

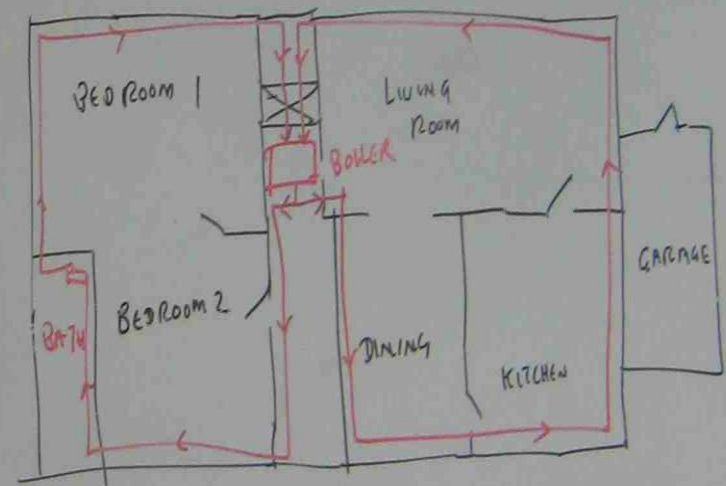
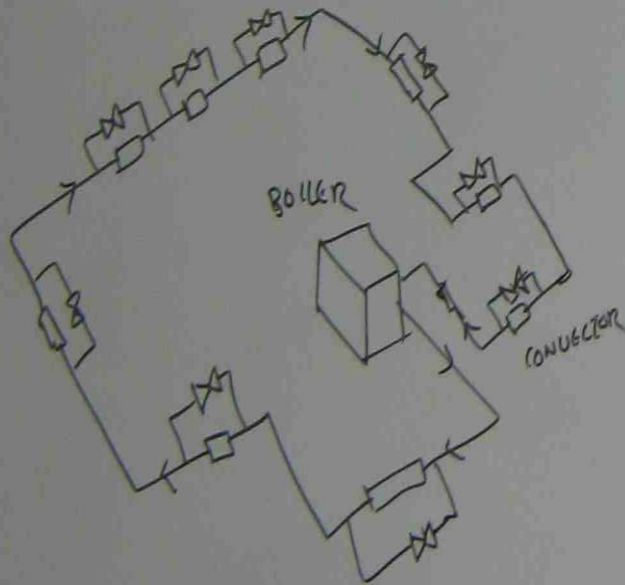
## HOT WATER HEATING SYSTEM AND DESIGN

FOR HEAT, THE WATER IS HEATED IN A BOILER TO PRESET TEMPERATURE 180°F TO 210°F. (82°C → 100°C)  $^{\circ}\text{C} = (F - 32) \times \frac{5}{9}$

THEN A CIRCULATING PUMP IS AUTOMATICALLY CUT ON, THE HOT WATER IS CIRCULATED THROUGH THE SYSTEM OF PIPES. PASSING THROUGH A VARIETY OF CONVECTOR TYPES.

### SERIES LOOP SYSTEM

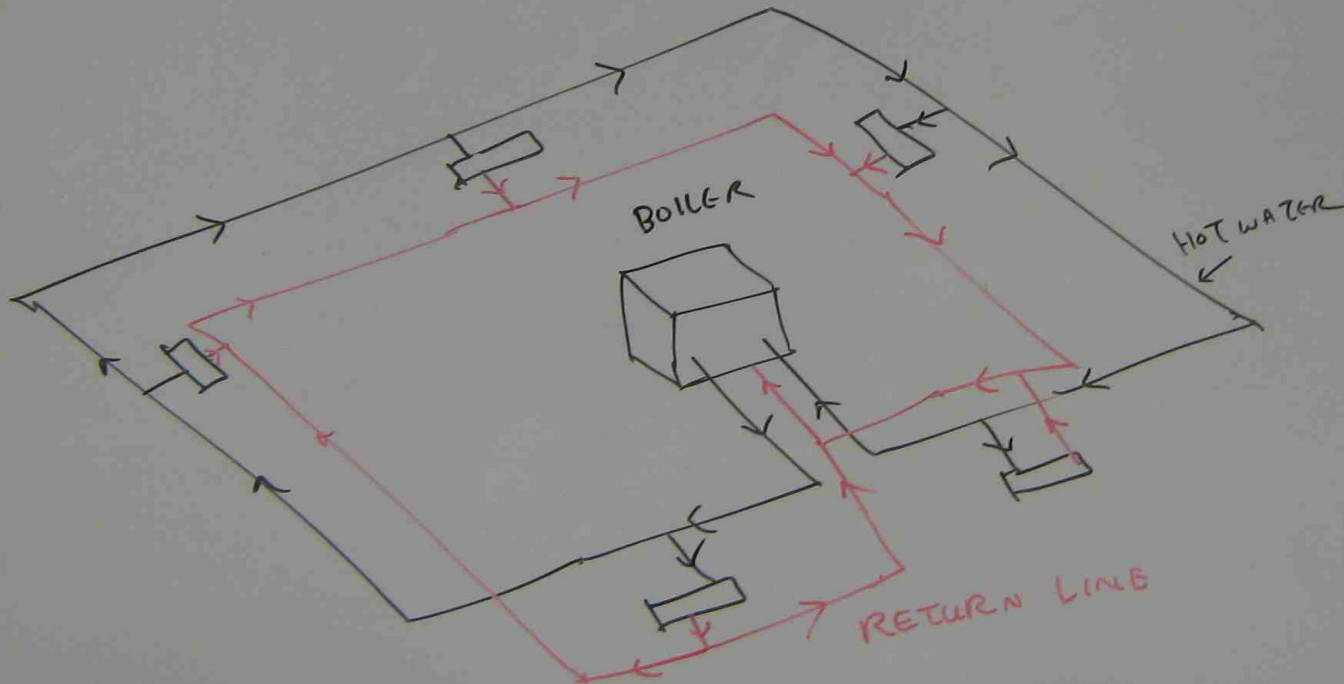
(ONE PIPE SYSTEM)



— WATER PIPE

## TWO PIPE SYSTEM

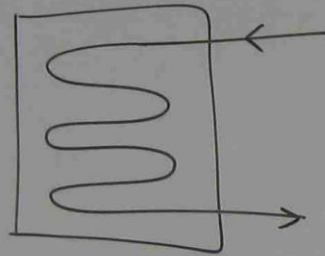
FOR THE LARGE INSTALLATIONS, THE SUPPLY OF HOT WATER NEEDS TO BE KEPT SEPARATE FROM THAT WATER WHICH HAS BEEN COOLED BY PASSING THROUGH CONVECTOR. TO ACCOMPLISH IT, ONE PIPE IS USED TO SUPPLY THE HOT WATER WHICH THEN EMPTIES INTO ANOTHER PIPE USED FOR RETURN.



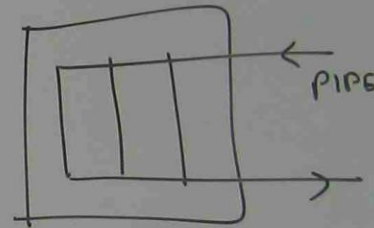
BY APPLYING TWO PIPE SYSTEM, HOT WATER TEMPERATURE CAN BE MAINTAINED.

## RADIANT PANEL (SPACE HEATING)

THE HOT WATER MAY BE CIRCULATED THROUGH PIPES LOCATED USUALLY IN THE FLOOR OR CEILING OF THE BUILDING. THE PIPES ARE LAID IN A COIL OR GRID ARRANGEMENT, FOR A FLOOR SYSTEM, THEY ARE EMBEDDED IN CONCRETE.



RADIANT PANEL



## PIPE AND FITTING

PIPE - COPPER PIPE

COPPER IS PREFERRED BECAUSE

IT IS LIGHT WEIGHT AND EASY

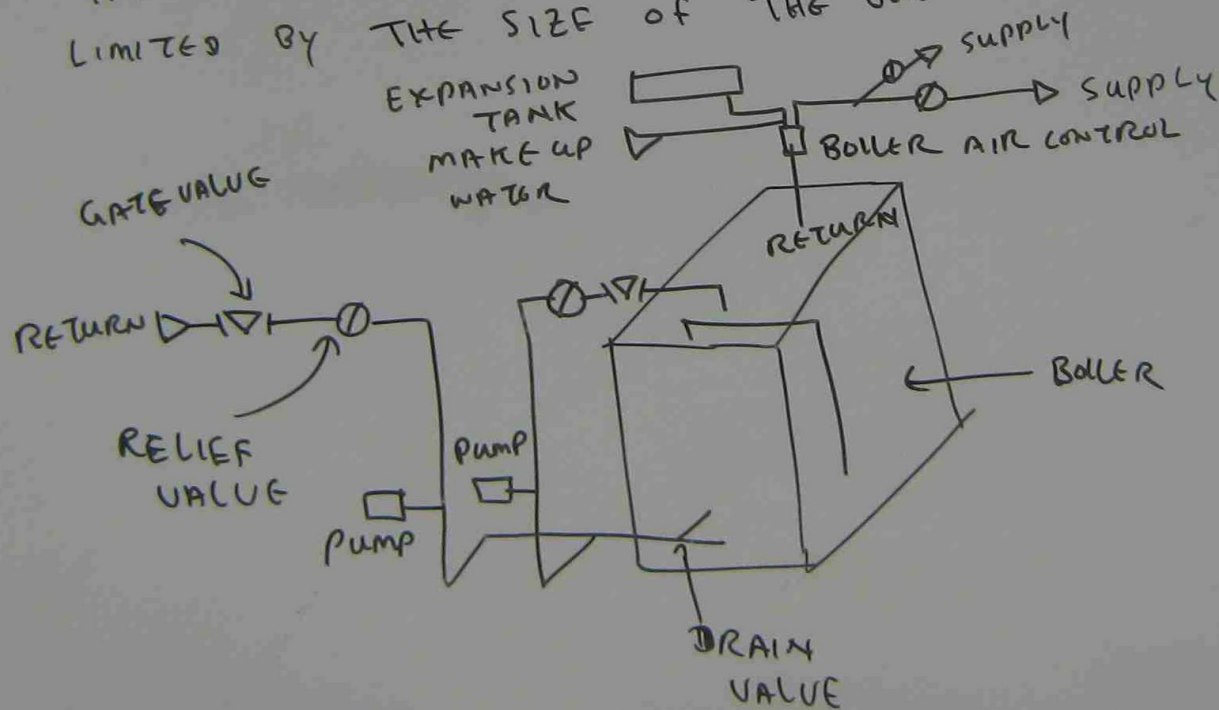
TO WORK.

## BOILER AND SYSTEM CONTROL

THE BOILER FURNACE HEATS THE WATER FOR CIRCULATION THROUGH THE SYSTEM. IT MAY BE RECTANGULAR (OR) SQUARE (OR) ROUND MADE OF STEEL OR CAST IRON.

A BOILER IS RATED BY THE AMOUNT OF HEAT IT CAN PRODUCE IN AN HOUR.

THE MAXIMUM AMOUNT OF HEAT THAT SYSTEM PUT OUT IS LIMITED BY THE SIZE OF THE BOILER SELECTED.





### THERMOSTAT

THERMOSTAT CONTROLS THE AIR TEMPERATURE IN THE SPACE.

TYPE OF THERMOSTAT - SINGLE, DAY NIGHT

### EXPANSION TANK

THE EXPANSION TANK ALLOWS FOR THE EXPANSION OF THE WATER IN THE SYSTEM AS IT IS HEATED.

### AUTOMATIC FILLER VALVE

WHEN THE PRESSURE IN THE SYSTEM DROPS, THIS VALVE OPENS, ALLOWING MORE WATER INTO THE SYSTEM.

### CIRCULATING PUMP

THE PUMP PROVIDES THE DISTRIBUTION OF HOT WATER THROUGHOUT THE SYSTEM.

### FLOW CONTROL VALVE

CONTROL THE WATER FLOW DEPENDING ON TEMPERATURE AND PRESSURE

### PRESSURE RELIEF VALVE

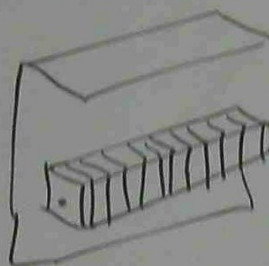
TO RELIEVE STEAM IN  
BOILER

# HOT WATER HEATING DEVICES

RADIANT  
HEATING  
DEVICE



CONVECTOR  
HEATING  
DEVICE



UNIT HEATER / COOLER

CEILING UNIT

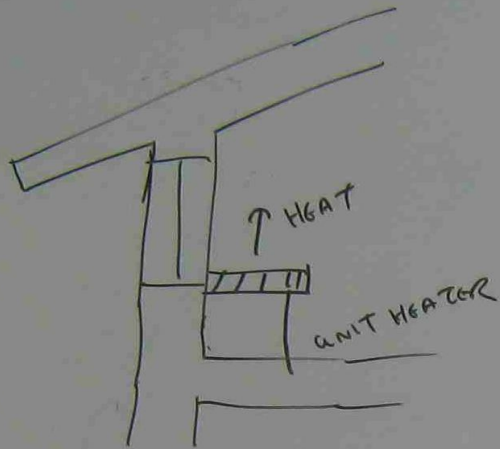
AIR CON  
EVAPORATOR

WATER  
RADIATOR

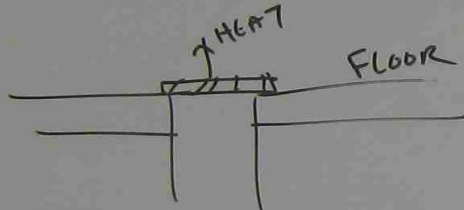
FLOOR  
UNIT

AIR CON  
COMPRESSOR  
+  
CONDENSER

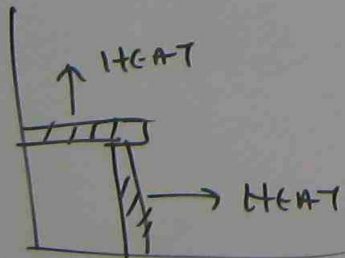
WATER  
BOILER



UNIT HEATER



RECESSED UNIT



FLOOR MOUNTED UNIT

DEPENDING ON VOLUME OF WATER AND TYPES OF PIPE FITTINGS, THE PRESSURE LOSS IN THE SYSTEM NEEDS TO BE DETERMINED BY REFERRING THE MANUFACTURERS' PIPE TABLES AND SELECT THE APPROPRIATE SIZE OF PUMP MOTOR.

# ELECTRICAL SYSTEMS AND DESIGN

## TECHNICAL ASPECT

- (1) MAXIMUM DEMAND CALCULATION
- (2) CAPACITY OF EQUIPMENTS
- (3) APPROPRIATE SIZE OF WIRE FOR MAIN, SUB MAIN, FINAL SUB CIRCUIT
- (4) LOCATION OF EQUIPMENTS, SWITCHBOARDS, PROTECTION DEVICES
- (5) WIRING SYSTEM
- (6) SWITCHING SYSTEM
- (7) EARTHING SYSTEM
- (8) VOLTAGE DROP CALCULATION

## MANAGEMENT ASPECT

COMPLIANCE WITH RELEVANT RULES, REGULATIONS & STANDARDS

### GENERAL WIRING

AS 3000 | 2007 (OR) AS 3000 | 2010 STANDARD.

### CABLE SIZE

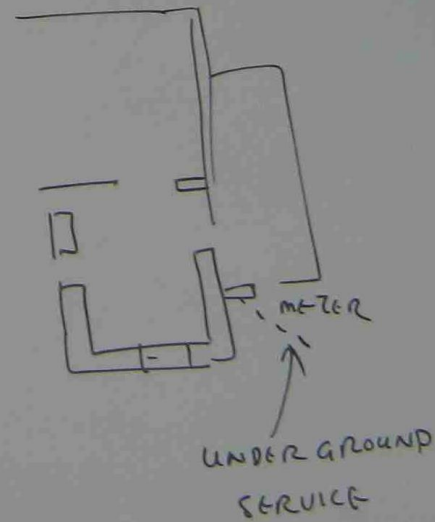
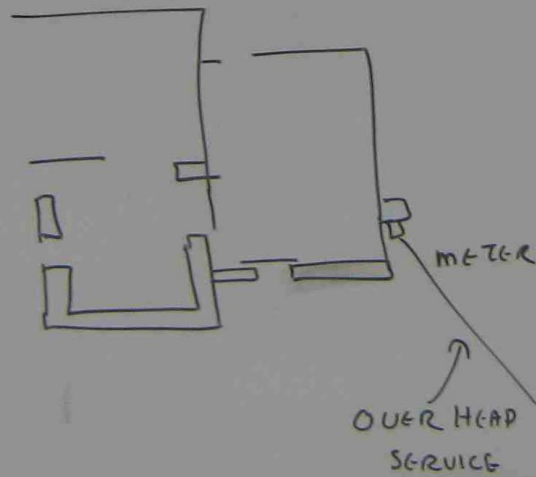
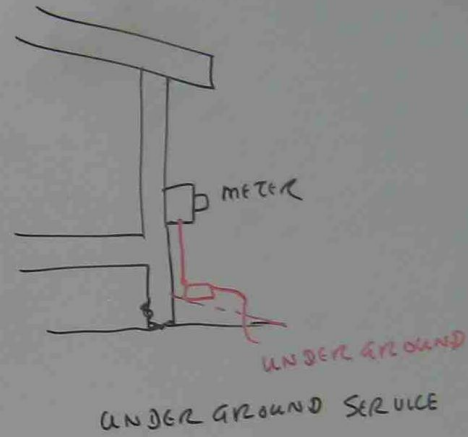
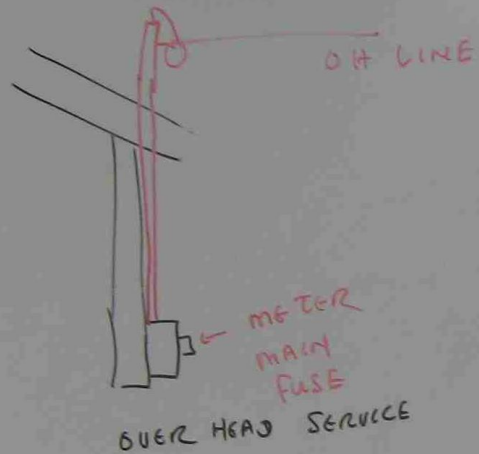
AS 3008

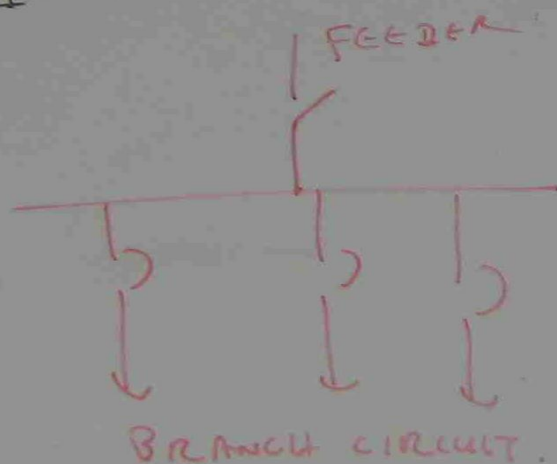
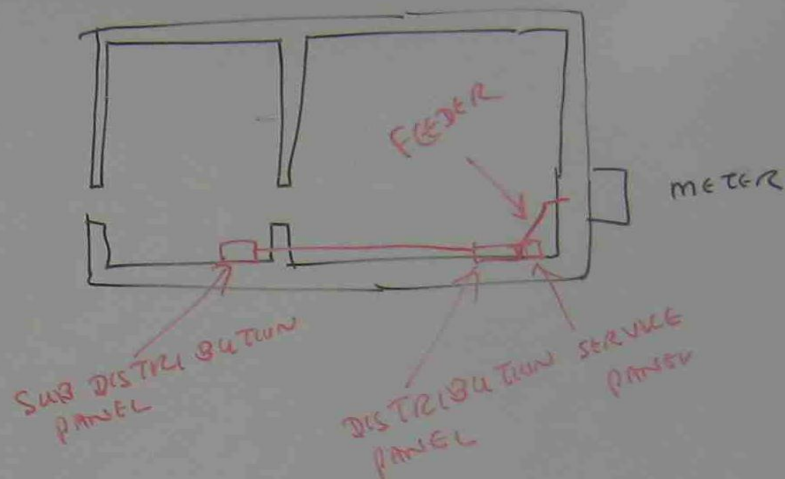
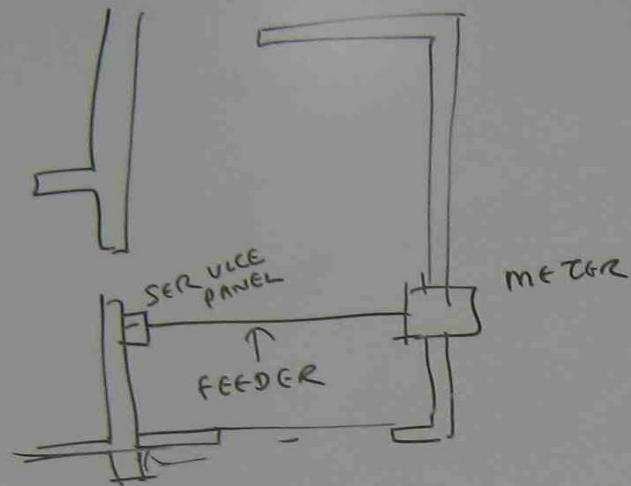
NSW ELECTRICAL SERVICE RULE

SPECIFIC CONDITIONS IMPOSED BY LOCAL COUNCILS & ENERGY SUPPLY AUTHORITIES.

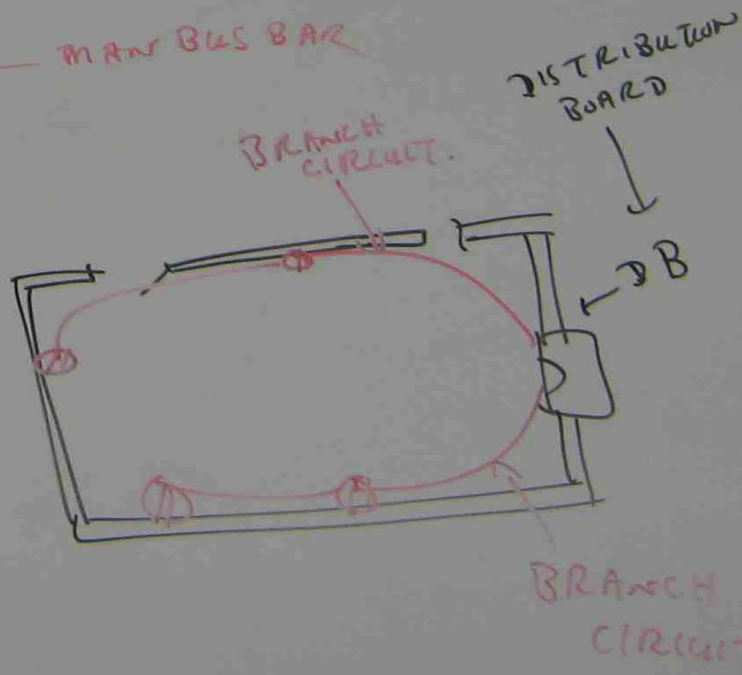


# SERVICE ENTRANCE





← MAIN BUS BAR



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