure safety of self, other workers and other people in the workplace within the scope of own work role
  - ramifications of failure to observe OHS or WHS legislation and organisational policies and procedures
- specific industry sector and organisation:
  - workplace hazards and associated health, safety and security risks
  - contents of health, safety and security procedures relating to:
    - evacuation of staff and customers
    - security management of cash, documents, equipment, keys or people
  - format and use of template reports for hazards and incident and accident reporting
  - safe work practices for individual job roles

- procedures for WHS management practices:
  - hazard identification
  - WHS induction training
  - safe work practice training
  - suggesting inclusions for WHS policies and procedures.

## Assessment Conditions

Skills must be demonstrated in an operational business environment. This can be:

- an industry workplace
- a simulated industry environment.

Assessment must ensure access to:

- current plain English regulatory documents distributed by the local WHS government regulator
- codes of practice and standards issued by government regulators or industry groups
- WHS information and business management manuals issued by industry associations or commercial publishers
- current commercial policies, procedures and template documents used for managing WHS practices.

Assessors must satisfy the Standards for Registered Training Organisations' requirements for assessors.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=68c40a93-e51d-4e0f-bc06-899dff092694>



## SITXWHS101 Participate in safe work practices

### Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	E Replaces and is equivalent to SITXOHS001B Follow health, safety and security procedures. Title changed to better reflect the intent and content of the unit. Re-worked Required Skills and Knowledge to more fully articulate content.

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to incorporate safe work practices into all workplace activities. It requires the ability to follow predetermined health, safety and security procedures and to participate in organisational work health and safety management practices.

### Application of the Unit

This unit applies to all tourism, travel, hospitality and event sectors and to any small, medium or large organisation.

All personnel at all levels use this skill in the workplace during the course of their daily activities.

### Licensing/Regulatory Information

The unit incorporates the requirement for all employees, under state and territory Occupational Health and Safety (OHS) or Work Health and Safety (WHS) legislation, to participate in the management of their own health and safety, that of their colleagues and anyone else in the workplace. They must cooperate with their employer and follow practices to ensure safety at work.

No occupational licensing or certification requirements apply to this unit at the time of endorsement.

## Pre-Requisites

Not applicable.

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

### Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

- |  |   |
|--|---|
| 1. Work safely.  | 1.1 Follow organisational <b><i>health and safety procedures</i></b> .<br>1.2 Incorporate <b><i>safe work practices</i></b> into all workplace activities.<br>1.3 Follow safety directions of supervisors, managers and workplace safety warning signs.<br>1.4 Use personal protective equipment and clothing.<br>1.5 Promptly report unsafe work practices, <b><i>issues and breaches of health, safety and security procedures</i></b> .<br>1.6 Identify and remove hazards from immediate <b><i>workplace</i></b> area and report all workplace hazards as they arise. |
| 2. Follow procedures for emergency situations.                     | 2.1 Recognise emergency and potential <b><i>emergency situations</i></b> .<br>2.2 Follow organisational <b><i>security and emergency procedures</i></b> .<br>2.3 Seek assistance from colleagues or authorities.<br>2.4 Complete emergency incident reports accurately, following organisational procedures.  |
| 3. Participate in organisational work health and safety practices. | 3.1 <b><i>Participate in work health and safety management practices</i></b> developed by the organisation to ensure a safe workplace.<br>3.2 Actively participate in the work health and safety <b><i>consultation processes</i></b> .<br>3.3 Report work health and safety issues and concerns as they arise.   |

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to:
  - participate in consultation processes
  - report and explain hazards
- literacy skills to:
  - read and interpret workplace safety signs, procedures and emergency evacuation plans
  - complete basic template reports about hazards and emergency incidents
- problem-solving skills to:
  - identify and report hazards
  - identify security and emergency issues.

### Required knowledge

- basic aspects of the relevant state or territory OHS or WHS legislation. This would include:
  - actions that must be adhered to by businesses
  - employer responsibilities
  - employee responsibilities to participate in work health and safety practices
  - employee responsibility to ensure safety of self, other workers and other people in the workplace
  - ramifications of failure to observe OHS or WHS legislation and organisational policies and procedures
- for the specific industry sector and organisation:
  - workplace hazards and associated health, safety and security risks
  - contents of health, safety and security procedures
  - format and use of template reports for hazards and emergency incidents
  - safe work practices for individual job roles.

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

**Critical aspects for assessment** Evidence of the ability to:  
**and evidence required to**

- integrate the use of predetermined health, safety and

**demonstrate competency in this unit**

security procedures and safe work practices with day-to-day work functions

- participate in consultation activities
- integrate, into daily work activities, knowledge of the basic aspects of OHS or WHS legislation and the ramifications of disregarding this.

**Context of and specific resources for assessment**

Assessment must ensure use of:

- a real or simulated tourism, hospitality or event industry environment where safe working practices must be maintained
- current plain English regulatory documents distributed by the local work health and safety government regulator
- codes of practice and standards issued by government regulators or industry groups
- work health and safety information and business management manuals issued by industry associations or commercial publishers
- current commercial policies, procedures and template documents used for the management of work health and safety practices.

**Method of assessment**

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the individual:
  - explaining workplace safety or emergency procedures to a colleague or customer
  - using safe work practices during an integrated assessment of operative functions, such as cleaning and tidying bars, guiding tours, setting up events, selling products in an office
- use of simulated activities to assess participation in:
  - emergency evacuations
  - consultation meetings
  - hazard identification
- use of problem-solving exercises to assess the individual's ability to respond to hazards
- written or oral questioning to assess knowledge of:
  - OHS or WHS law and the employee responsibilities for workplace safety and security
  - personal protective equipment and clothing appropriate for particular jobs and situations
- review of portfolios of evidence and third-party

workplace reports of on-the-job performance by the individual.

### Guidance information for assessment

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITHACS103 Prepare rooms for guests
- SITHASC201 Cook simple Asian dishes
- SITHCCC201 Cook simple dishes
- SITHCCC202 Prepare and present food
- SITTGDE401 Coordinate and operate tours
- SITTTOP301 Load touring equipment
- SITTTOP402 Set up and operate a camp site
- SITTTSL305 Process reservations
- SITTVAF303 Tow and site recreational vehicles
- SITXINV201 Receive and store stock
- SITXWHS301 Identify hazards, assess and control safety risks.

## Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Health and safety procedures*** may cover:

- consultation
- emergencies
- handling chemicals and hazardous substances
- hazard identification and reporting
- incident and accident reporting
- safe work practices.

***Safe work practices*** may include:

- clearing hazards from immediate work area
- following the direction of:
  - safety signage
  - supervisors
  - managers
- handling chemicals, poisons and dangerous materials safely
- operating beverage dispensing systems, taking account of the dangers associated with inert gases
- taking short breaks away from stressful situations involving difficult colleagues and customers
- taking designated breaks and rotating tasks
- using:
  - equipment designed to assist with or replace manual handling
  - ergonomically sound furniture and workstations
  - personal protective equipment and clothing
  - safe manual handling techniques for shifting heavy items
  - safe posture and movements, including sitting, standing and bending
  - working with knives and hot equipment to avoid injury.

***Issues and breaches of health, safety and security procedures*** may involve:

- being asked to participate in unsafe work practices
- failing to replace unsafe damaged property or fittings
- ignoring the direction of:
  - safety signage
  - supervisors
  - managers
- lack of:
  - required safety signage
  - training in health and safety procedures
  - training in safe work practices
- seeing others using unsafe work practices

**Workplace** may include:

- using broken or malfunctioning equipment.
- any tourism, travel, hospitality or event environment, such as:
  - heritage venues
  - holiday parks and resorts
  - hotels, motels
  - clubs
  - event, meeting and exhibition venues
  - restaurants
  - retail outlets
  - retail travel agencies
  - office environment for tour operators, event organisers, tour wholesalers
- any location where a tour is delivered, for example:
  - onboard a coach or cruise vessel
  - a tourist precinct where walking tours are operated
  - in a national park.

**Emergency situations** may include:

- accidents
- bomb threats
- natural events, e.g. earthquakes, floods, electrical storms
- chemical leak or spill
- fires
- illness
- irrational customers
- power failure
- suspicious behaviour of staff or other people in the workplace
- robberies or armed hold-ups.

**Security and emergency procedures** may cover:

- evacuation of staff and customers
- security management of:
  - cash
  - documents
  - equipment
  - keys
  - people.

**Participation in work health and safety management practices** may involve:

- participating in:
  - consultation
  - hazard identification
  - work health and safety induction training

***Consultation processes*** may involve:

- safe work practice training
- suggesting inclusions for work health and safety policies and procedures.
- a diary, whiteboard or suggestion box used by staff to report issues of concern
- discussions with and reports to formal work health and safety representatives and committee members
- formal meetings with agendas, minutes and action plans
- informal meetings with notes
- work health and safety discussions with supervisors and managers during the course of each business day
- regular staff meetings that involve work health and safety discussions
- special staff meetings or workshops to specifically address work health and safety issues
- surveys or questionnaires that invite staff feedback on work health and safety issues.

## **Unit Sector(s)**

Cross-Sector

## **Competency Field**

Work Health and Safety



## TAEASS402 Assess competence

### Modification History

Release	Comments
Release 2	This was first released with <i>TAE Training and Education Training Package Release 2.1</i> . Minor update to Assessment Conditions.
Release 1	This version first released with <i>TAE Training and Education Training Package Release 2.0</i> .

### Application

This unit describes the skills and knowledge required to implement an assessment plan, and gather quality evidence to assess the competence of a candidate using compliant assessment tools.

It applies to teachers, trainers and assessors in enterprises and registered training organisations (RTOs) and those providing assessment advisory services.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### Unit Sector

Assessment

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare for the assessment	1.1 Interpret assessment planning documentation and applicable organisational, legal and ethical requirements for conducting the assessment and confirm with the relevant people 1.2 Access and interpret units of competency that are to be used as

ELEMENT	PERFORMANCE CRITERIA
	<p>benchmarks for assessment, and the nominated assessment tools, to confirm the requirements for the evidence to be collected</p> <p>1.3 Determine opportunities for integrated assessment activities and document any changes to the assessment instruments, where required</p> <p>1.4 Determine opportunities for evidence-gathering in actual or simulated activities, through consultation with the candidate and relevant personnel</p> <p>1.5 Conduct a candidate briefing and explain, discuss and agree on the details of the planned assessment</p> <p>1.6 Arrange identified material and physical resource requirements</p> <p>1.7 Identify any specialist support requirements for the assessment, and organise if necessary</p>
2. Gather quality evidence	<p>2.1 Use agreed assessment methods and tools to gather, organise and document evidence in a format suitable for determining competence</p> <p>2.2 Apply the principles of assessment and rules of evidence in gathering quality evidence</p>
3. Support the candidate	<p>3.1 Discuss and guide candidates in gathering their own evidence to support the recognition of prior learning (RPL)</p> <p>3.2 Use appropriate communication and interpersonal skills to develop a professional relationship with the candidate that reflects sensitivity to individual differences and enables two-way feedback</p> <p>3.3 Make decisions on reasonable adjustments with the candidate, based on the candidate's needs and characteristics</p> <p>3.4 Access specialist support, if required, in accordance with the assessment plan</p> <p>3.5 Address any workplace health and safety (WHS) risk to a person or equipment immediately</p>
4. Make the assessment decision	<p>4.1 Assess the collected evidence, and to evaluate whether it reflects the evidence required to demonstrate competence</p> <p>4.2 Use judgement to infer whether competence has been demonstrated, based on the available evidence</p> <p>4.3 Make the assessment decision in line with agreed assessment procedures and according to the agreed assessment plan</p> <p>4.4 Provide clear and constructive feedback to the candidate regarding the assessment decision, and clearly document</p>

ELEMENT	PERFORMANCE CRITERIA
	follow-up, if required
5. Record and report the assessment decision	5.1 Record assessment outcomes promptly and accurately 5.2 Complete and submit required assessment documentation, according to assessment procedures and confidentiality conventions 5.3 Inform other relevant parties of the assessment decision, according to confidentiality conventions
6. Review the assessment process	6.1 Review the assessment process in consultation with candidates and other relevant people to improve future practice 6.2 Document and record the review according to relevant assessment system policies and procedures

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	1.1, 1.2, 2.1, 4.1	<ul style="list-style-type: none"> <li>Accesses and interprets procedural and compliance documentation relevant to the assessment process</li> <li>Examines and evaluates assessment evidence</li> </ul>
Writing	1.1, 1.3, 1.5, 2.1, 3.1, 5.1, 5.2, 5.3, 6.2	<ul style="list-style-type: none"> <li>Completes workplace documentation accurately using appropriate language and following organisational requirements</li> </ul>
Oral Communication	1.1, 1.4, 1.5, 3.1, 3.4, 4.4, 5.3, 6.1	<ul style="list-style-type: none"> <li>Communicates information and assessment process requirements clearly, using techniques appropriate to the audience and environment</li> <li>Interacts appropriately with candidates to build rapport and understanding, and obtain specific information to support the assessment process</li> </ul>
Navigate the world of work	1.1, 3.5, 5.3	<ul style="list-style-type: none"> <li>Identifies, confirms and takes responsibility for adherence to legal and ethical requirements</li> <li>Recognises, and follows, explicit and implicit protocols and meets expectations associated with own role</li> </ul>

Interact with others	1.1, 1.4, 1.5, 3.1, 3.2, 3.4, 5.3, 6.1	<ul style="list-style-type: none"> <li>Adjusts personal communication style in recognition of the values and experiences of others to build rapport</li> <li>Cooperates and collaborates with others and contributes to activities requiring joint responsibility and accountability</li> </ul>
Get the work done	1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 2.1, 2.2, 3.3, 3.4, 4.1, 4.2, 4.3, 6.1, 6.2	<ul style="list-style-type: none"> <li>Uses systematic, analytical processes in complex, non-routine situations, gathering information, and identifying and evaluating options against agreed criteria</li> <li>Organises work according to specific requirements taking some responsibility for decisions regarding the format of information</li> <li>With guidance, reviews the effectiveness of solutions in relation to the set goals</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
TAEASS402 Assess competence	TAEASS402B Assess competence	Updated to meet Standards for Training Packages	Equivalent unit

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=35337905-785d-4f93-8777-e9991ad4c6c3>

## Assessment Requirements for TAEASS402 Assess competence

### Modification History

Release	Comments
Release 2	This was first released with <i>TAE Training and Education Training Package Release 2.1</i> . Minor update to Assessment Conditions.
Release 1	This version first released with <i>TAE Training and Education Training Package Release 2.0</i> .

### Performance Evidence

The candidate must show evidence of the ability to complete tasks outlined in the elements and performance criteria of this unit, including:

- assessment of at least five candidates within the vocational education and training (VET) context against at least one endorsed or accredited unit of competency according to the organisation's assessment processes and practices.
- using recognition of prior learning (RPL) processes in the assessment of at least one candidate (which may be one of the five candidates above)
- making reasonable adjustments in the assessment of at least one candidate.

The assessments must be undertaken under the supervision of a qualified assessor and cover an entire unit of competency for each candidate, including:

- the application of different assessment methods and instruments involving a range of activities and events
- using two-way communication and feedback with the candidate
- exercising judgement in making the assessment decision
- recording and reporting assessment outcomes in accordance with the assessment system and organisational, legal and ethical requirements

reviewing the assessment process.

### Knowledge Evidence

The candidate must be able to demonstrate essential knowledge to effectively complete the task outlined in the elements and performance criteria of this unit. This includes knowledge of:

- competency-based assessment, including:
  - VET as a competency-based system
  - how competency based assessment differs from other types of assessment
  - competency standards as the basis of qualifications
  - structure and application of competency standards
  - the principles of assessment and how they are applied
  - the distinction between assessment tools and assessment instruments
  - the rules of evidence and how they are applied
  - the range of assessment purposes and assessment contexts, including RPL
  - different assessment methods, including suitability for gathering various types of evidence, suitability for the content of units, and resource requirements and associated costs
  - reasonable adjustments and when they are applicable
  - types and forms of evidence, including assessment instruments that are relevant to gathering different types of evidence used in competency-based assessment, including RPL
  - the training and assessment strategies, including policies and procedures established by the industry, organisation or training authority
- RPL policies and procedures established by the organisation
- cultural sensitivity and equity considerations in assessment activities
- current legislative requirements relevant to the assessor and the assessment process
- workplace health and safety (WHS) responsibilities associated with assessing competence, including:
  - requirements for reporting hazards and incidents
  - emergency procedures
  - procedures for the use of relevant personal protective equipment
  - the safe use and maintenance of relevant equipment
  - sources of WHS information.

## Assessment Conditions

Gather evidence to demonstrate consistent performance in a real assessment environment. The assessment environment must include access to assessment tools and recording materials.

Assessors must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=35337905-785d-4f93-8777-e9991ad4c6c3>



# TLID1001 Shift materials safely using manual handling methods

## Modification History

Release 1. This is the first release of this unit of competency in the TLI Transport and Logistics Training Package.

## Application

This unit involves the skills and knowledge required to shift loads safely using manual handling methods. Work must be carried out in compliance with the relevant work health and safety (WHS)/occupational health and safety (OHS) regulations concerning the manual handling and movement of loads.

It includes assessing the risks associated with relocating the load, planning the relocation process and carrying out the relocation in accordance with the plan.

Work is performed under some supervision generally within a team environment.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Not applicable.

## Competency Field

D – Load Handling

## Unit Sector

Not applicable.

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Assess risks associated with

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Products, goods or materials to be relocated are identified and assessed to determine appropriate relocation method



**relocating load**

- 1.2 Storage locations are determined and potential routes to be followed are identified
- 1.3 Effect of load relocation on original load base is predicted
- 1.4 Points of balance are estimated
- 1.5 Required clearances are compared to available space and adjustments are made to moving loads to reflect required clearance
- 1.6 Effects of moving contents, which may be loose, liquid, dangerous or hazardous, are considered
- 1.7 Risks in potential routes are considered
- 1.8 Risks to self are identified arising from the required lifting, load carrying, set down or movement of the goods
- 1.9 Manual handling procedures for lifting, lowering and carrying, pushing and pulling are identified
- 1.10 Team lifting processes are considered when moving loads
- 1.11 Appropriate personal protective equipment is determined
- 1.12 Size to weight ratio of items to be manually handled are identified

**2 Plan load relocation**

- 2.1 Relocation of the load is planned, consistent with the code of practice for manual handling and in accordance with the risk assessment
- 2.2 Process for relocating load is proposed including predicting and planning for potential difficulties
- 2.3 Proposed process is checked for compliance with code of practice and workplace procedures

**3 Relocate load**

- 3.1 Actions for lifting, lowering and carrying, pulling and pushing a load are in accordance with workplace procedures and WHS/OHS requirements
- 3.2 Applications appropriate for team relocation of load are identified
- 3.3 Team lifting tasks are coordinated
- 3.4 Planned process and route are followed

- 3.5 Relocated materials are set down without damage to goods, personnel or equipment and are checked for stability
- 3.6 Relocation is checked to see it meets work requirements and variance/s are reported

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

## Unit Mapping Information

This unit replaces and is equivalent to TLID1001A Shift materials safely using manual handling methods.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=df441c6e-213d-43e3-874c-0b3f7036d851>

# **Assessment Requirements for TLID1001 Shift materials safely using manual handling methods**

## **Modification History**

Release 1. This is the first release of this unit of competency in the TLI Transport and Logistics Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying precautions and required action to minimise, control or eliminate risks that may exist when manually lifting and handling materials and goods
- applying relevant legislation and workplace procedures
- communicating effectively with others when manually lifting and handling materials and goods
- implementing contingency plans when manually lifting and handling, materials and goods
- interpreting and following operational instructions and prioritising work
- interpreting manual handling risks
- modifying activities depending on operational contingencies, risk situations and environments
- operating and adapting to differences in loads and materials in accordance with standard operating procedures
- reading and interpreting instructions, procedures and information relevant to the manual lifting and handling of materials and goods
- selecting and using required personal protective equipment conforming to industry and work health and safety (WHS)/occupational health and safety (OHS) standards
- using correct manual handling practices
- working collaboratively with others when manually lifting and handling materials and goods
- working systematically with required attention to detail without injury to self or others, or damage to goods or equipment.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- housekeeping standards and procedures
- relevant WHS/OHS procedures and guidelines concerning the manual lifting and movement of loads
- risks when manually lifting and handling materials and goods, and related precautions to control the risk, including:
  - controlled actions on a movement during lifting
  - distance over which load is to be shifted
  - frequency of shifting operations
  - load on the spine during lifting
  - postures and positions during lifting
  - rotation and side movement of the spine during lifting
  - time allowed for shifting the load
  - type, weight and position of the load
  - work layout
  - site layout and obstacles
- workplace procedures and policies for manual handling.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations, current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment currently used in industry
- applicable documentation including workplace procedures, regulations, codes of practice

and operation manuals.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=df441c6e-213d-43e3-874c-0b3f7036d851>

## **TLI3003 Provide customer service in transport vehicles/vessels**

### **Modification History**

Release 1. This is the first release of this unit of competency in the TLI Transport and Logistics Training Package.

### **Application**

This unit involves the skills and knowledge required to provide customer service for local and overseas passengers in transport vehicles/vessels, in accordance with tourism and transport industry codes of practice and/or workplace procedures.

It includes monitoring and addressing passenger needs, preparing and delivering commentaries, resolving problems and conflicts involving customers, and liaising with suppliers of tourism products to ensure appropriate materials and services are obtained and made available to service customer needs.

Work will be undertaken with limited supervision, and with duty of care responsibility for self and others in achieving the prescribed outcomes.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

### **Pre-requisite Unit**

Not applicable.

### **Competency Field**

I – Customer Service

### **Unit Sector**

Not applicable.

### **Elements and Performance Criteria**

#### **ELEMENTS**

#### **PERFORMANCE CRITERIA**

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
<b>1 Monitor and address passenger needs</b>	<p>1.1 Circumstances affecting passenger needs and comfort are monitored and action is taken in accordance with workplace procedures</p> <p>1.2 Needs of all types of passengers are acknowledged and appropriate assistance is provided</p> <p>1.3 Passengers are advised about the operation of internal vehicle/vessel facilities and the benefits of wearing seat belts, as required</p> <p>1.4 Hazards and risks to passenger safety are identified and appropriate action is initiated to minimise the risk</p> <p>1.5 Passengers are suitably advised about any safety risk and action being taken</p> <p>1.6 Tact, courtesy, friendliness and patience are used at all times when dealing with passengers</p> <p>1.7 Passenger inquiries and requests are received and resolved with minimal delays</p> <p>1.8 Passenger inquiries and associated action are recorded and reported in accordance with workplace procedures</p>
<b>2 Prepare and deliver commentaries</b>	<p>2.1 Comprehensive briefings are delivered clearly and precisely</p> <p>2.2 Commentary presentations are well-researched and delivered clearly and at precise timings</p> <p>2.3 Additional information is provided in response to questions</p> <p>2.4 Audio visual equipment is correctly and safely operated, as required</p>
<b>3 Implement conflict resolution strategies</b>	<p>3.1 Conflict and difficult situations are recognised and fair solutions are negotiated equitably</p> <p>3.2 Conflicts unable to be resolved are referred to a higher authority</p> <p>3.3 Opportunities to enhance service quality are taken, particularly in conflict situations</p>
<b>4 Communicate with</b>	<p>4.1 Liaison is maintained with suppliers of tourism products and/or information to obtain accurate and comprehensive</p>

**suppliers**

information about products available to meet customer needs

- 4.2 Needs for tourism products and/or information are appropriately communicated to relevant workplace personnel

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions can be found in the Companion Volume Implementation Guide.

## Unit Mapping Information

This unit replaces and is equivalent to TLII3003A Provide customer service in transport vehicles/vessels.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=df441c6e-213d-43e3-874c-0b3f7036d851>



# **Assessment Requirements for TLII3003 Provide customer service in transport vehicles/vessels**

## **Modification History**

Release 1. This is the first release of this unit of competency in the TLI Transport and Logistics Training Package.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying precautions and required action to minimise, control or eliminate identified hazards
- applying relevant legislation and workplace procedures
- communicating effectively with others
- completing relevant documentation
- conducting presentations to tourist passengers
- interacting effectively with passengers
- interpreting and following operational instructions and prioritising work
- modifying activities depending on operational contingencies, risk situations and environments
- operating and adapting to differences in equipment in accordance with workplace procedures
- reading and interpreting relevant instructions, procedures, information and signs
- reporting and/or rectifying identified problems promptly, in accordance with regulatory requirements and workplace procedures
- responding appropriately to cultural differences
- working collaboratively with others
- working systematically with required attention to detail without injury to self or others, or damage to goods or equipment.

## **Knowledge Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- customer service policies and workplace procedures
- procedures for handling customer questions, complaints and conflicts

- procedures for using audiovisual equipment
- procedures for using communications equipment
- relevant state/territory regulations and industry codes of practice for tourism and transport operations as they relate to customer service and safety in tourism vehicles/vessels
- relevant tourism products, services and/or operations
- relevant work health and safety (WHS)/occupational health and safety (OHS) and environmental procedures and regulations
- route information
- specific needs of different community sectors/cultures
- specific needs of persons with disabilities.

## Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment include:

- a range of relevant exercises, case studies and/or simulations
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- relevant materials, tools, equipment and personal protective equipment currently used in industry.

## Links

Companion Volume implementation guides are found in VETNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=df441c6e-213d-43e3-874c-0b3f7036d851>

# MAR Maritime Training Package

## Modification History

The version details of this endorsed Training Package are in the table below.

Release Number	Release Date	Comments
4.0	26 February 2016	<p>Three qualifications revised and transitioned to the <i>Standards for Training Packages</i>.</p> <p><b>Qualifications:</b></p> <ul style="list-style-type: none"> <li>MAR20116 Certificate II in Maritime Operations (Linesperson)</li> <li>MAR30516 Certificate III in Maritime Operations (Integrated Rating)</li> <li>MAR40216 Certificate IV in Maritime Operations (Chief Integrated Rating)</li> </ul> <p>Eighteen units of competency revised and transitioned to the <i>Standards for Training Packages</i> and five new units of competency:</p> <p><b>Units of competency:</b></p> <ul style="list-style-type: none"> <li>MARB016 Contribute to routine engine maintenance on a vessel</li> <li>MARB017 Perform routine maintenance and repairs on a vessel</li> <li>MARB018 Implement vessel planned maintenance system</li> <li>MARB019 Manage stores for planned maintenance system</li> <li>MARB025 Maintain mooring equipment</li> <li>MARB026 Apply knowledge of marine terminology and port procedures</li> <li>MARC022 Perform mooring and unmooring activities</li> <li>MARC027 Contribute to the operation of engine equipment and associated propulsion plant</li> <li>MARC028 Operate deck machinery, cargo handling gear and equipment on a vessel</li> <li>MARC029 Perform rigging on board a vessel</li> <li>MARC030 Use and care for hand and power tools</li> <li>MARC031 Shift mooring lines using mechanical means</li> <li>MARC032 Perform dogging on board a vessel</li> <li>MARE002 Communicate during mooring and unmooring activities</li> <li>MARF017 Follow work health and safety and emergency procedures during mooring and unmooring activities</li> <li>MARF018 Assist in an emergency response</li> <li>MARF019 Operate emergency equipment and apply emergency</li> </ul>

		<p>procedures</p> <ul style="list-style-type: none"> <li>• MARF026 Follow port and terminal security procedures</li> <li>• MARG005 Supervise a crew</li> <li>• MARK005 Steer a vessel under direction of the Master</li> <li>• MARN007 Use seamanship skills on board a vessel</li> <li>• MARO005 Contribute to monitoring and controlling a safe engine watch</li> <li>• MARO006 Contribute to monitoring and controlling a safe navigational watch</li> </ul> <p><b>Skill Sets:</b></p> <p>New Skill Sets for Tanker Familiarisation and Dogging and Rigging:</p> <ul style="list-style-type: none"> <li>• MARSS00015 Marine Dogging and Rigging Skill Set</li> <li>• MARSS00016 Tanker Familiarisation Skill Set</li> <li>• MARSS00017 Coxswains Grade 1 Skill Set</li> <li>• MARSS00018 Marine Dogging Skill Set</li> <li>• MARSS00019 Marine Rigging Skill Set</li> </ul> <p><b>ISC upgrade:</b></p> <p>Amendments to the following units of competency:</p> <ul style="list-style-type: none"> <li>• MARB009 Manage refuelling</li> <li>• MARF006 Observe personal safety and social responsibility</li> <li>• MARF007 Operate survival craft and other lifesaving appliances</li> <li>• MARF008 Prevent and fight fires on board a vessel</li> <li>• MARJ001 Follow environmental work practices.</li> </ul>
3.0	7 September 2015	<p>Four qualifications transitioned to the <i>Standards for Training Packages</i> and one new qualification.</p> <p><b>Qualifications:</b></p> <ul style="list-style-type: none"> <li>• MAR30315 Certificate III in Marina Operations</li> <li>• MAR30415 Certificate III in Maritime Operations (Marine Cookery)</li> <li>• MAR50315 Diploma of Maritime Operations (Watchkeeper Deck)</li> <li>• MAR50415 Diploma of Maritime Operations (Master up to 500 GT)</li> <li>• MAR60315 Advanced Diploma of Maritime Operations (Master Unlimited)</li> </ul> <p>Twelve units of competency transitioned to the <i>Standards for Training Packages</i> and eight new units of competency:</p> <p><b>Units of competency:</b></p> <ul style="list-style-type: none"> <li>• MARA009 Manage stability of a vessel 500 gross tonnage or more</li> </ul>

		<ul style="list-style-type: none"> <li>• MARA010 Manage loading, unloading and stowage of cargo</li> <li>• MARB020 Manage repairs and maintenance of a vessel 500 gross tonnage or more</li> <li>• MARB021 Perform routine tasks in a marina</li> <li>• MARB022 Refuel a vessel</li> <li>• MARB023 Maintain marina infrastructure</li> <li>• MARB024 Undertake basic boatyard operations</li> <li>• MARC026 Operate remote controls of propulsion plant and engineering systems</li> <li>• MARD003 Manage legal requirements of a vessel</li> <li>• MARF020 Coordinate search and rescue operations</li> <li>• MARF021 Manage safety and security of vessel crew and passengers</li> <li>• MARF023 Apply safe work practices in a marina</li> <li>• MARF024 Classify marina infrastructure, vessels and staffing structure</li> <li>• MARF025 Respond to marina emergencies</li> <li>• MARG006 Manage a vessel and its crew</li> <li>• MARH011 Forecast weather and oceanographic conditions to plan a safe passage</li> <li>• MARH012 Manage the navigation of a vessel 500 gross tonnage or more</li> <li>• MARJ005 Manage compliance with environmental management legislation</li> <li>• MARK006 Manoeuvre a vessel 500 gross tonnage or more</li> <li>• MARN006 Manage cargo operations</li> </ul> <p><b>ISC upgrade:</b></p> <p>Amendments to the following units of competency:</p> <ul style="list-style-type: none"> <li>• MARH004 Plan and navigate a passage for a vessel up to 80 metres</li> <li>• MARH005 Use wheelhouse equipment for safe navigation</li> </ul>
2.0	27 February 2015	<p>Seven qualifications transitioned to the <i>Standards for Training Packages</i>.</p> <p><b>Qualifications:</b></p> <ul style="list-style-type: none"> <li>• MAR30115 Certificate III in Maritime Operations (Marine Engine Driver Steam)</li> <li>• MAR30215 Certificate III in Maritime Operations (Marine Surveying)</li> <li>• MAR40115 Certificate IV in Maritime Operations (Marine Surveying)</li> <li>• MAR50115 Diploma of Maritime Operations (Engineer Watchkeeper)</li> </ul>

		<ul style="list-style-type: none"> <li>• MAR50215 Diploma of Maritime Operations (Marine Surveying)</li> <li>• MAR60114 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)</li> <li>• MAR60215 Advanced Diploma of Maritime Operations (Marine Engineering Class1)</li> </ul> <p>Fifty units of competency transitioned to the <i>Standards for Training Packages</i> and two new units of competency.</p> <p><b>Units of competency:</b></p> <ul style="list-style-type: none"> <li>• MARF022 Apply maritime resource management principles</li> <li>• MARL037 Demonstrate knowledge of ships and ship routines</li> </ul> <p>New units for Radio Operator and Fast Rescue Craft:</p> <ul style="list-style-type: none"> <li>• MARC019 Transmit and receive information by marine VHF radio within Australian Territorial Waters</li> <li>• MARC020 Transmit and receive information by marine radio</li> <li>• MARC021 Transmit and receive information by marine VHF radio</li> <li>• MARF016 Carry out fast rescue craft operations</li> </ul> <p>New units for Offshore Familiarisation:</p> <ul style="list-style-type: none"> <li>• MARA007 Contribute to safe cargo operations on offshore support vessels</li> <li>• MARA008 Contribute to safe anchor handling and towing operations</li> </ul> <p><b>Skill Sets:</b></p> <p>New Skill Sets for Radio Operator and Fast Rescue Craft:</p> <ul style="list-style-type: none"> <li>• MARSS00009 Australian Territorial Waters VHF Radio Operators</li> <li>• MARSS00010 Marine Radio Operators VHF and HF</li> <li>• MARSS00011 Marine Radio Operators VHF</li> <li>• MARSS00012 Fast Rescue Craft Operations.</li> </ul> <p>New Skill Sets for Offshore Familiarisation:</p> <ul style="list-style-type: none"> <li>• MARSS00013 Cargo Handling Skill Set</li> <li>• MARSS00014 Anchor Handling and Cargo Operations Skill Set</li> </ul> <p><b>ISC upgrade:</b></p> <p>Amendments to the following Skill Set:</p> <ul style="list-style-type: none"> <li>• MARSS00008 Shipboard Safety Skill Set</li> </ul> <p>Amendments to the following units of competency:</p> <ul style="list-style-type: none"> <li>• MARB004 Perform routine maintenance on a vessel up to 24 metres</li> <li>• MARB006 Maintain marine internal combustion engines,</li> </ul>
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		<p>propulsion plant and auxiliary systems</p> <ul style="list-style-type: none"> <li>• MARF001 Apply basic survival skills in the event of vessel abandonment</li> <li>• MARF002 Follow procedures to minimise and fight fires on board a vessel</li> <li>• MARF004 Meet work health and safety requirements</li> <li>• MARF005 Survive at sea using survival craft</li> <li>• MARK001 Handle a vessel up to 12 metres</li> <li>• MARO003 Transmit and receive information by the global maritime distress and safety system</li> </ul>
1.1	3 December 2013	<p><b>ISC upgrade</b></p> <p>Minor corrections to the following units of competency:</p> <ul style="list-style-type: none"> <li>• MARA005</li> <li>• MARC008</li> <li>• MARC009</li> <li>• MARC010</li> <li>• MARC011</li> <li>• MARC018</li> </ul>
1.0	7 October 2013	<p><b>Primary release</b></p> <p>The MAR Maritime Training Package is the result of the near coastal material in the MAR13 Maritime Training Package being transitioned to the new <i>Standards for Training Packages</i>.</p> <p>The remaining material in the MAR13 Maritime Training Package will be transitioned to the MAR Maritime Training Package over time.</p>

## Credit Arrangements

Currently there are no credit transfer arrangements between the proposed qualifications/units of competency in this Training Package and higher education qualifications.

## Links

Companion Volume implementation guide can be found in VetNet -  
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

# MARSS00004 Marine Emergency Care, Craft and Communication Skill Set

## Modification History

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1. New Skill Set.

## Description

This Skill Set reflects the additional units required by people certified as a Master up to 80 metres Near Coastal seeking Australian Maritime Safety Authority (AMSA) certification as a Master up to 500 gross tonnage (GT) as defined by the National Standard for Commercial Vessels (NSCV) Part D.

## Pathways Information

This Skill Set contributes to a range of qualifications in the MAR Maritime Training Package.

Before undertaking this Skill Set, seafarers seeking certification as a Master up to 500 GT should check with AMSA to determine additional certification requirements.

## Licensing/Regulatory Information

Seafarers should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## Skill Set Requirements

**A total of 3 units of competency must be attained.**

MARF038	Manage provision of medical care on board a vessel
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)
MARO011	Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)



## Target Group

People who hold a MAR50220 Diploma of Maritime Operations (Master less than 80 metres Near Coastal), have AMSA certification to work as a Master up to 80 metres Near Coastal as defined by NSCV Part D and are seeking certification as a Master up to 500 GT.

## Suggested words for Statement of Attainment

The MARSS00004 Marine Emergency Care, Craft and Communication Skill Set reflects additional responsibilities undertaken by someone with Australian Maritime Safety Authority (AMSA) certification as a Master up to 80 metres Near Coastal seeking certification as a Master up to 500 gross tonnage (GT).

## Custom Content Section

Not applicable.

# MARSS00005 Marine Engineering Class 3 Near Coastal Maintenance Skill Set

## Modification History

Release 1. New Skill Set.

## Description

This Skill Set reflects additional maintenance responsibilities for people who are an Engineer Class 3 Near Coastal.

## Pathways Information

The MAR Marine Engineering Class 3 Near Coastal Maintenance Skill Set is part of the MAR Maritime Training Package.

This Skill Set meets the workshop skill equivalent or trade requirement for entry to progress from the MAR50613 Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal) to the MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper).

Before undertaking this Skill Set, candidates seeking certification should check with AMSA to determine additional certification requirements.

## Licensing/Regulatory Information

Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

## Skill Set Requirements

MARB013	Maintain and repair marine electrical and electronic equipment
MARB014	Maintain and repair shipboard machinery and equipment
MARC018	Employ tools, equipment and materials in a shipboard context

## Target Group

People who hold a MAR50613 Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal), have Australian Maritime Safety Authority (AMSA) certification to work on a vessel with propulsion power of less than 3000 kW in the exclusive economic zone (EEZ), are required to undertake additional maintenance and trade skill responsibilities, and who wish to progress to the MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper).

## Suggested words for Statement of Attainment

The MAR Marine Engineering Class 3 Near Coastal Maintenance Skill Set reflects additional maintenance and trade skill responsibilities undertaken by someone with AMSA certification as a Marine Engineer Class 3 Near Coastal.

## Custom Content Section

Not applicable.

# **MARSS00006 Marine Engineering Class 3 Near Coastal Shipboard Safety Skill Set**

## **Modification History**

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1. New Skill Set.

## **Description**

This Skill Set reflects the additional units required by people certified as an Engineer Class 3 Near Coastal seeking Australian Maritime Safety Authority (AMSA) certification as an Engineer Watchkeeper or who are required by AMSA to perform additional shipboard safety responsibilities.

## **Pathways Information**

This Skill Set contributes to a range of qualifications in the MAR Maritime Training Package.

## **Licensing/Regulatory Information**

Seafarers should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## **Skill Set Requirements**

**A total of 3 units of competency must be attained.**

MARF032	Apply medical first aid on board a ship
MARF043	Operate survival craft, rescue boats and lifesaving appliances (proficiency in survival craft)
MARF044	Prevent, control and fight fires on board a vessel (advanced firefighting)

## **Target Group**

People who hold a MAR50120 Diploma of Marine Engineering (Engineer Class 3 Near Coastal), have AMSA certification to work on a vessel with propulsion power of less than 3000 kW in the exclusive economic zone (EEZ), are required to undertake additional shipboard safety responsibilities and who may wish to progress to the MAR50120 Diploma of Marine

Engineering (Engineer Watchkeeper).

## **Suggested words for Statement of Attainment**

This MARSS00006 Marine Engineering Class 3 Near Coastal Shipboard Safety Skill Set reflects additional shipboard safety responsibilities undertaken by someone with Australian Maritime Safety Authority (AMSA) certification as a Marine Engineer Class 3 Near Coastal.

## **Custom Content Section**

Not applicable.

# MARSS00007 Safety Training Certification Skill Set

## Modification History

Release 1. New Skill Set.

The MARSS00007 Safety Training Certification Skill Set is equivalent to the MARSS00002 Safety Training Certification Skill Set.

## Description

This Skill Set reflects the work required by people who need an Australian Maritime Safety Authority (AMSA) Certificate of Safety Training.

## Pathways Information

The MAR Safety Training Certification Skill Set is part of the MAR Maritime Training Package.

## Licensing/Regulatory Information

Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

## Skill Set Requirements

MARF003	Follow vessel security procedures
MARF006	Observe personal safety and social responsibility
MARF008	Prevent and fight fires on board a vessel
MARF009	Survive at sea in the event of vessel abandonment

## Target Group

People interested in the Australian Maritime Safety Authority (AMSA) Certificate of Safety Training.

## **Suggested words for Statement of Attainment**

The MAR Safety Training Certification Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for the AMSA Certificate of Safety Training; people seeking certification should check with AMSA.

## **Custom Content Section**

Not applicable.

# MARSS00008 Shipboard Safety Skill Set

## Modification History

Release 4: Updated pathways information and details in the Statement of Attainment.

Release 3: Updated unit codes.

Release 2: Changes to description, target group and suggested words for statement of attainment.

Release 1: New Skill Set. The MARSS00008 Shipboard Safety Skill Set replaces and is equivalent to the MARSS00003 Shipboard Safety Skill Set.

## Description

This Skill Set reflects the work required by people who need to complete shipboard safety units of competency required by the Australian Maritime Safety Authority (AMSA).

## Pathways Information

This Skill Set contributes to a range of qualifications in the MAR Maritime Training Package.

## Licensing/Regulatory Information

Seafarers should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

Seafarers seeking certification should check with AMSA.

## Skill Set Requirements

**A total of 4 units of competency must be attained.**

MARF027	Apply basic survival skills in the event of vessel abandonment
MARF028	Follow procedures to minimise and fight fires on board a vessel
MARF029	Meet work health and safety requirements
MARF030	Survive at sea using survival craft

## Target Group

People interested in completing a number of units that contribute to qualifications in the MAR Maritime Training Package.



## **Suggested words for Statement of Attainment**

This MARSS00008 Shipboard Safety Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for shipboard safety.

# **MARSS00009 Australian Territorial Waters VHF Radio Operator's Skill Set**

## **Modification History**

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1: New Skill Set.

## **Description**

This Skill Set reflects the skills required by commercial and recreational boaters using marine very high frequency (VHF) radio equipment to transmit and receive information to and from ship to ship and ship to shore within 12 nautical miles from the Australian coastal baseline.

## **Pathways Information**

This Skill Set contributes to a range of qualifications in the MAR Maritime Training Package.

## **Licensing/Regulatory Information**

Before undertaking this Skill Set, candidates seeking certification should check with the Australian Communications and Media Authority (ACMA) to determine certification requirements.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARC059	Transmit and receive information by marine VHF radio within Australian Territorial Waters
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## **Target Group**

Individuals seeking ACMA certification.

## **Suggested words for Statement of Attainment**

This MARSS00009 Australian Territorial Waters VHF Radio Operator's Skill Set is consistent with the requirements of the Radiocommunications (Maritime Ship Station – 27 MHz and VHF)

Class Licence 2001.

## **Custom Content Section**

Not applicable.

# **MARSS00010 Marine Radio Operator's VHF and HF Skill Set**

## **Modification History**

Release 2. Updated unit codes

Release 1. New Skill Set.

## **Description**

This Skill Set reflects the skills required by Masters of commercial vessels who use marine radio and telephone equipment to transmit and receive information to and from ship to ship and ship to shore.

## **Pathways Information**

The Marine Radio Operator's VHF and HF Skill Set is part of the MAR Maritime Training Package.

## **Licensing/Regulatory Information**

Before undertaking this Skill Set, candidates seeking certification for the Marine Radio Operator's Certificate of Proficiency should check with ACMA to determine certification requirements.

## **Skill Set Requirements**

MARC043      Transmit and receive information by marine radio

## **Target Group**

Individuals seeking Australian Communications and Media Authority (ACMA) Marine Radio Operator's Certificate of Proficiency.

## **Suggested words for Statement of Attainment**

The MAR Marine Radio Operator's VHF and HF Skill Set is consistent with the relevant maritime regulations and certification requirements as specified in the Radiocommunications Act 1992 for the Marine Radio Operator's Certificate of Proficiency.

# **MARSS00011 Marine Radio Operator's VHF Skill Set**

## **Modification History**

Release 2. Updated unit code.

Release 1. New Skill Set.

## **Description**

This Skill Set reflects the skills required by Coxswains Grade1 and Masters of commercial vessels requiring proficiency in the use of marine VHF radio and telephone equipment to transmit and receive information to and from ship to ship and ship to shore.

## **Pathways Information**

The Marine Radio Operator's VHF Skill Set is part of the MAR Maritime Training Package.

## **Licensing/Regulatory Information**

Before undertaking this Skill Set, candidates seeking certification for the Marine Radio Operator's VHF Certificate of Proficiency should check with ACMA to determine certification requirements.

## **Skill Set Requirements**

MARC044      Transmit and receive information by marine VHF radio

## **Target Group**

Individuals seeking Australian Communications and Media Authority (ACMA) Marine Radio Operator's VHF Certificate of Proficiency.

## **Suggested words for Statement of Attainment**

The MAR Marine Radio Operator's VHF Skill Set meets the certification requirements as specified in the Radiocommunications Act 1992 for the Marine Radio Operator's VHF Certificate of Proficiency.

# **MARSS00012 Fast Rescue Craft Operations Skill Set**

## **Modification History**

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1: New Skill Set.

## **Description**

This Skill Set reflects the skills required to carry out fast rescue craft operations.

## **Pathways Information**

This Fast Rescue Craft Operations Skill Set is part of the MAR Maritime Training Package.

To obtain fast rescue craft endorsement from the Australian Maritime Safety Authority (AMSA) a Certificate of Proficiency in survival craft other than rescue boats plus this Skill Set will be required.

## **Licensing/Regulatory Information**

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARF034                      Carry out fast rescue craft operations

## **Target Group**

Individuals who hold a Certificate of Proficiency in survival craft and rescue boats, other than fast rescue boats.

## **Suggested words for Statement of Attainment**

This MARSS000012 Fast Rescue Craft Operations Skill Set meets the industry requirements for individuals launching and operating fast rescue craft and using related survival equipment.

# **MARSS00013 Cargo Handling Skill Set**

## **Modification History**

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1. New Skill Set.

## **Description**

This Skill Set reflects the skills required by Integrated Ratings to undertake a range of offshore activities onboard an offshore support vessel (OSV).

## **Pathways Information**

This Skill Set contributes to a range of qualifications in the MAR Maritime Training Package.

## **Licensing/Regulatory Information**

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA016                      Contribute to safe cargo operations on offshore support vessels

## **Target Group**

People who hold a current MAR30220 Certificate III in Maritime Operations (Integrated Rating) or higher Deck or Engineer officer qualifications or equivalent or are working towards such qualifications.

It is most suitable for personnel new to offshore operations.

## **Suggested words for Statement of Attainment**

This MARSS00013 Cargo Handling Skill Set provides additional skills required by an Integrated Rating to support a range of offshore activities.

# MARSS00014 Anchor Handling and Cargo Operations Skill Set

## Modification History

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1. New Skill Set.

## Description

This Skill Set reflects the skills required by Integrated Ratings to undertake a range of offshore anchor handling and towing activities onboard an Anchor Handling Tug Supply (AHTS), under the direction of the officer in charge or Master.

## Pathways Information

This Anchor Handling and Cargo Operations Skill Set is part of the MAR Maritime Training Package.

## Licensing/Regulatory Information

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## Skill Set Requirements

**A total of 2 units of competency must be attained.**

MARA015                      Contribute to safe anchor handling and towing operations

MARA016                      Contribute to safe cargo operations on offshore support vessels

## Target Group

People who hold a current MAR30220 Certificate III in Maritime Operations (Integrated Rating) or higher Deck or Engineer officer qualifications or equivalent or are working towards such qualifications.

It is most suitable for personnel new to offshore operations.



## **Suggested words for Statement of Attainment**

This MARSS00014 Anchor Handling and Cargo Operations Skill Set provides additional skills required by an Integrated Rating to support a range of offshore anchor handling operations.

# MARSS00015 Marine Dogging and Rigging Skill Set

## Modification History

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1: New Skill Set.

## Description

This Skill Set is for individuals who undertake basic dogging and rigging onboard a vessel. They perform basic rigging on a range of vessels, apply slinging techniques, select and inspect lifting gear, and direct the crane operator in moving a load.

## Pathways Information

This Skill Set contributes to MAR30220 Certificate III in Maritime Operations (Integrated Rating) and MAR40120 Certificate IV in Maritime Operations (Chief Integrated Rating).

## Licensing/Regulatory Information

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## Skill Set Requirements

**A total of 2 units of competency must be attained.**

MARC057 Perform dogging on board a vessel

MARC058 Perform rigging on board a vessel

## Target Group

People working onboard a vessel who want to specialise in dogging and rigging.

## Suggested words for Statement of Attainment

This MARSS00015 Marine Dogging and Rigging Skill Set meets the industry requirements for individuals who perform dogging and rigging onboard a vessel.

## **Custom Content Section**

Not applicable.

# MARSS00016 Tanker Familiarisation Skill Set

## Modification History

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1. New Skill Set.

## Description

This Skill Set is for individuals who undertake a range of activities onboard a liquefied gas tanker, and an oil and chemical tanker.

## Pathways Information

This Skill Set contributes to a range of qualifications in the MAR Maritime Training Package.

## Licensing/Regulatory Information

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## Skill Set Requirements

**A total of 2 units of competency must be attained.**

MARA012	Contribute to basic cargo operations on liquefied gas tankers
MARA013	Contribute to basic cargo operations on oil and chemical tankers (basic oil and chemical)

## Target Group

People interested in working on liquefied gas, and oil and chemical tankers.

## Suggested words for Statement of Attainment

This MARSS00016 Tanker Familiarisation Skill Set from the MAR Maritime Training Package meets the industry requirements for individuals who work on liquefied gas, and oil and chemical

tankers.

## **Custom Content Section**

Not applicable.

# MARSS00017 Coxswains Grade 1 Skill Set

## Modification History

Release 3: Updated pathways information and details in Statement of Attainment.

Release 2: Updated unit codes.

Release 1: New Skill Set. This Skill Set replaces but is not equivalent to MARSS00001 Coxswains Grade 1 and Grade 2 Skill Set.

## Description

This Skill Set is for individuals who work as a Coxswain Grade 2 in the maritime industry and want to progress to a Coxswain Grade 1.

## Pathways Information

This Skill Set contributes towards MAR20318 Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal).

## Licensing/Regulatory Information

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## Skill Set Requirements

**A total of 4 units of competency must be attained.**

MARB027	Perform basic servicing and maintenance of main propulsion unit and auxiliary systems
MARC038	Operate main propulsion unit and auxiliary systems
MARF030	Survive at sea using survival craft
MARH013	Plan and navigate a passage for a vessel up to 12 metres

## Target Group

People who are certified by the Australian Maritime Safety Authority (AMSA) as a Coxswain Grade 2 or hold a MAR10418 Certificate I in Maritime Operations (Coxswain Grade 2 Near

Coastal) qualification or equivalent and want to progress to a Coxswain Grade 1.

## **Suggested words for Statement of Attainment**

This MARSS00017 Coxswains Grade 1 Skill Set forms part of the requirements for the MAR20318 Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal), which forms part of the industry requirements for certification by the Australian Maritime Safety Authority (AMSA) as a Coxswain Grade 1.

Individuals seeking certification should check with AMSA.

## **Custom Content Section**

Not applicable.

# **MARSS00018 Marine Dogging Skill Set**

## **Modification History**

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1: New Skill Set.

## **Description**

This Skill Set is for individuals who undertake basic dogging onboard a vessel. They perform basic dogging on a range of vessels, apply slinging techniques, select and inspect lifting gear, and direct the crane operator in moving a load.

## **Pathways Information**

This Skill Set contributes to MAR30220 Certificate III in Maritime Operations (Integrated Rating) and MAR40120 Certificate IV in Maritime Operations (Chief Integrated Rating).

## **Licensing/Regulatory Information**

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARC057                      Perform dogging on board a vessel

## **Target Group**

People working onboard a vessel who want to specialise in basic dogging.

## **Suggested words for Statement of Attainment**

This MARSS00018 Marine Dogging Skill Set meets the industry requirements for individuals who perform basic dogging onboard a vessel.



## **Custom Content Section**

Not applicable.

# **MARSS00019 Marine Rigging Skill Set**

## **Modification History**

Release 2: This is the second release of this Skill Set in the MAR Maritime Training Package with updated unit codes and details.

Release 1: New Skill Set.

## **Description**

This Skill Set is for individuals who undertake basic rigging onboard a vessel. They perform basic rigging onboard a range of vessels using associated equipment.

## **Pathways Information**

This Skill Set contributes to MAR30220 Certificate III in Maritime Operations (Integrated Rating) and MAR40120 Certificate IV in Maritime Operations (Chief Integrated Rating).

## **Licensing/Regulatory Information**

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARC058                      Perform rigging on board a vessel

## **Target Group**

People working onboard a vessel who want to specialise in basic rigging.

## **Suggested words for Statement of Attainment**

This MARSS00019 Marine Rigging Skill Set meets the industry requirements for individuals who perform basic rigging onboard a vessel.

## **Custom Content Section**

Not applicable.

## MARSS00020 Able Seafarer - Deck Skill Set

### Modification History

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

### Description

This Skill Set reflects the skills and knowledge required by Seafarers to undertake task, duties and responsibilities of an Able Seafarer - Deck.

### Pathways Information

This Skill Set is part of the MAR Maritime Training Package.

Before undertaking this Skill Set, Seafarers seeking certification will need to have completed certification in:

- MAR30220 Certificate III in Maritime Operations (Integrated Rating) (Able Seafarer - Engine)

Check with Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for Able Seafarer - Deck.

### Licensing/Regulatory Information

To obtain a Certificate of Proficiency as an Able Seafarer – Deck from the Australian Maritime Safety Authority (AMSA) Seafarers will need to complete this Skill Set.

Check with AMSA to determine requirements for Able Seafarer – Deck certification.

### Skill Set Requirements

**A total of 7 units of competency must be attained.**

MARB025	Maintain mooring equipment
MARC022	Perform mooring and unmooring activities
MARC031	Shift mooring lines using mechanical means
MARC052	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC058	Perform rigging on board a vessel
MARK012	Steer a vessel under direction of the Master

MARO008                      Contribute to monitoring and controlling a safe navigational watch

## **Target Group**

Persons interested in undertaking task, duties and responsibilities of an Able Seafarer – Deck.

## **Suggested words for Statement of Attainment**

This MARSS00020 Able Seafarer - Deck Skill Set from the MAR Maritime Training Package meets some of the industry requirements for Seafarers who work on commercial vessels as an Able Seafarer – Deck.

## **Custom Content Section**

Not applicable.

# MARSS00021 Able Seafarer - Engine Skill Set

## Modification History

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## Description

This Skill Set reflects the skills and knowledge required by seafarers to undertake tasks, duties and responsibilities of an Able Seafarer - Engine.

## Pathways Information

This Skill Set is part of the MAR Maritime Training Package.

Before undertaking this Skill Set, Seafarers seeking certification will need to have completed certification in:

- MAR30220 Certificate III in Maritime Operations (Integrated Rating) (Able Seafarer - Deck)

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for Able Seafarer - Engine.

## Licensing/Regulatory Information

To obtain a Certificate of Proficiency as an Able Seafarer – Engine from the Australian Maritime Safety Authority (AMSA) Seafarers will need to complete this Skill Set.

Check with AMSA to determine requirements for Able Seafarer - Engine certification.

## Skill Set Requirements

**A total of 3 units of competency must be attained.**

MARB035	Contribute to routine engine maintenance on a vessel
MARC045	Contribute to the operation of engine equipment and associated propulsion plant
MARO007	Contribute to monitoring and controlling a safe engine watch

## Target Group

Persons interested in undertaking tasks, duties and responsibilities of an Able Seafarer - Engine.

## **Suggested words for Statement of Attainment**

This MARSS00021 Able Seafarer - Engine Skill Set from the MAR Maritime Training Package meets some of the industry requirements for seafarers who work on commercial vessels as Able Seafarer - Engine.

## **Custom Content Section**

Not applicable.

# **MARSS00022 Advanced Chemical Tanker Cargo Operations Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## **Description**

This Skill Set reflects the skills and knowledge required by: Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers and Ratings for advanced chemical tanker cargo operations.

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for a chemical tanker endorsement.

## **Licensing/Regulatory Information**

To obtain certification in advanced training for chemical tanker cargo operations from AMSA Seafarers will need a complete this Skill Set.

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1
- Tanker familiarisation.

Check with AMSA to determine requirements for a chemical tanker endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA018                      Manage advanced chemical tanker cargo operations



## **Target Group**

Seafarers interested in AMSA certification in Advanced Training for Chemical Tanker Cargo Operations.

## **Suggested words for Statement of Attainment**

This MARSS00022 Advanced Chemical Tanker Cargo Operations Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for advanced training for chemical tanker cargo operations.

## **Custom Content Section**

Not applicable.

# **MARSS00023 Advanced Liquefied Gas Tanker Cargo Operations Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## **Description**

This Skill Set reflects the skills and knowledge required by Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers and Ratings for advanced liquefied gas tanker cargo operations.

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for liquefied gas tanker endorsement.

## **Licensing/Regulatory Information**

To obtain certification in advanced training for liquefied gas tankers from AMSA Seafarers will need to complete:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1
- Tanker familiarisation.

Check with AMSA to determine requirements for advanced liquefied gas tanker endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA019                      Manage advanced liquefied gas tanker cargo operations

## **Target Group**

Seafarers interested in AMSA certification in advanced training for liquefied gas tanker cargo operations.

## **Suggested words for Statement of Attainment**

This MARSS00023 Advanced Liquefied Gas Tanker Cargo Operations Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for advanced training for liquefied gas tanker cargo operations.

## **Custom Content Section**

Not applicable.

# **MARSS00024 Advanced Oil Tanker Cargo Operations Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## **Description**

This Skill Set reflects the skills and knowledge required by: Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers and Ratings for advanced oil tanker cargo operations.

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for an oil tanker endorsement.

## **Licensing/Regulatory Information**

To obtain certification in advanced training for oil tanker cargo operations from AMSA Seafarers will need to complete this Skill Set.

Before undertaking this Skill Set, Seafarers will need to complete:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1
- Tanker familiarisation.

Check with AMSA to determine requirements for an oil tanker endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA020                      Manage advanced oil tanker cargo operations

## **Target Group**

Seafarers interested in AMSA certification in advanced training for oil tanker cargo operations.

## **Suggested words for Statement of Attainment**

This MARSS00024 Advanced Oil Tanker Cargo Operations Skill Set from the MAR Maritime Training Package meets some of the industry requirements for advanced training for oil tanker cargo operations.

## **Custom Content Section**

Not applicable.

# **MARSS00025 Advanced Operations for Ships in Polar Waters Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## **Description**

This Skill Set reflects the skills required by Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers and Ratings for advanced operations on ships in polar waters.

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for polar waters endorsement.

## **Licensing/Regulatory Information**

To obtain certification in advanced training for ships operating in polar waters from AMSA Seafarers will need to complete this Skill Set.

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1
- Basic training for ships operating in polar waters – Regulation V/4 (1 and 2) and Code Section A-V/4 (1), Table A-V/4-1.

Check with AMSA to determine requirements for polar waters endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARN012                      Manage advanced operations of ships in polar waters

## **Target Group**

Seafarers interested in AMSA certification in advanced training for ships operating in polar waters.

## **Suggested words for Statement of Attainment**

This MARSS00025 Advanced Operations for Ships in Polar Waters Skill Set from the MAR Maritime Training Package meets some of the industry requirements for advanced training for ships operating in polar waters.

## **Custom Content Section**

Not applicable.

# **MARSS00026 Advanced Operations for Ships Subject to IGF Code Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## **Description**

This Skill Set reflects the skills and knowledge required by a Master, Chief Mate, Engineer, Rating and any Seafarer on a ship subject to International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code).

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for ships subject to the IGF Code endorsement.

## **Licensing/Regulatory Information**

To obtain certification in advanced training for ships subject to IGF code from AMSA Seafarers will need to complete this Skill Set.

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1
- basic training for ships subject to the IGF Code – Regulation V/3 (4 and 5), Code Section A-V/3 (1), Table A-V/3-1.

Check with Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for ships subject to IGF Code endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA021                      Manage advanced operations of a ship subject to IGF Code



## Target Group

Seafarers interested in AMSA certification in advanced training for ships subject to the IGF Code.

## Suggested words for Statement of Attainment

This MARSS00026 Advanced Operations for Ships Subject to IGF Code Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for advanced training for ships subject to the IGF Code.

## Custom Content Section

Not applicable.

# **MARSS00027 Basic Operations for Ships in Polar Waters Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## **Description**

This Skill Set reflects the skills and knowledge required by Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers and Ratings for basic operations on ships in polar waters.

## **Pathways Information**

This Skills Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for polar waters endorsement.

## **Licensing/Regulatory Information**

To obtain certification in basic training for ships operating in polar waters from AMSA Seafarers will need to complete this Skill Set (or equivalent).

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1.

Check with AMSA to determine requirements for polar waters endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA011                      Contribute to basic operations of ships in polar waters

## **Target Group**

Seafarers interested in AMSA certification in basic training for ships operating in polar waters.

## **Suggested words for Statement of Attainment**

This MARSS00027 Basic Operations for Ships in Polar Waters Skill Set from the MAR Maritime Training Package meets some of the industry requirements for basic training for ships operating in polar waters.

## **Custom Content Section**

Not applicable.

# **MARSS00028 Basic Operations for Ships Subject to IGF Code Skill Set**

## **Modification History**

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package

## **Description**

This Skill Set reflects the skills and knowledge required by Masters, Chief Mate, Deck Officers, Engineering Officers, Engineers, Rating and other Seafarers on ships subject to the International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code).

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for ships subject to the IGF Code endorsement.

## **Licensing/Regulatory Information**

To obtain certification in basic training for ships subject to the IGF Code from AMSA Seafarers will need to complete this Skill Set or hold an endorsement in tanker familiarisation or advanced training for liquefied gas tanker cargo operations.

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1

Check with AMSA to determine requirements for ships subject to IGF Code endorsement.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARA014                      Contribute to basic operations of a ship subject to IGF Code

## Target Group

Seafarers interested in AMSA certification in basic training for ships subject to the IGF Code.

## Suggested words for Statement of Attainment

This MARSS00028 Basic Operations for Ships Subject to IGF Code Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for basic training for ships subject to the International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code).

## Custom Content Section

Not applicable.

# MARSS00029 Chief Integrated Rating Skill Set

## Modification History

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## Description

This Skill Set reflects the skills and knowledge required by a Seafarer who is in charge of the Integrated Rating on a ship and is responsible for implementing the planned maintenance system and maintaining relevant stores.

## Pathways Information

This Skill Set is part of the MAR Maritime Training Package.

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- MAR30220 Certificate III in Maritime Operations (Integrated Rating)

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determined requirements for Chief Integrated Rating.

## Licensing/Regulatory Information

Check with AMSA to determine requirements for Chief Integrated Rating.

## Skill Set Requirements

**A total of 4 units of competency must be attained.**

MARB036	Implement vessel planned maintenance system
MARB043	Manage stores for planned maintenance system
MARF044	Prevent, control and fight fires on board a vessel (advanced firefighting)
MARG010	Supervise a crew

## Target Group

Seafarers interested in undertaking tasks, duties and responsibilities of a Chief Integrated Rating.

## **Suggested words for Statement of Attainment**

This MARSS00029 Chief Integrated Rating Skill Set meets some of the industry requirements for Seafarers who work on commercial vessels as Chief Integrated Rating.

## **Custom Content Section**

Not applicable.

# MARSS00030 Global Maritime Distress Signal Radio Operators Skill Set

## Modification History

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## Description

This Skill Set reflects the skills and knowledge required by radio operators with immediate responsibility for operating a Global Maritime Distress and Safety System (GMDSS) radio.

## Pathways Information

This Skills Set is part of the MAR Maritime Training Package.

Check with the Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine requirements for a GMDSS radio operator.

## Licensing/Regulatory Information

To obtain certification in GMDSS radio operator from AMSA Seafarers will need to complete this Skill Set (or equivalent).

Check with AMSA to determine requirements for GMDSS radio operator certification.

## Skill Set Requirements

**A total of 3 units of competency must be attained.**

MARC043	Transmit and receive information by marine radio
MARC044	Transmit and receive information by marine VHF radio
MARO011	Transmit and receive information by the Global Maritime Distress and Safety System (GMDSS)

## Target Group

Seafarers interested in AMSA certification in GMDSS radio operation.



## **Suggested words for Statement of Attainment**

This MARSS00030 Global Maritime Distress Signal Radio Operators Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for Global Maritime Distress and Safety System (GMDSS) radio operation.

## **Custom Content Section**

Not applicable.

# MARSS00031 Marine Engineering Workshop Skills Equivalent Skill Set

## Modification History

Release 1. New Skill Set.

This MARSS00031 Marine Engineering Workshop Skills Equivalent Skill Set supersedes and is equivalent to MARSS00005 Marine Engineering Class 3 Near Coastal Maintenance Skill Set.

## Description

This Skill Set reflects additional maintenance responsibilities for people who are an Engineer Watchkeeper.

## Pathways Information

This MAR Marine Engineering Workshop Skills Equivalent Skill Set is part of the MAR Maritime Training Package.

This Skill Set meets the workshop skill equivalent requirement for pathways from the MAR50120 Diploma of Marine Engineering (Engineer Class 3 Near Coastal) to the MAR50120 Diploma of Marine Engineering (Engineer Watchkeeper).

This is a requirement for Engineering Cadet program in accordance with Marine Order 72.

Before undertaking this Skill Set, candidates seeking certification should check with the Australian Maritime Safety Authority (AMSA) to determine additional certification requirements.

## Licensing/Regulatory Information

Candidates should ensure they have also read the part of the Training Package Companion Volume Implementation Guide that outlines licensing and regulatory requirements.

## Skill Set Requirements

**A total of 3 units of competency must be attained.**

MARB038	Maintain and repair marine electrical and electronic equipment
MARB039	Maintain and repair shipboard machinery and equipment
MARC046	Employ tools, equipment and materials in a shipboard context

## Target Group

People who do not hold a workshop skills equivalent qualification under Marine Orders, have AMSA certification to work on a vessel with propulsion power of less than 3000 kW in the exclusive economic zone (EEZ), are required to undertake additional maintenance and trade skill responsibilities, and who wish to progress to the MAR50120 Diploma of Marine Engineering (Engineer Watchkeeper).

## Suggested words for Statement of Attainment

This MARSS00031 Marine Engineering Workshop Skills Equivalent Skill Set reflects additional maintenance and trade skill responsibilities undertaken by someone with Australian Maritime Safety Authority (AMSA) certification as a Marine Engineer Class 3 Near Coastal.

## Custom Content Section

Not applicable.

# MARSS00032 Operate Roll-On and Roll-Off Equipment Skill Set

## Modification History

Release 1. This is the first release of this Skill Set in the MAR Maritime Training Package.

## Description

This Skill Set reflects the skills and knowledge required by Seafarers with immediate responsibility for embarking and disembarking passengers; loading, discharging or securing cargo; and closing hull openings onboard roll-on and roll-off (ro-ro) carrier ships.

## Pathways Information

This Skill Set is part of the MAR Maritime Training Package.

Before undertaking this Skill Set, Seafarers will need to have completed certification in:

- Elementary first aid – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-3
- Fire prevention and firefighting – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-2
- Personal safety and social responsibilities – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-4
- Personal survival techniques – Regulation VI/1, Code Section A-VI/1, Table A-VI/1-1

Check with Australian Maritime Safety Authority (AMSA) before undertaking this Skill Set to determine additional certification requirements.

## Licensing/Regulatory Information

Check with AMSA to determine requirements for operating ro-ro equipment.

## Skill Set Requirements

**A total of 4 units of competency must be attained.**

MARC052	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC056	Operate roll-on and roll-off machinery and equipment on board a vessel
MARN014	Plan and manage safe loading of cargo
TLII3003	Provide customer service in transport vehicles/vessels

## Target Group

Seafarers interested in Australian Maritime Safety Authority (AMSA) certification in operating ro-ro equipment

## Suggested words for Statement of Attainment

This MARSS00032 Operate Roll-On and Roll-Off Equipment Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for operating roll-on and roll-off (ro-ro) equipment.

## Custom Content Section

Not applicable.

# MARSS00033 Safety Training Certification Skill Set

## Modification History

Release 1. New Skill Set.

This MARSS00033 Safety Training Certification Skill Set replaces but is not equivalent to the MARSS00007 Safety Training Certification Skill Set.

## Description

This Skill Set reflects the work required by people who need an Australian Maritime Safety Authority (AMSA) Certificate of Safety Training.

## Pathways Information

This Skill Set is part of the MAR Maritime Training Package.

## Licensing/Regulatory Information

Seafarers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

Seafarers seeking certification should check with AMSA.

## Skill Set Requirements

**A total of 5 units of competency must be attained.**

HLTAID011	Provide first aid
MARF035	Contribute to fire prevention and firefighting (basic firefighting)
MARF037	Follow vessel security procedures (security awareness training)
MARF041	Observe personal safety and social responsibility (PSSR)
MARF046	Survive at sea in the event of vessel abandonment and personal survival techniques (PST)

## Target Group

People interested in AMSA Certificate of Safety Training.

## **Suggested words for Statement of Attainment**

This MARSS00033 Safety Training Certification Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for the Australian Maritime Safety Authority (AMSA) Certificate of Safety Training.

## **Custom Content Section**

Not applicable.

# **MARSS00034 Ship Security Officer Skill Set**

## **Modification History**

Release 1. New Skill Set.

## **Description**

This Skill Set reflects the work required by people who need to complete Ship Security Officer units of competency required by the Australian Maritime Safety Authority (AMSA).

## **Pathways Information**

This Skill Set is part of the MAR Maritime Training Package.

Check with AMSA before undertaking this Skill Set to determine requirements for a proficiency for Ship Security Officer.

## **Licensing/Regulatory Information**

To obtain certification for Ship Security Officer from AMSA Seafarers will need to complete this Skill Set.

Check with AMSA to determine requirements for Ship Security Officer.

## **Skill Set Requirements**

**A total of 1 unit of competency must be attained.**

MARF040                      Manage ship security (Ship Security Officer)

## **Target Group**

Seafarers interested in AMSA certification in Ship Security Officer.

## **Suggested words for Statement of Attainment**

This MARSS00034 Ship Security Officer Skill Set is from the MAR Maritime Training Package and meets some of the industry requirements for shipboard safety.



## **Custom Content Section**

Not applicable.