






















Unit 204: Common plumbing processes

Outcome 3

Joint common plumbing materials

Plumbing materials

Fittings

	Elbows	Tees	Couplings	Reducers	End caps
End feed					
Solder ring					
Push fit					
Compression					
Press fit					

Plumbing materials

End feed fitting

- Joint is cleaned inside
- Pipe cleaned on outside
- Flux added
- Solder needs to be added when fitting is heated
- Lead-free solder **must** be used on hot and cold water systems
- Allowed to cool
- Joint wiped clean with cloth
- Use once only



Plumbing materials



Solder

Lead solder: 70% lead + 30% tin

These types of solder can only be used on non-potable water systems – central heating or gas pipes.

Lead-free solder: 99% tin + 1% copper (lead free).

Flux

Active fluxes are acid based and the cleaning of pipes is not necessary, but must be cleaned off after soldering.

Non-active fluxes are paraffin based and the cleaning of pipes must always be carried out.

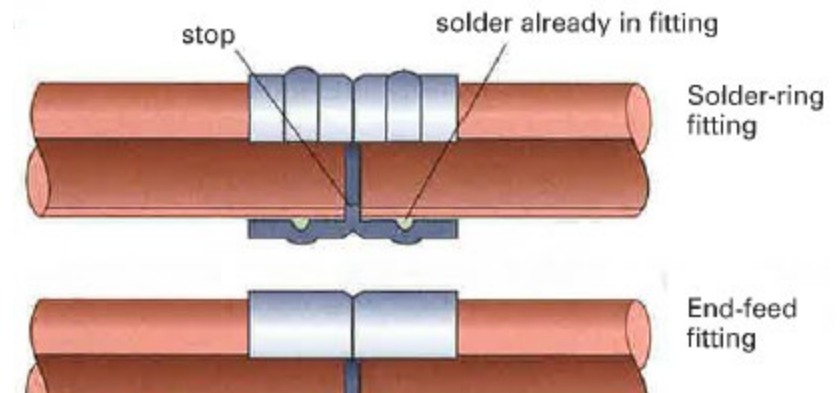
- Keep the surface clean
- Prevent oxidation
- Help the solder flow



Plumbing materials

Solder ring fittings

- Joint is cleaned inside
- Pipe cleaned on outside
- Flux added
- Solder is in integral ring
- Joint is heated to allow solder to flow
- Allowed to cool
- Joint wiped clean with cloth
- Use once only



Plumbing materials

Push fit fittings

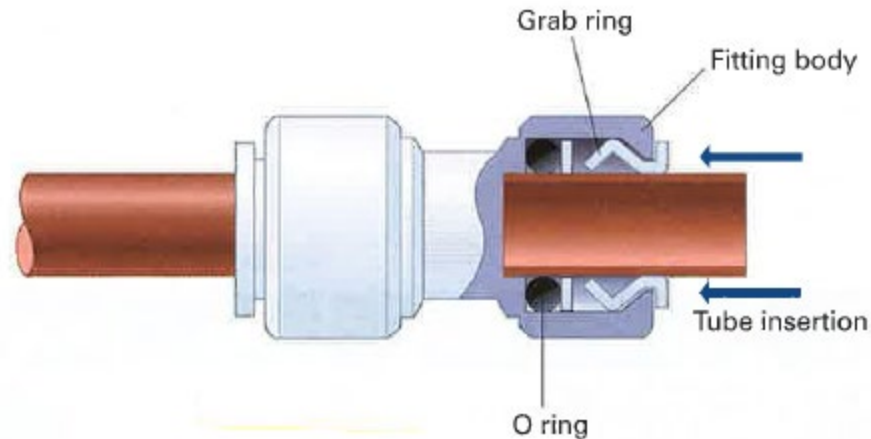
- These can be used on pressure plastic pipe or copper pipe
- Pipe end **must** be cut square and burr free
- Sleeve or insert used to support plastic pipe
- O ring creates watertight seal
- Grab ring retains pipe
- Silicon gel can be used to aid insertion (manufacturers supply fittings already lubricated)
- A key or release tool may have to be used to remove fitting
- Reusable and re-positional



Plumbing materials

Push fit fittings

These components are produced by many manufacturers and come in different finishes.



Plumbing materials

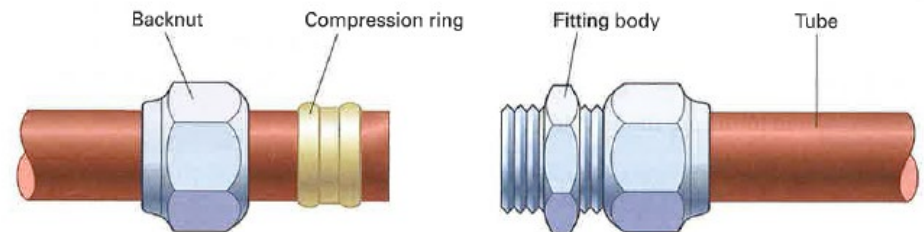
Compression fittings

These come in two styles:

Type A:

Non-manipulative fittings: require nothing more than the piece of pipe to be cut square and the burrs removed. The fitting is assembled with an olive, and tightened using an adjustable spanner.

Suitable for half hard copper and plastic pressure pipe.



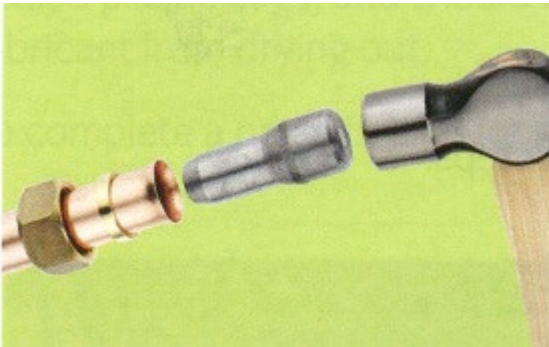
Plumbing materials

Compression fittings

Type B

Manipulative fittings: require the end of the pipe to be manipulated using a swaging tool. They are much stronger than the type A fittings and cannot be pulled apart. Mostly used for high pressure and below ground pipe work.

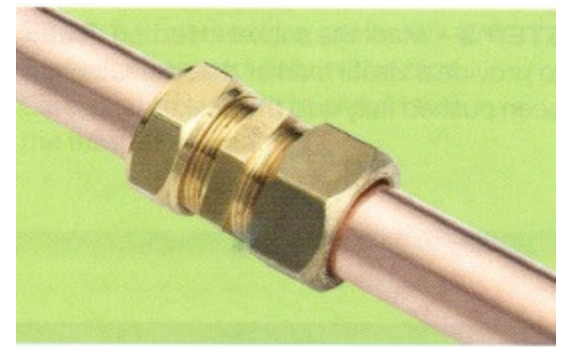
1



2



3



Plumbing materials

Brass fittings

Brass is an alloy – copper and zinc.

Brass fittings can suffer from dezincification. This shows itself in a white powder (zinc oxide) coating on the outside of a fitting. It leaves the fitting very brittle.

Modern fittings are marked CZ or DZR which means they are dezincification resistant.



Plumbing materials

Press fit fittings

These rely on an O ring to create the watertight seal. They are pushed into position after marking the component depth. Once in place, they are clamped into position using a mechanical clamping tool.



Plumbing materials

When lead pipe is found in a property, the customer should always be advised that it should be removed.

Sometimes it is necessary to connect either copper or plastic pipe to an existing lead pipe. This needs to be done carefully and by using a proprietary fitting (eg leadlock). This allows old lead pipes to be connected to copper pipes safely. The old wiped joint is not allowed to be used.



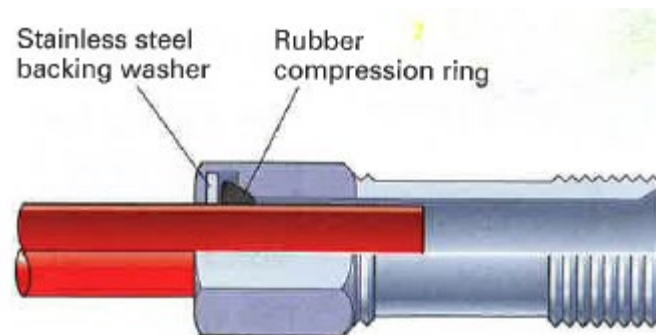
Plumbing materials

LCS fittings

Threaded: using BSPT threads, along with PTFE or hemp and paste, to create the watertight seal.



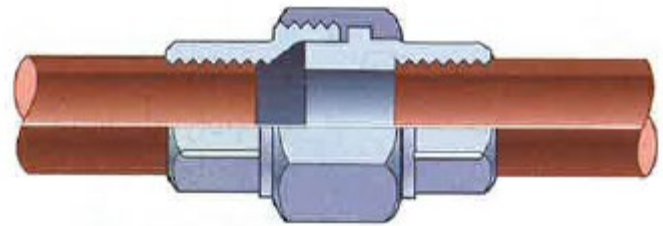
Compression: these use a tapered rubber seal to create the watertight seal.



Plumbing materials

LCS fittings

Unions: these are commonly supplied with either a flat face or conical face to create the watertight seal.



Flanges: these come in flat face and use either a rubber or fibre gasket to create a watertight seal.



Plumbing materials

Plastic push fit fittings

Plastic to copper as well as plastic to plastic. Hot water, cold water and central heating push fit fittings have the retention rings but soil and waste, as shown, only have the O ring seal. Expansion allowance is always required.

Make sure the O rings are in place and not damaged. Silicon grease is useful to allow the joint to be made after the burrs have been removed.



Plumbing materials

Plastic compression fittings

Plastic to copper or plastic to plastic. The seals or O rings must be in place and not damaged when the pipe is pushed into place. All burrs must be removed. The important support ring must also go behind the seal.

Generally used on waste fittings.



Plumbing materials

Plastic solvent weld fittings

Used on **ABS** and **uPVC** waste or soil pipes. The surface is cleaned, and solvent cement is applied to both internal and external components. They are pushed together and the material chemically melts together. The joint sets within minutes.



Plumbing materials

Plastic fusion weld fittings

Specialist fittings generally used on water mains and gas mains where they remain underground. These fittings are electrically heated for a pre-determined time, melting the plastic to fuse the connection.



Plumbing materials

Plastic MDPE fittings:

These can be compression to allow plastic-to-plastic connections.



They can be a combination of plastic compression and copper push fit, or plastic compression to screw thread LCS.

They can be push fit only for MDPE.
MDPE can be fusion welded.



<http://www.philmac.co.uk/technical-advice/video-player/?video=utc-installation>
<http://www.philmac.co.uk/technical-advice/video-player/?video=upp-how>

Plumbing materials

Jointing compounds

Used on copper

Flux: active and passive. Use to aid the flow of solder, stop oxidation and keep the surface clean.

PTFE tape and liquid: use on compression fittings over the olives. (Polytetraflouroethylene).

Sealing paste: small amounts of paste are used on olive.

Plumbing materials

Jointing compounds Used on low carbon steel

PTFE tape and string: use on the threads of the pipe.
(polytetrafluoroethylene).

Hemp and paste: used on the threads of the pipe without blocking the pipe.

Gaskets: either rubber or fibre gaskets are used on flange faced joints.

Plumbing materials

Jointing compounds Used on plastics

Solvent weld: used on waste and soil pipes.

Fusion weld: used on underground utility pipework.

Rubber seals: used on waste and soil pipes (silicon).

O Rings: used on push fit, waste and soil pipes (silicon).

Plumbing materials

Hazards

- Burns to person
- Burns to property
- Fires
- Explosions
- Oxidation from flux
- Pitting
- Fumes from soldering
- Fumes from solvent welding



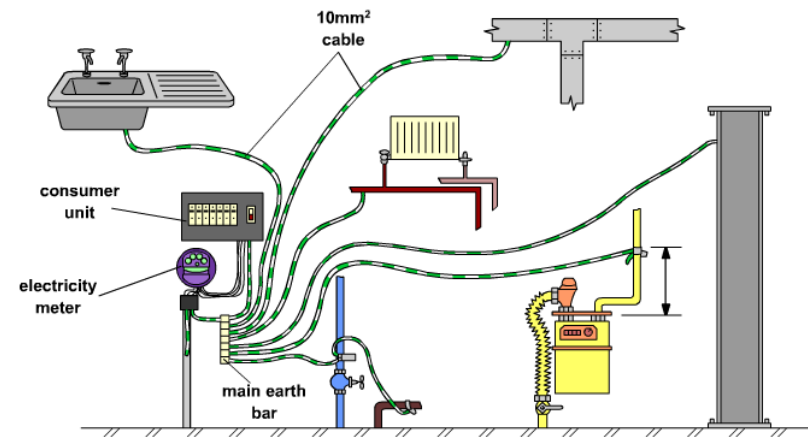
Plumbing materials

Hazards

All metallic pipes need to be earthed:

- Equipotential bonding
- Supplementary bonding
- Temporary continuity bonding

All hidden plastic pipework needs to have metallic tape attached so it can be traced behind walls.



Plumbing materials

Quality assurance

All components fitted in any installation should be:

WRAS approved

British Standard kite mark

BBA approved

BRE Building Research Establishment offer advice and information

IOPHE Institute of plumbing and heating engineers is the plumbing lead body, offering guidance

