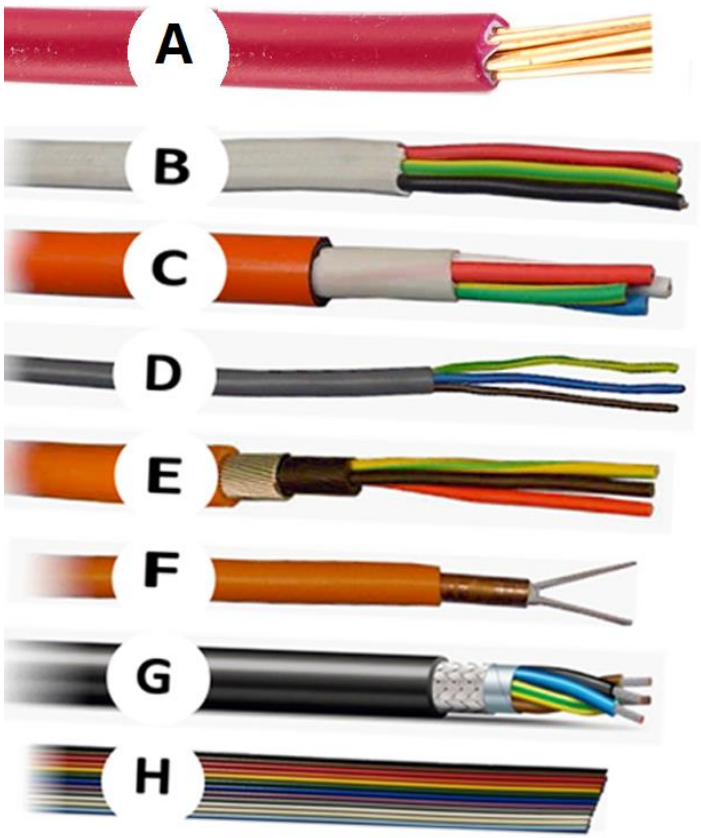
Part1:

Cable Type



Cable Type	Identification Letter
Thermoplastic Insulated Cable – TPI	A
Thermoplastic Sheathed Cable – TPS	B
Orange Circular TPS Cable	C
Flexible Cord	D
Steel Wire Armoured Cable	E
Mineral Insulated Metal Sheathed Cable with Serving	F
Screened (Shielded) Rubber Cable	G
Ribbon Cable	H

the colour for the internal cores of electrical cables and flexible cords .

Green/Yellow, Green, Black, White, Red, Orange, Brown, Grey, Light Blue, Blue, Bare (no insulation)

Cable/Cord Type	Region	Conductor	Insulation Colour
Flexible Cords	Australia New Zealand European	Active	Brown
		Neutral	Light Blue
		Earth	Green/Yellow
Single Phase Cables (Fixed Wiring)	Australia New Zealand	Active	Red
		Neutral	Black
		Earth	Green/Yellow
Multiphase Cables (Fixed Wiring)	Australia New Zealand	Phase 1	Red
		Phase 2	White
		Phase 3	Blue
		Neutral	Black
		Earth	Green/Yellow

1) In older installations, colour coding of earthing conductors may not conform to current AS/NZS 3000 requirements. From the options below, which two (2) have **historically** been used to identify earthing conductors?

   - Green
   - Blue

The cable or cord would be best for the installation situations given?

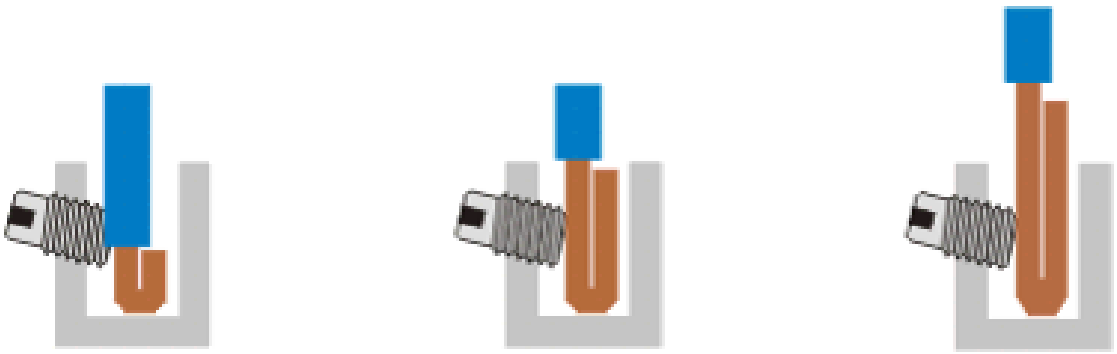
Situation	Cable or Cord Type
Circuit supplying socket-outlets in a domestic installation	Flat TPS
Supply to an outdoor light fitting exposed to the weather	Orange Circular TPS
Supply from a ceiling rose to a pendant socket-outlet in a workshop	Flexible Cord

identification label attached to a cable drum

CNCP05AA002WVAA
1.5 sqmm STR 2C+E FLAT
"RD, BK, EARTH, WT SHEATH"
450/750V CU/PVC/PVC
AS/NZS 5000.2
90 DEG: V-90/3V-90
7/050-2ERB
100m

Determine the following characteristics of the cable	
Cable size	1.5 mm^2
Conductor material	Copper
Conductor stranding	7 / 050
Insulation type	PVC
Core configuration	2C+E
Voltage rating to earth	450V V
Maximum Temperature rating	90 °C

2) Pictured below are three cable terminations



A B C

	Termination
Which cable is suitably terminated?	B
Which cable has poor conductivity?	A
Which cable has exposed conductor?	C

Where the terminals of an accessory have a considerably larger diameter than the conductors to be terminated:

“the conductors should be doubled over”

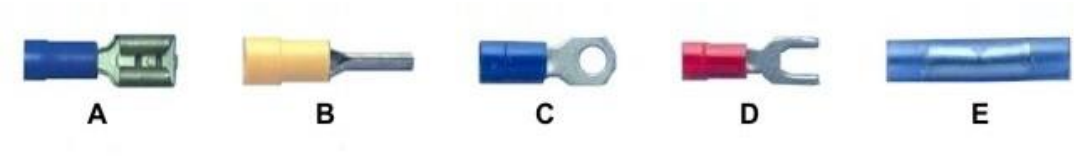
AS/NZS 3000 DOES NOT allow the strands of a flexible cord conductor to be soft-soldered prior to being clamped under a screw or between metal surfaces? Answer Yes or No **AND** give the AS/NZS 3000 reference for your answer

AS/NZS 3000 3.7.2.5 and 3.7.2.7

The termination accessory (a single screw connector)

The ceiling rose

Crimp lugs



Spade Pin Ring Fork Link

Ordinary Duty is the minimum requirement for the sheath of a flexible cord used for a **cord extension set** for normal use (e.g. domestic)?

Heavy Duty is the minimum requirement for the sheath of a flexible cord used for a **cord extension set** on a **construction site**?

The earth pin of a 15A plug is bigger when compared to a **10A** 3-pin plug

Table 1 Multiple choice

The purpose of a **'side-entry'** plug

To minimise how far the plug protrudes when connected to a wall socket

The purpose of the **tortuous path** of a 3-pin plug or cord extension socket is to minimise stress on terminals

Cable trunking and cable duct are both available with multiple compartments to allow for segregation between power cables and other services

Skirting trunking is commonly used in office environments for the installation of low voltage socket-outlets as well as telecommunications outlets. To protect telecommunications workers against the risk of electric shock, the low voltage cables must be sub-ducted in a separate enclosure that is installed inside the main enclosure

Flat TPS cable is used to supply a low voltage lighting loom in the ceiling space of a commercial premises. The minimum separation distance required between the TPS cable and any telecommunications cabling is 50mm

A circular TPS cable is to be installed **unenclosed** near the underside of a roof in an industrial premises. There is no RCD protecting the cable. What distance must be maintained between the cable and the underside of the roof material?

Minimum distance= ____50____ mm

b) Provide an AS/NZS 3000 reference for your answer.

AS/NZS 3000: 3.9.4.3.2

3) a) An orange circular TPS cable (unarmoured) has an outer sheath diameter of 15mm. What is minimum allowable bend radius for the cable?

Minimum bend radius =____90 ____mm

b) Provide an AS/NZS 3000 reference for your answer.

AS/NZS 3000: 3.9.6(b)(i)

Where a lighting loom is installed in a commercial premises, light fittings are usually connected to the circuit via surface sockets

Larger cables are often installed on cable ladder rather than cable tray to increase air circulation

A rigid PVC conduit suitable for use in direct sunlight will be marked with the letter “T”

Mechanical continuity of the enclosure must be maintained is the AS/NZS 3000 requirements for the mechanical continuity of a wiring enclosure when required to be cut (e.g. for a change of direction)?

The bending of rigid conduit

Cables must not suffer damage and the internal diameter must not be significantly reduced

TWhen installing rigid PVC conduit, the conduit must be joined with conduit cement wherever a join exists

AS/NZS 3000 requirements for earthing a metallic wiring enclosure that contains TPI cables

The metallic wiring enclosure must be earthed at the switchboard end

A metallic cable trunking is installed horizontally around a workshop wall at a height of 1.8m above the ground. What are the AS/NZS 3000 requirements regarding the cable trunking covers where the trunking contains TPI cables?

The trunking covers must require a tool for removal

A rigid metallic conduit is attached to a metallic cable trunking through a close fitting hole and held in place by metallic locknuts both inside and outside the trunking. The metallic

cable trunking is earthed at the end adjacent to the switchboard. What are the earthing requirements for the conduit if it contains TPI cables?

The rigid metallic conduit is considered to be earthed

A rigid metallic conduit run containing TPI cables connects to one side of a PVC enclosure. Another rigid metallic conduit continues on from the other side of the enclosure to supply other equipment. What are the AS/NZS 3000 requirements for the outgoing conduit?

The outgoing metallic conduit must be earthed by connection to the incoming conduit

After cutting or threading rigid metallic conduit, the ends of the conduit must be lubricated to allow conduit accessories to be fitted more easily

Cables must be segregated from conductors of different safety systems and any other system is the AS/NZS 3000 requirements for the segregation of cables supplying fire pumps and fire pump control equipment?

4) a) A fire rated cable has a WS classification of 'WS52W'. How long will circuit integrity be maintained in the event of a fire?

Time: 120 minutes

b) Provide the AS/NZS 3000 reference for your answer.

AS/NZS 3000: H1.3

5) a) What is the 'normal use' operating temperature of served MIMS cable?

Temperature: 100 °C

b) Provide the AS/NZS 3000 reference for your answer.

AS/NZS 3000: Table 3.2

Vibration loop must be made in the cable immediately before the point of termination Where a MIMS cable terminates at an electric motor, to protect the cable from the effect of vibrations.

T**hree (3)** AS/NZS 3000 requirements for a wiring system that penetrates a fire barrier? Select all three correct responses.

- Openings must be at least 50mm from any other service opening
- Openings must be close fitting and generally no greater than 500mm²
- Any opening that remains after the installation of the wiring system must be fire-stopped

Elastomer is **NOT** a type of fire protection cable?

When terminating MIMS cable, **sealing compound** is used to minimise the ingress of moisture into the cable

Where MIMS cable is to be installed **underground** the cable must be served to protect against corrosion

What is the minimum permissible value of insulation resistance for a MIMS cable?

Minimum value: 1 MΩ

Provide the AS/NZS 3000 reference for your answer.

AS/NZS 3000: 8.3.6.3

It is NOT permissible to install sheathed SWA cable as a Category C underground wiring system (AS/NZS 3000 Table 3.5)

A **steel wire armoured** cable has an outside diameter of 15mm. In the absence of manufacturer's information, : 180 mm is the minimum internal bend radius for the cable during installation. AS/NZS 3000: 3.9.6 (b)(ii)

A **steel wire armoured** cable is to be installed near the roof of an industrial premises. There is **no RCD** protecting the cable. What distance must be maintained between the cable and the underside of the roof material?

There is no minimum distance required

Weatherproof SWA cable gland is different to a general use SWA cable gland due to the presence of a neoprene sealing ring

Screened cables are often used to supply electric motors connected to variable frequency drives (VFDs) to minimise the effects of electromagnetic radiation

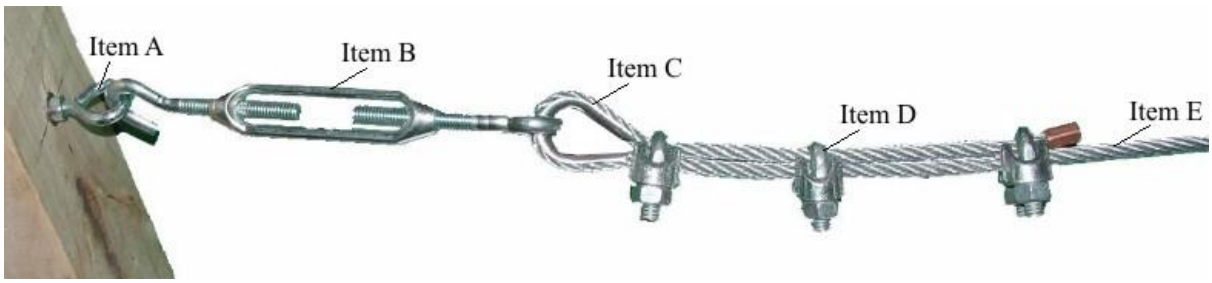
A 2.5mm² cable is to be run outdoors between two buildings along a catenary wire. ar**three (3)** mandatory requirements for the type of cable to be used are

- Cable must be double insulated
- Cable conductors must be stranded
- Cable insulation must be suitable for exposure to direct sunlight

b) Provide the AS/NZS 3000 reference for your answer.

AS/NZS 3000 3.13.1

Identify the following components of a catenary wiring system by matching the letter with the items listed in the table below.



Eye Bolt Turnbuckle Thimble Clamp Wire Rope

The minimum height for a catenary wiring system above an outdoor area used by vehicles is 4.6 m

Where a catenary wiring system is installed indoors, 100 mm is the minimum clearance that must be maintained from equipment operating at an elevated temperature.

A trailing cable system is used to supply a 230V pendant socket-outlet in a workshop environment. Double pole switch Is required for the switch controlling the socket-outlet?

Additional elements needed for a **trailing cable system** that are not generally required for a catenary wiring system are cable rollers/trolleys

The minimum permissible value of insulation resistance for general wiring in a 230/400V low voltage installation is 1 MΩ

When testing the polarity of the surface socket shown below, B terminal should the **active** wire .