

Copper pipework support and routing

This Bulletin provides guidance on pipework support methods for copper pipework designed to contain refrigerant in air conditioning, heat pump or refrigeration applications. Before any components are fitted into a system, it is important that the installer understands where within the system they have to be fitted, the correct methods to be used to fit them and the correct orientation for satisfactory operation, as this will all impact on the routing and support of piping.

1. Support spacing

Numerous alternative methods of fixing are available depending on the situations in which the pipework is to be installed. It is important to survey the site thoroughly before work on site commences. This enables the route for the pipework be established with others (e.g., Client/Co-contractor etc.) and the methods of fixing confirmed.

All piping must be adequately supported, the supports or hangers being sized to carry the weight of the pipe including the contents, and where required the insulation. The recommended maximum distance between supports is as follows:

Copper pipe sizes		Max spacing of supports
mm	Inch	m
15 – 22 soft	½ to 7/8 soft	2
22 - <54 half hard	7/8 to 1.5/8 half hard	3
54 – 67 half hard	2.1/8 to 2.5/8 half hard	4

Note: information on soft and half hard is available in EN12735-1 and EN 12735-2

2. Pipework routing

Installation may involve routing through floor ducts or fastened to walls or ceilings, or at high level on supports suspended from roof purlins or rafters. The pipe route must be chosen to avoid potential contact of the pipe with any obstruction or other pipes and to allow access to joints, flanges, screwed joints and fittings for future service and maintenance. Where the pipe passes through a building structure an adequately sized sleeve should be used to protect the copper pipework from corrosion due to contact with concrete or cement.

Piping, valves and fittings, particularly where located less than 2m above the floor, should be adequately protected against accidental damage. Overhead pipelines should be fixed as high as reasonably practicable. Channels or ducts for refrigerant piping should contain no other pipelines or electric wires unless they are adequately separated and protected against condensation.

An identification system may be required on pipes assembled and installed on site; colour coding to BS 1710:1984 Specification for Identification of Pipelines should be used with wording or other additions to distinguish between high and low-pressure piping and liquid or vapour pipelines. Identification of refrigerant by refrigerant number should be included in this case.

The following are recommended methods of fixing for the various situations.

2.1 Floor Ducts

Where ducts have been formed to take the refrigeration, electrical or plumbing services to a refrigerated fixture, or group of fixtures, there is normally no need for clipping or fixing of pipework. It is laid in the bottom of the duct resting on load bearing insulation materials. Care needs to be taken to ensure that the pipework does not foul the corners of the ducts, or the other services where crossovers of these occur. Cradles need to be made in order to prevent chaffing. Where ducts hold a number of pipes and double stacking is necessary, load bearing insulation needs to be placed between the layers of pipework.

2.2 Fixing to Walls and Ceilings

If pipework has to run up or down a wall, or traverse a ceiling, several methods of fixings are available as follows:

- a) Pipe clips: Where pipework for a single system is involved, the suction and liquid lines are fixed directly to the wall by means of pipe saddles clamping over each of the pipes. As most suction lines are insulated, a saddle that is slightly smaller than the outside diameter of the insulation needs to be selected. This enables the pipework to be held satisfactorily, with only a slight indentation of the insulation material.
- b) Cable Trays: The use of cable trays allows for a tidy fixing of pipework, particularly where a large number of pipes have to be run. The tray is fixed to the wall or ceiling with a spacer between the tray and the surface. The pipework, and/or electrical services, are then clipped to the tray. Care must be exercised in fixing suction lines to ensure insulation around the pipe is not distorted, and the vapour seal is not broken. It is important where exposed copper pipework is run on galvanised cable tray, that some means of insulating the pipework from the tray is used. This prevents electrolytic action and corrosion. From 1 January 2015, a requirement in BS7671 came into effect that required new wiring systems in escape routes to be supported in such a way that they are not liable to premature collapse in the event of a fire – see SES Technical Bulletin T17 for details.
- c) Proprietary Fixing Systems: There are a number of fixing systems available. These systems are very adaptable and can be used to fix or support single or multiple pipework systems, whether fixed to a surface or suspended from rafters or purlins. The pipework is fixed by means of insulated clamps to support brackets cut and assembled on site to suit the particular requirements. Reference should be made to suppliers' literature for fixing materials and insulation for further information.

3. Further information and references

BS EN378:2016 “Refrigerating systems and heat pumps - Safety and environmental requirements” Part 2 Design, construction, testing, marking and documentation provides more detail. The standard was revised and republished in December 2016.

For more information on good practice in commercial installation see the “Guide to Good Commercial Refrigeration Practice” published by the British Refrigeration Association and Institute of Refrigeration, part 4 “System Installation” available at www.ior.org.uk

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