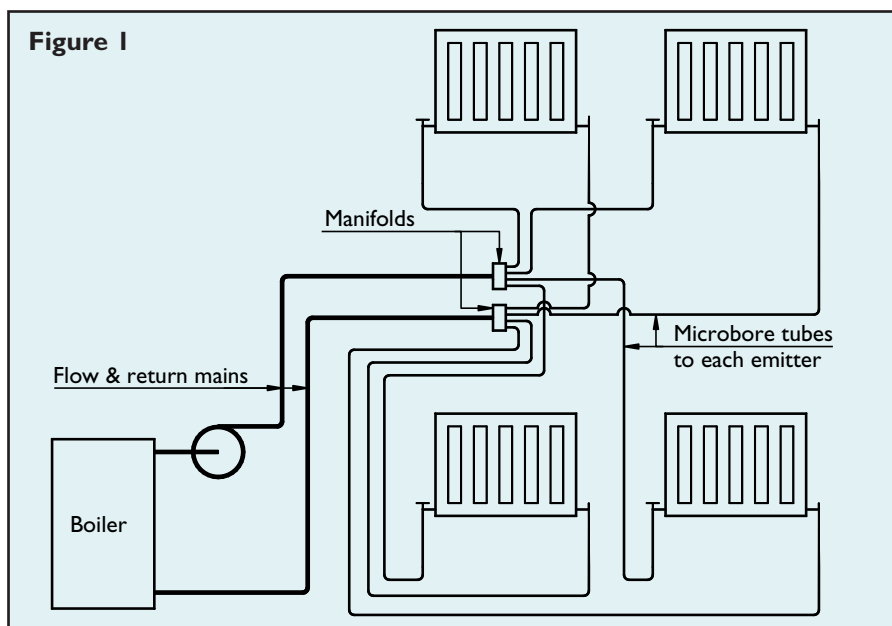


# CABLING SOFT COPPER

**S**mall diameter soft condition copper tube to EN 1057 is available in coils from 10m to 50m in length. It is easy to cut, install, bend and joint, and has been used for many years in minibore and microbore heating systems, (see Figure 1) with the following advantages:

- Less structural disturbance, fewer floor-boards to lift, holes through walls can be drilled easily, runs of tube can be hidden easily.
- Lower installation costs, due to speedy installation. Fewer fittings required.
- Easy installation, the small diameter, soft condition tube can be cabled through floors and concealed in small ducts.
- Lines can be clipped easily, using plastics single nail fixings. The tubing, after uncoiling, remains fairly rigid and self supporting, which in turn reduces the



number of clips required.

- Neat inconspicuous finish. Where tube is surface fixed it can be uncoiled on to the skirting board and clipped as it is

installed to give a neat finish. Alternatively, plastics channels can be used to conceal and fix the tube.

- Reduced number of fittings, number of possible leak sites are reduced as flow and returns to emitters are fitted in continuous lengths.
- Reduced water-flow noise, due to the damping effect of soft temper copper tube.
- Greater system efficiency, due to lower water content enabling faster response to controls and reduced heat loss from tubes.
- Reduced chance of air-locks, where the tube dips, say between joists, the water velocity (up to 1.5m/s) is usually sufficient to move any air bubbles present in the minibore or microbore tube.
- A potentially self-balancing system, by selecting the most appropriate tube diameter for each heat emitter at the design stage, the system will tend to be self-balancing, (see Table 1).

Tube diameter	Water volume of tube (litres/metre)	Water velocity (metres/second)			
		1	1.5	2	2.5
6	0.018	0.018	0.027	0.036	0.045
8	0.036	0.036	0.054	0.072	0.090
10	0.058	0.058	0.087	0.116	0.145
12	0.085	0.085	0.127	0.170	0.212
15	0.145	0.145	0.217	0.290	0.362
22	0.321	0.321	0.481	0.642	0.802
28	0.539	0.539	0.808	1.078	1.347
Flow rate too low for effective use except on spray taps					

Copper based microbore systems are suitable for all types of property,

Table 2 Flow rates at sanitary fittings (l/s)	
Fitting	Flow rate
Washbasin (spray tap)	0.05
Washbasin tap	0.1
Bath tap	0.3
Shower	0.1
WC flushing cistern	0.1
Sink tap	0.2

whether new or existing, flats, houses or large buildings, (multi-story flats, office blocks). There is no limit on the size of installation.

### New buildings

A cabled copper installation is easy to install in a new building. When first fixing, tube and manifolds can be installed quickly and, because of its size, the tube can be buried in the thickness of the plaster, covered by plastics cable sheathing, or in the depth of the floor screed. In this case, either in channels to allow for access, or plastics coated if buried.

### Existing buildings

In existing properties a cabled copper installation can be installed with less disturbance than other systems. This is mainly due to the malleability of the copper tube used.

### Installation points to note

Only cut small diameter soft condition tube with a junior hacksaw, not a wheel cutter. This is to avoid restricting or reducing the diameter of the bore significantly. Then remove burrs with a file. When feeding tube in line with the joists beneath floors, seal the end to prevent dirt entering. Where the tube has to be run across the joists, these can be drilled or notched, (see Figure 2). On drop loop circuits, where the tube has to be run down the wall a choice of methods is available. A chase can be cut into the plaster, the tube installed and covered by plastics sheathing. The tube can be clipped direct to the wall and covered with plastics channel. Where

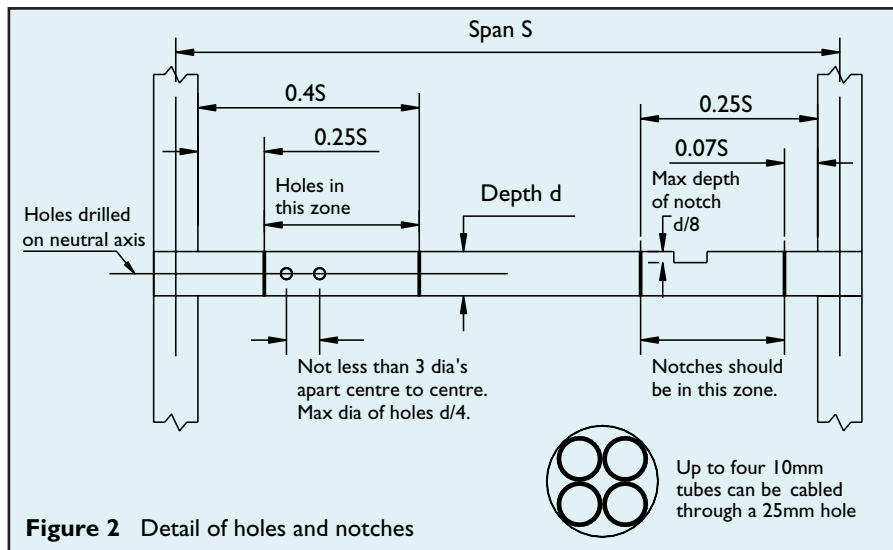


Figure 2 Detail of holes and notches

runs are surface fixed pass the tube through a straightener to help achieve a neat finish. Minibore and microbore tube can be easily bent by hand, but for tight radius bends an external spring, a hand former or mini bender, (see Figure 3) should be used.

### Development of modern plumbing systems

Modern plumbing systems are developing in ways that can enable installers to benefit from many of the above advantages. Many taps now come with soft copper tails for connection to the water services. A large number of new and refurbishment installations make use of mains pressure for both cold and hot water; (combi-boiler and instantaneous multi-point systems, as well as unvented domestic hot water storage systems). Hard water need not be a problem with the many types of water conditioners and small base-exchange water softeners that are available. Also, many installations are

designed with totally concealed pipe runs in mind.

So, why not use smaller tube diameters and the cabling type of installation techniques that are employed on microbore heating in appropriate areas of domestic hot and cold water systems? This might be particularly useful where sanitary fittings are closely grouped.

Providing there is sufficient head pressure available, and that appropriate tube diameters are selected, (to give water flow velocities that do not create unacceptable noise levels or pitting and scouring) the system will perform to a satisfactory standard. Table 1 gives details of the flow-rates that can be expected from different tube diameters for various water velocities. These can be compared with the flow-rates required for various terminal fittings shown in Table 2. This shows that 10mm tube could be used to feed washbasins and WC's and 15mm is adequate to feed a bath tap or up to 3 low demand appliances simultaneously.

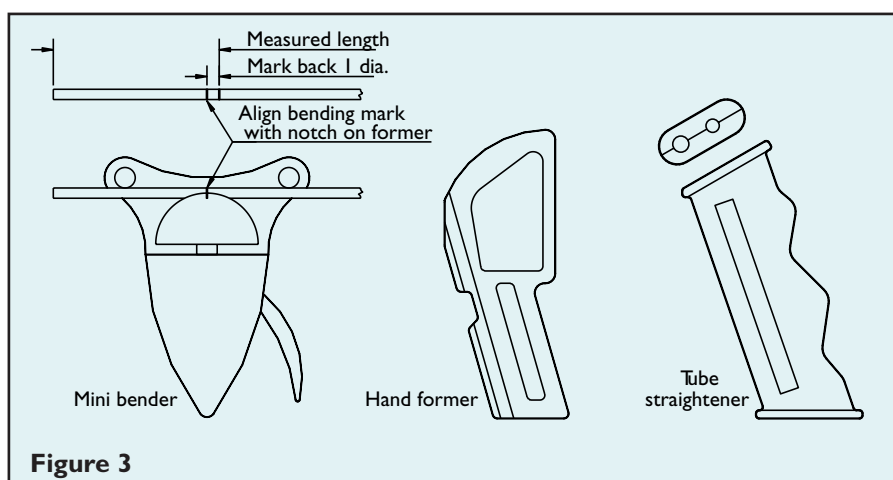


Figure 3