FIXING COPPER TUBE

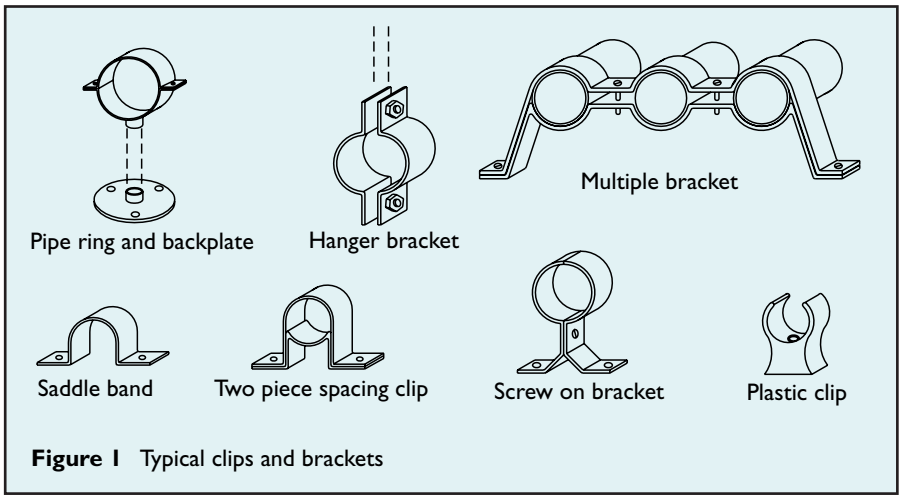

Figure 1 Typical clips and brackets

Copper tube installations have been tried and tested over many years of use in all parts of plumbing and heating systems. Copper's versatility in such a wide variety of situations has resulted in the design and development of many different types of fixing clips and bracketing systems.

All pipework systems must be adequately supported if they are to give trouble-free service especially over the long life of a copper system. Manufacturers' catalogues illustrate a vast range of clips and brackets to meet specific requirements, a few of which are illustrated in Figure 1.

Selection of the most appropriate pattern of clip or bracket depends on a number of factors which will vary with the type of job and position or situation in which the tube is installed. For example, where a tube has to be insulated against heat or frost in accordance with Water regulations. In this situation, a simple plastic stand-off clip will not give sufficient clearance for the thickness of insulation required between the tube and the fixing surface. Therefore, an alternative type of support must be chosen, such as a ring bracket with a threaded rod and backplate.

Another factor which can have a very significant effect on the overall cost of an installation is the actual number of tube supports required. Because copper tube is a relatively rigid and self supporting material, it requires comparatively few supports when compared to non-metallic tube.

How far apart should the supports for copper tube be placed?

The recommended intervals are set out in Table 1. Studying the table will show that fewer supports are required on vertical runs. This is because the vertical tube will not be subjected to possible sagging between supports. Excessive sagging will occur on horizontal runs of tube made from any material if the supports are too far apart.

Another factor which must be borne in mind, especially when considering supports for larger diameter tube and/or

Table 1
Recommended Maximum Fixing Intervals for Copper Tube Supports.

Diameter of Copper Tube mm	Intervals for Vertical Runs in m	Intervals for Horizontal Runs in m
6	0.6	0.4
8	0.9	0.6
10	1.2	0.8
12	1.5	1.0
15	1.8	1.2
22	2.4	1.8
28	2.4	1.8
35	3.0	2.4
42	3.0	2.4
54	3.0	2.7
67	3.6	3.0
76	3.6	3.0
108	3.6	3.0
133	3.6	3.0
159	4.2	3.6

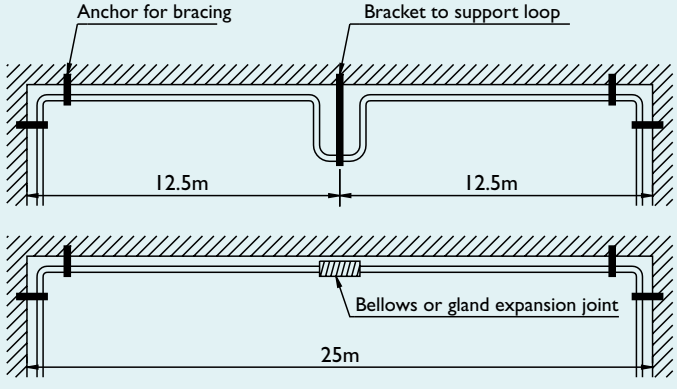

Figure 2 Anchor fixings for bracing to accommodate expansion on long runs of tube

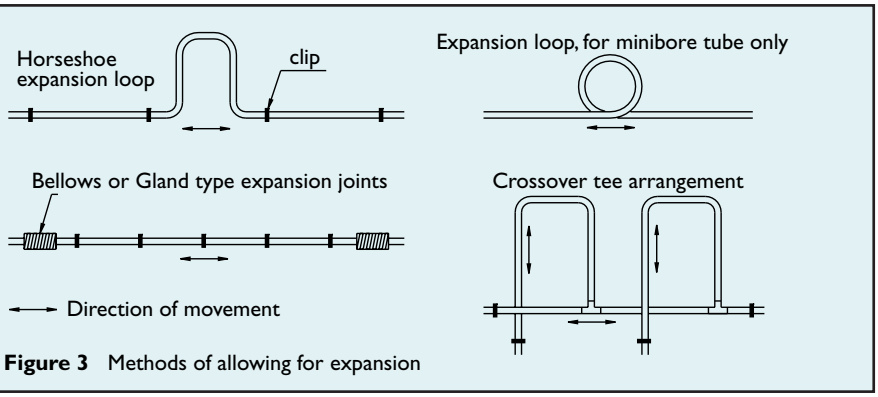

Figure 3 Methods of allowing for expansion

lightweight building structures, is the method to be used to fix the tube support to the building fabric. The fixing method used must be able to transmit the weight of the tube and its contents as well as any other forces acting on the tube to the building fabric without damage.

Bracing long runs of tube

On long runs of tube with fixing supports such as hanging brackets anchor bracing should be used at 12m centres to avoid swaying. The distance between anchor fixings used for bracing and expansion joints in hot water lines is determined by the type of expansion joint used and the amount of movement which the joint can accommodate. Figure 2 shows how a long run of tube can be anchored by means of supports at each change of direction. The expansion can then be accommodated by an expansion joint or by fabricating an expansion loop, either from fittings or by bending the tube. If an expansion loop is used it should be installed and supported in the horizontal plane to prevent air locks.

Where a gland type expansion joint is used and the tube is subjected to a temperature difference of 60°C, then if the expansion joint can accommodate 25mm of expansion the length of straight tube each side of the joint to an anchor fixing can be up to 12.5m. This is because each 1 metre length of copper tube will change in length by approximately 1mm when its temperature is changed by 60°C. So, 1mm of movement within the expansion joint permits 1m of pipe length between expansion joint and anchor points. Similarly, if a bellows type expansion joint is used, the tube should be installed so that it stretches the bellows. By applying "cold draw" in this way the bellows will be able to accommodate the expansion.

In order to avoid possible breakdown of branch joints connected to a heating or hot water main, it may be advisable to use the branch joints as anchor fixings. Where, however, the branch is connected to a tube which will itself be moving due to thermal expansion, then the leg of the branch should also be able to move. In this situation "cross-over tees" should be used to permit the movement as in Figure 3.

All pipe runs should be aligned correctly to prevent undue strain. This is particularly important when connecting tube to a plastic cistern. Suitable backing plates or washers without sharp edges should be fitted between the tube connection and the cistern to spread any load.

Notching and drilling floor and roof joists

Notches and holes in simply supported floor and roof joists should be within the following limits:-

Notches should be cut no deeper than 1/8 of the depth of the joist. They should not be cut closer to the support than 0.07 times the span, nor further away than 1/4 of the span.

Drilled holes should be no greater in diameter than 1/4 of the depth of the joist. They should be drilled on the neutral axis and should be not less than 3 diameters apart, measured from centre to centre. Holes should be located in the area between 0.25 and 0.4 times the span of the joist from the support.

Note: Notches or holes for pipes must NOT be cut in roof rafters.

Figure 4 shows the permitted limits of notches and holes in floor and roof joists.

Cabling soft copper tube through joists

The ability to drill holes through joists means that where soft coiled copper tube (up to 10mm O.D. Table W or up to 12mm O.D. Table Y) is to be installed it is quite easy to drill and cable the tube through the joists. This means that in new build work the tube can sometimes, if desired, be installed from below after the floorboards have been laid but before ceilings are boarded.

Use of Joist Clips

Where straight lengths of half - hard copper tube are required to be run in floors they can be laid in notches. By using pipe joist clips with integral protective metal plates, the risk of damage due to punctures from nailing accidents should be eliminated. Furthermore, the rectangular shape of the joist clip can be used as a template when notching joists. This should avoid the joists being weakened accidentally by excessively deep notches.

Although unseen when the installation is complete, joist clips improve the overall quality of the installation. They do this by helping to align the tube and permit expansion movement due to temperature changes in hot water lines. This will help to prevent clicking noises and the water hammer which can arise due to badly-aligned pipework.

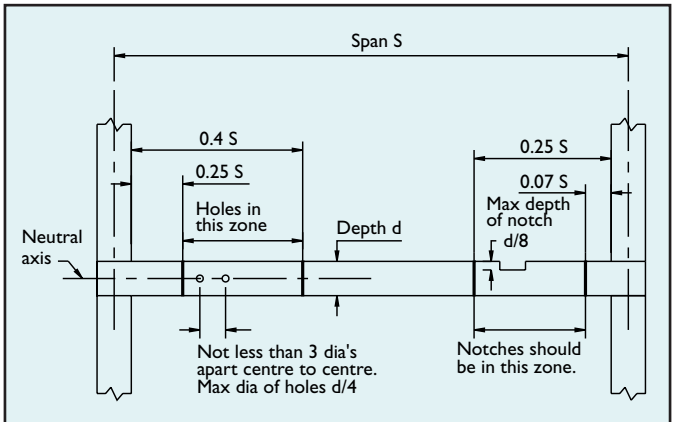

Figure 4 Recommended locations of holes and notches