

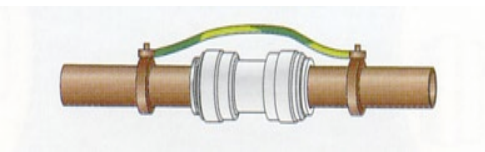
Unit 202: Electrical principles and processes for building services engineering

Outcome 6

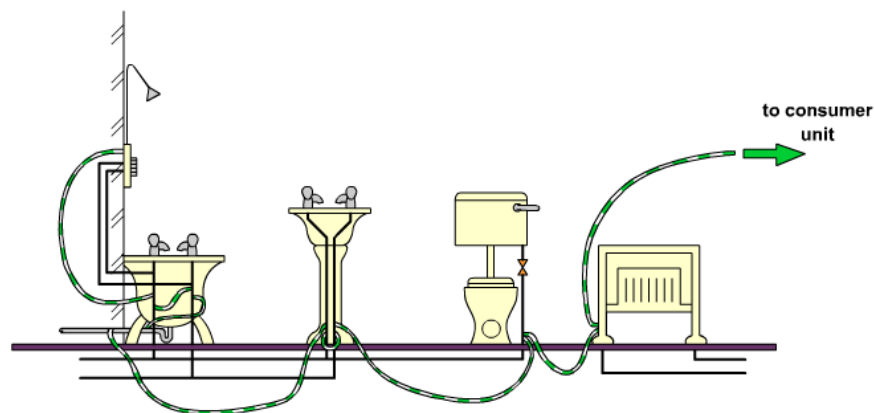
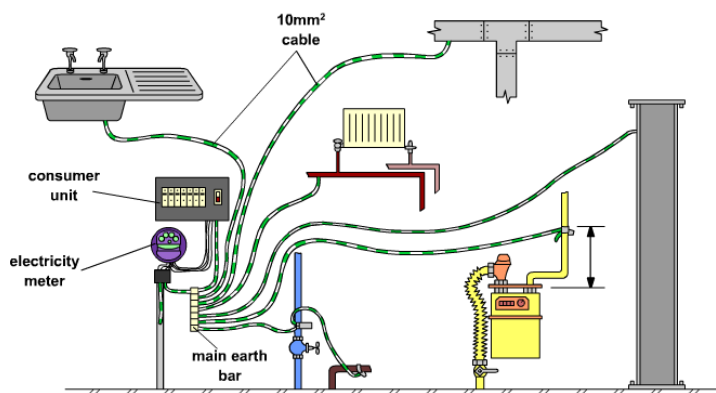
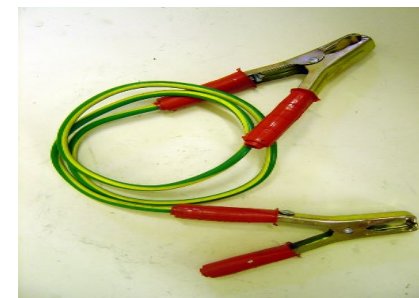
Undertake basic electrical tasks

Electrical tasks

Electrical continuity bonding



Equipotential bonding
Supplementary bonding
Cross bonding
Temporary continuity bonding



Electrical tasks

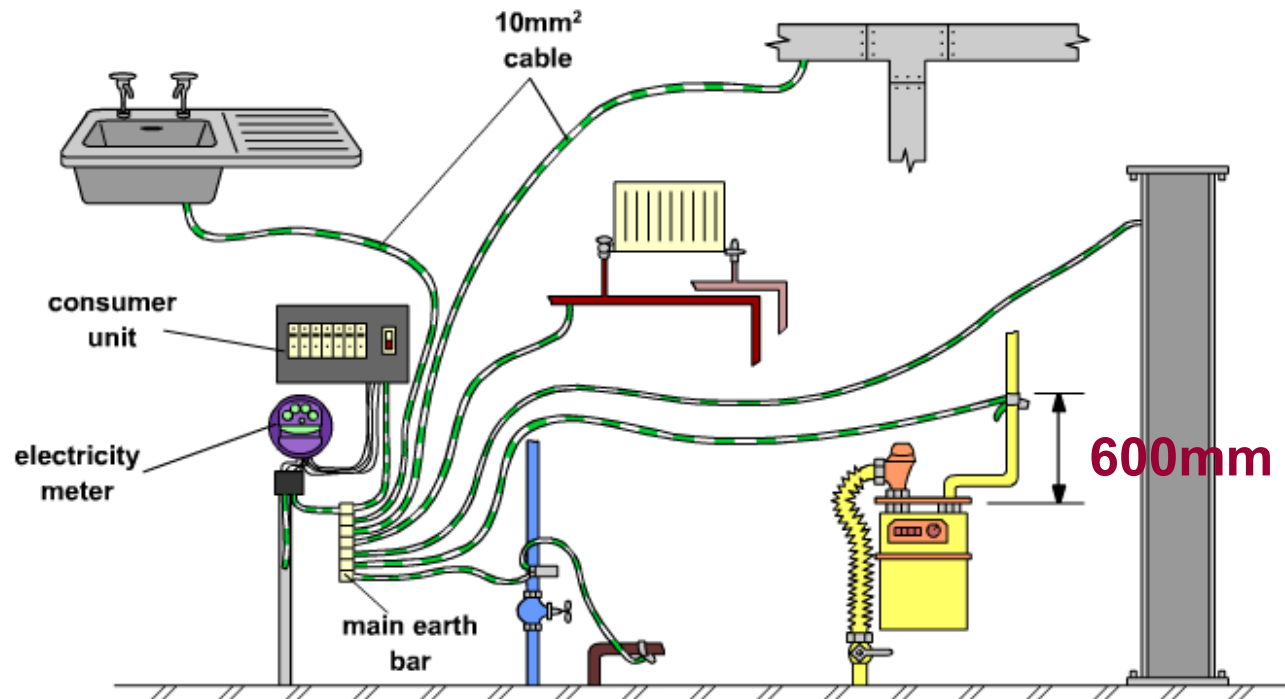
Equipotential bonding

- All metal parts within the building must be joined to the earth cable
- All services – oil, gas, water and electricity – along with any exposed metal
- Cable is then joined to the building's electrical system
- If a fault occurs, the electrical current would have a direct route through the wiring, stopping the person touching the metal object from getting a shock
- The earth cable used is 10mm², and runs from each supply back to the main earth terminal at consumer unit
- Bonding provides **equal potential** between metal parts.

Electrical tasks

Equipotential bonding

All main metal work and utilities connected from earth bar in 10mm² cable.



Electrical tasks

Supplementary bonding

This maintains earth continuity throughout the **whole**, using 6mm² earth cable. Earth clips are made to BS951 and should be placed on clean pipework. The label says **Safety electrical connection do not remove**. To avoid unsightly wiring, continuity bonds are placed behind appliances or in airing cupboards.

As plumbers, if we disconnect a hot or cold service etc, it is our responsibility to make sure the earth clip is reinstated.

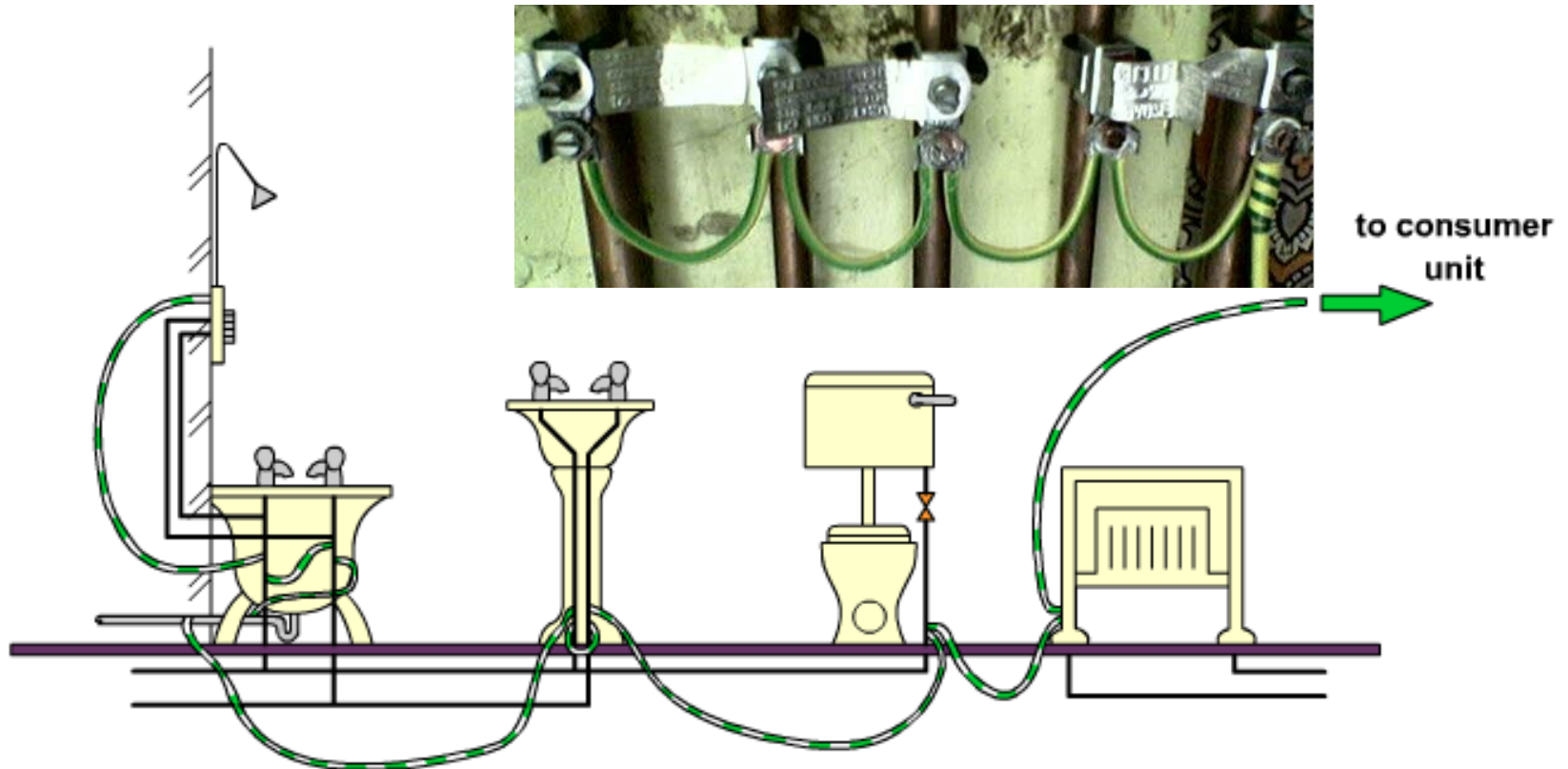


Electrical tasks



Supplementary bonding

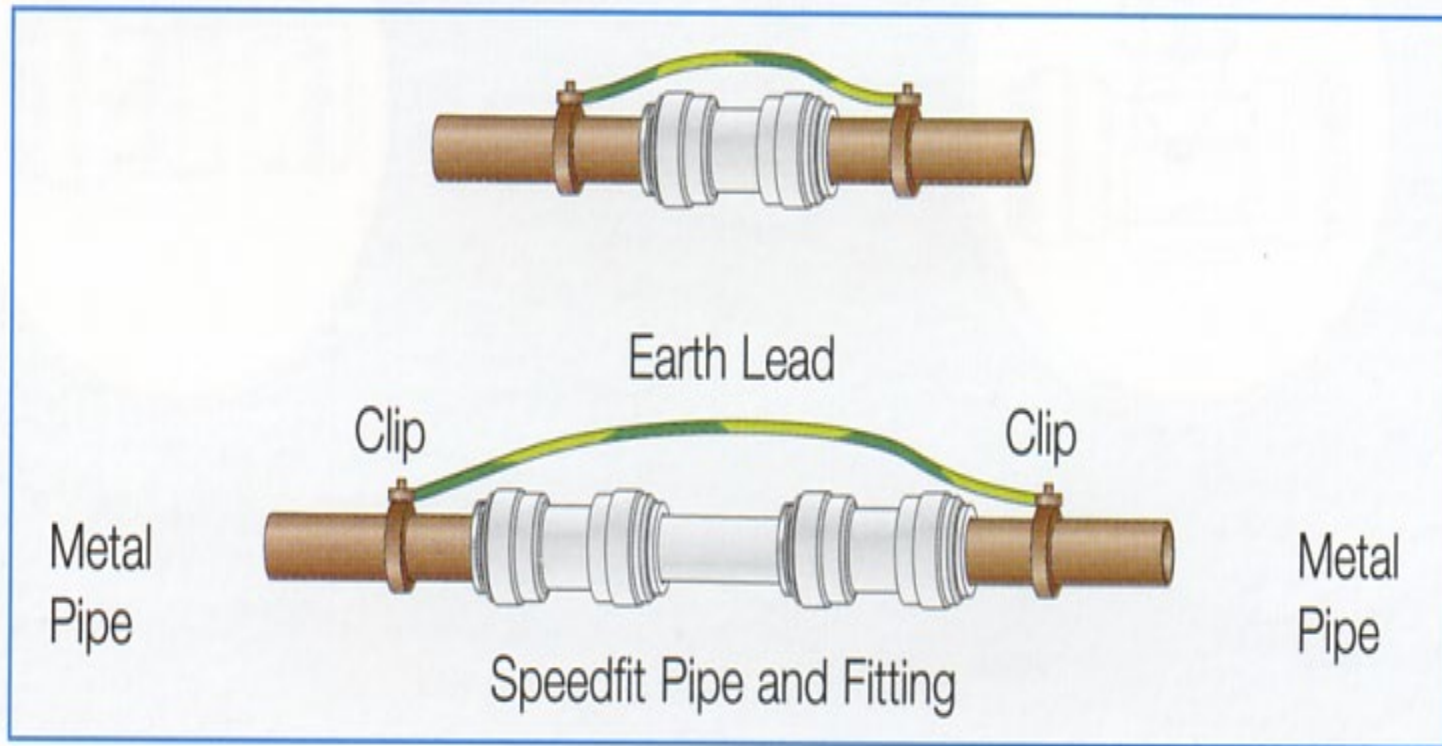
Joining all individual pipes together in 6mm² cable, which in turn connects to the equipotential.



Electrical tasks

Cross bonding

Maintains earth continuity if plastic components are used (push-fit, water meters etc). 6mm² cable is used again.

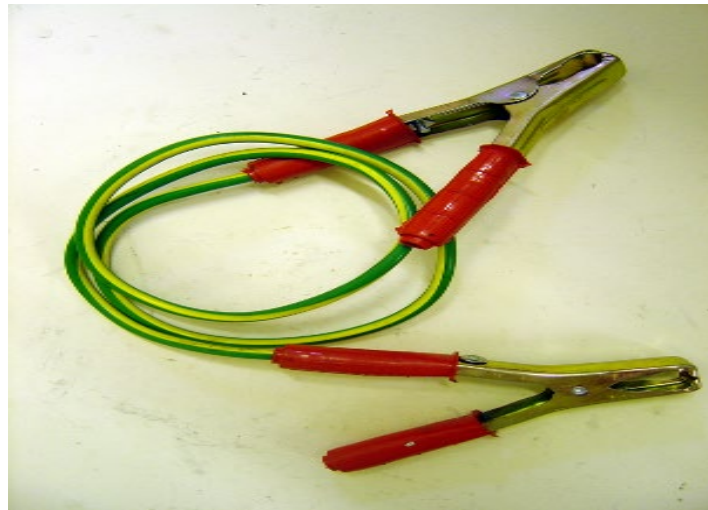


Electrical tasks

Temporary continuity bonding

When plumbers cut into pipework, the earth continuity is broken, so the plumber could become the earth and therefore get an electric shock. Before cutting into pipework **always** use temporary continuity bonds.

1.5m long, made with 10mm² cable, with crocodile clamps at either end.



Electrical tasks

To attach an earth continuity clamp you must:

1. Identify the correct pipe.
2. Clean the pipe (no paint).
3. Secure the clamp tightly on pipe.
4. Secure the earth cable tightly in clamp.
5. Check label is in place.
6. Test continuity.

Electrical tasks



Heating engineer electrocuted

A heating engineer has died following an electric shock while attempting to repair a central heating system. The 39-year-old engineer was carrying out work in a flat in St Paul's Mews in Birmingham when he suffered an electric shock and hit his head.

His two colleagues – one of whom is believed to be his nephew – and the householder made attempts to resuscitate him before paramedics arrived at the scene. The engineer was taken to the City Hospital where he later died.

SAVVAS, C. (2011) Engineer Electrocuted while working in Birmingham city centre flat. *Birmingham Mail*. 21st October. Available from: <http://www.birminghammail.co.uk/news/local-news/engineer-electrocuted-while-working-in-birmingham-city-163803> [Accessed 25th January 2013].

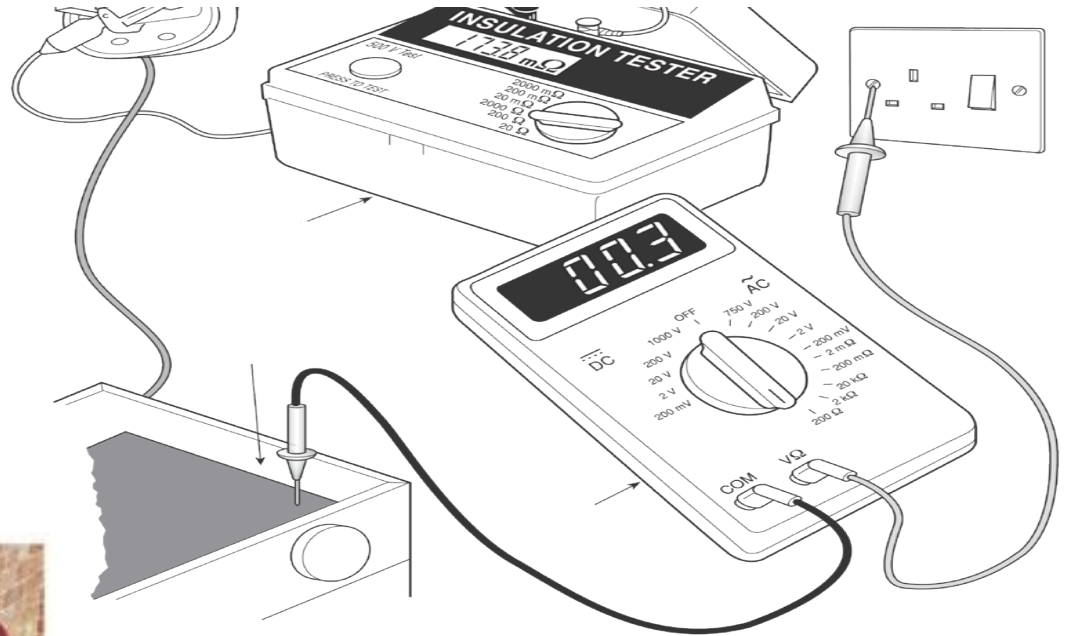
Electrical tasks

Earth continuity test

This is where the installer tests to make sure all the metal work (pipes, boilers, appliances, metal sinks etc) is safely connected to the main earth bar at the consumer unit. This keeps everybody safe.

1. Find a known earth source (screw on cover or earth terminal).
2. Low reading OHM meter (or buzzer).
3. Place one probe on the known earth.
4. Place the second probe on appliance casing or pipework.
5. It should show a low reading (or buzz).

Electrical tasks



Electrical tasks

Short circuit

If the live accidentally touches the earth, an earth fault will occur. This means the fuse may blow or the MCB will trip.

If the live accidentally touches the earth, a short circuit will occur. This means the fuse will blow or the RCD will trip.

Electrical tasks

Polarity test

This must first be carried out **dead** before allowing any electricity.

- Is live connected to live?
- Is neutral connected to neutral?
- Is earth connected to earth?

On a circuit, you can connect the live and earth together, then go to the other end of the circuit and test. The low reading ohm meter needs to be set on ohms. By operating any switches you can also check the polarity (i.e. all switches must be in the live conductor only)

Electrical tasks

Polarity test

If the dead test proves successful, you can make the system live and re-test. This time the multimeter needs to be set on voltage (230v).

Probes:	Live and neutral	= 230v
	Live and earth	= 230v
	Neutral and earth	= 0v

If these readings are different, polarity is incorrect.

Electrical tasks

Socket tester

A simple way to test polarity in a domestic socket is by using a socket tester. Plug it in and switch the socket on: if all three lights come on, the socket is fine.



Electrical tasks



Assorted electrical screwdrivers (all insulated)



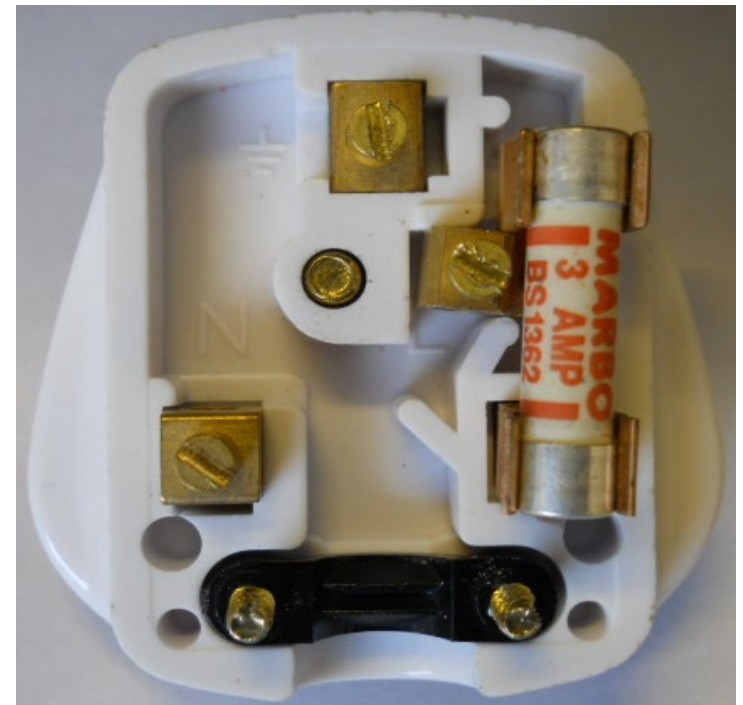
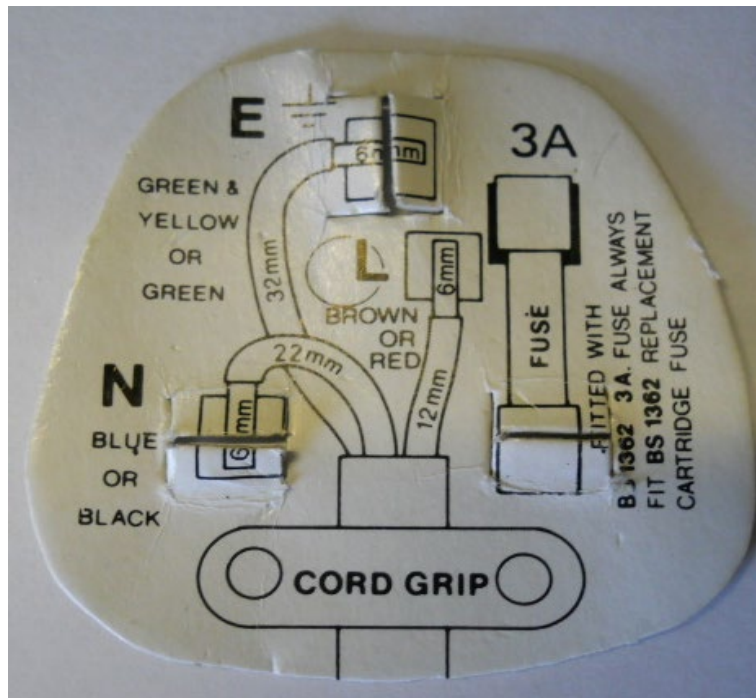
Differing wire strippers or side cutters (all insulated)



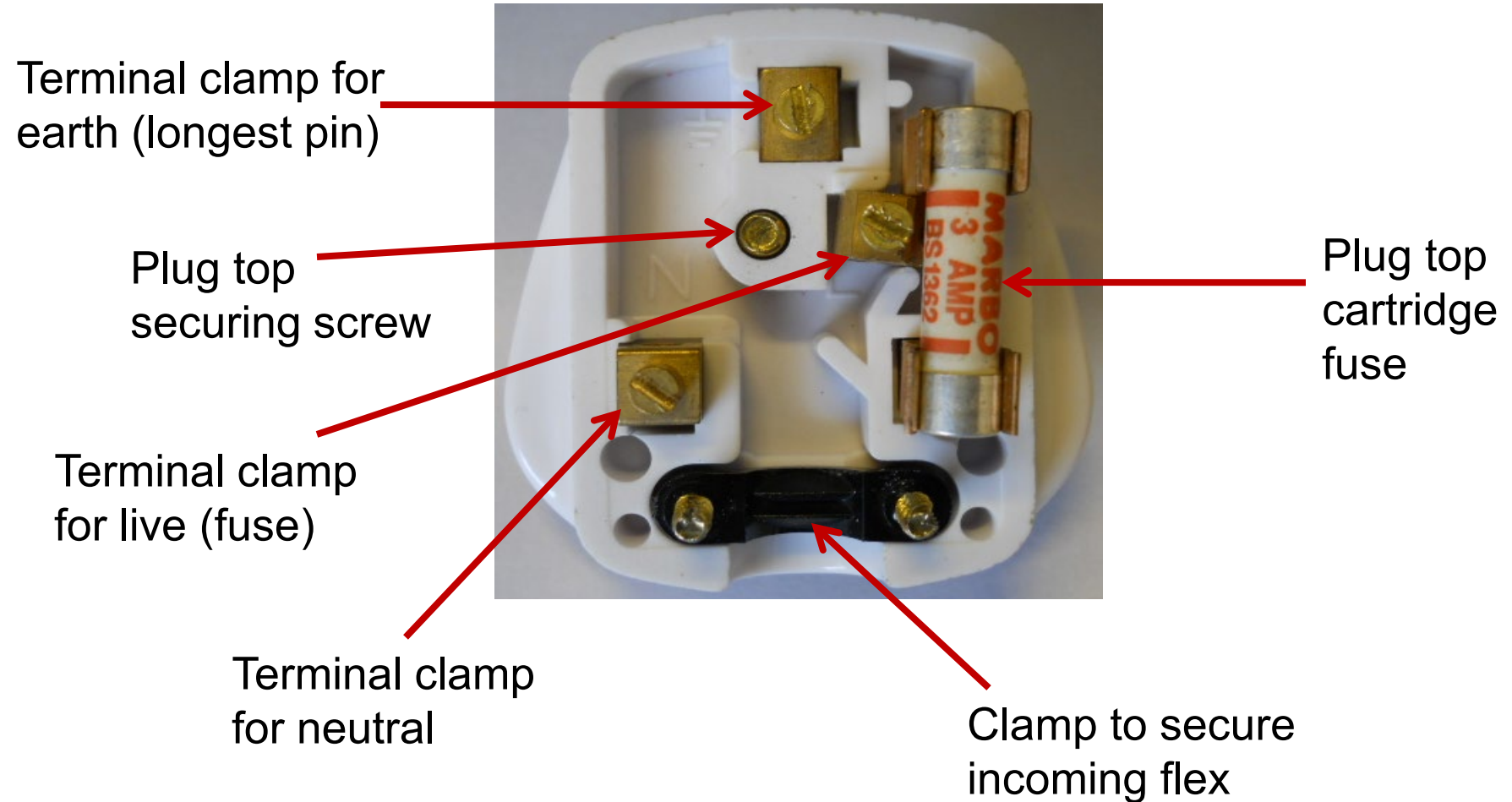
Electrical tasks

3 pin plug

Maximum 13 amp rating and found on most domestic appliances. On new appliances, they come moulded but some appliances may need the plug replacing.



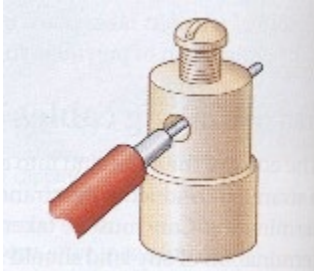
Electrical tasks



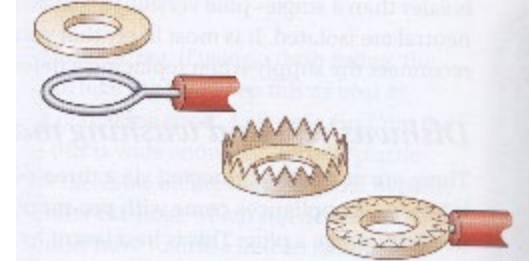
Electrical tasks

Electrical clamps and terminals

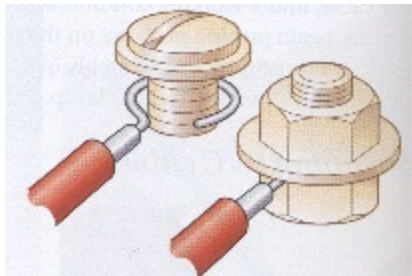
Pillar
terminal



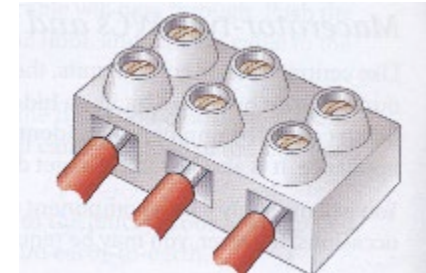
Claw
type
terminal



Screw or
nut head
terminal



Strip connector



Commonly found in terminals that plumbers use

