

Copper Tube in Buildings

COPPER DEVELOPMENT ASSOCIATION
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Copper Development Association (limited by guarantee) is a non-trading organisation sponsored by the copper producers and fabricators to encourage the use of copper and copper alloys and to promote their correct and efficient application. Its services, which include the provision of technical advice and information, are available to those interested in all aspects of existing and potential uses of copper. The Association also provides a link between research and the user industries and maintains close contact with other copper development organisations throughout the world.

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Manipulative compression fittings are not suitable for use with hard tubes and annealed tubes must be carefully deburred and re-rounded before the tube end is formed. This type of fitting, to BS EN 1254: Part 2 Type "B", must be used for underground installation and therefore must be made from dezincification resistant or immune materials.

5.6 Push-fit Fittings

Push-fit fittings are new, reliable and versatile. As the tube is inserted into the fitting in several types it passes through a release collar and then a stainless steel grab ring. The grab ring has a series of teeth that open out and grip onto the outside of the copper tube. A support sleeve inside the fitting will help in alignment of the tube and when the tube is fully inserted, to the tube stop, an 'O' ring is compressed between the wall of the fitting and the tube. For a secure joint to be formed the tube must pass through the 'O' ring and reach the tube stop. In some push-fit fittings the position of the 'O' ring and grab ring are reversed.

Most of these fittings can be disconnected, and the operation is as simple as forming the joint. Pressure is

applied to the release collar in the mouth of the fitting, using a special disconnecting tool, which splays the teeth of the grab ring. Thus the tube is freed from the fitting. Other types require a securing cap to be unscrewed.

Push-fit fittings are suitable for all above ground hot and cold domestic water services, including both direct and indirect heating systems. They are also ideal for use in smallbore and microbore central heating systems and in pressurised unvented heating systems within the permitted temperature and pressure limits.

Press-fit fittings

Press-fit fittings are another new type of fitting requiring a special compression tool. The fitting is slid over the tube and mechanically crimped between the body of the fitting and the 'O' ring seal at the end of the fitting. The tube must be prepared as for a push-fit fitting in order to ensure the 'O' ring is not damaged. This type of joint is quick and effective requiring no spanners or flame but does require the special tool.

6 Installing copper pipework

The general specification for the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages is BS 6700.

6.1 General requirements

To ensure long and trouble-free service life, copper tubes and fittings should be installed with due care in a proper workmanlike manner. Circuits should be designed to operate at optimum flow conditions, i.e. for cold water circuits between 0.5 and 3 metres per second and for hot water recirculating systems between 0.5 and 1.5 metres per second. They should be arranged in such a manner that "dead-legs" are kept to an absolute minimum. Joints should be made carefully to avoid excess flux residues both from entering the system and contaminating the exterior. Each section of a large circuit should be flushed through after completion to remove flux and debris.

In hot water services and central heating systems, tubes must be fixed in a manner that allows thermal movement, i.e. expansion and contraction without imposing undue stress on the tubes and fittings.

The more important specifications covering the use of copper tubes in buildings are detailed below:

BS EN 1057: Copper and copper alloys – Seamless, round copper tubes for water and gas in sanitary and heating applications.

BS EN 1254: Copper and copper alloys – Plumbing fittings

Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes.

Part 2: Fittings with compression ends for use with copper tubes.

Part 4: Fittings combining other end connections with capillary or compression ends.

BS 1306: 1975 (1983): Specification for copper and copper alloy pressure piping systems.

BS 5431: 1976 (1987): Specification for bending springs for use with copper tubes for water, gas and sanitation.

BS 6700: 1997: Specification for the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

BS EN ISO 9002 Quality systems. Model for quality assurance in production, installation and servicing.

These are available from British Standards Institution.

Further detailed information is contained in CDA Publications:

33 – Copper Tube in Domestic Water Services.

39 – Copper in Domestic Heating Systems.

6.5 Pipework in screed or passing through walls

Except where a pipe passes through a wall, where it must be enclosed in a sleeve and must take the shortest practical route, the embedding of pipework in the load bearing fabric of buildings is prohibited. Special arrangements are made for the rising main into a building. Except for underfloor heating, pipework is not permitted in a solid floor or screed unless a purpose made duct with a removable cover is provided. In the case of underfloor heating, where the temperature is below 60°C, the coefficient of expansion of copper is so close to that of concrete that no problems will be experienced if annealed copper tubes, free from joints within the screed, are laid in a serpentine fashion, where any expansion stresses on one leg are neutralised by the adjacent leg. All joints to the main feed and return must however be placed in accessible ducts.

Many water suppliers will permit this type of installation, particularly if the tubes have a factory applied plastic coating, to avoid any risk of contamination through the screed by floor cleansers, etc., but approval should be sought from the water supplier concerned, before any installation work is carried out.

6.6 Plastics coated pipework

Factory applied plastics coated pipework is available to protect the tube from aggressive environments when buried or for aesthetic reasons. One variety of this pipework has channels running on the inside of the plastics coating to trap air and provide some insulation. When jointing this pipework or at any termination it is important to ensure that the exposed ends of the channels are covered with a self adhesive tape to prevent any moisture or aggressive materials from entering the channels and attacking the tube.

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