SYSTEMATIC INSTALLATION OF COPPER TO SAVE MONEY

PART ONE - BASIC PRINCIPLES

Copper is a marvellous material for the professional installer. Easy to bend and join to produce an installation that looks great and gives us pride in our work. Furthermore, by adopting a systematic approach to tube fabrication and installation methods, considerable savings can be made. Savings will result from better use of our labour. By taking as many measurements as possible in one operation, piecemeal, time consuming installation of individual tubes is reduced and cutting lengths can be optimised to minimise waste.

This first of two articles explains basic principles that can be used to produce an efficient top quality tube installation every time.

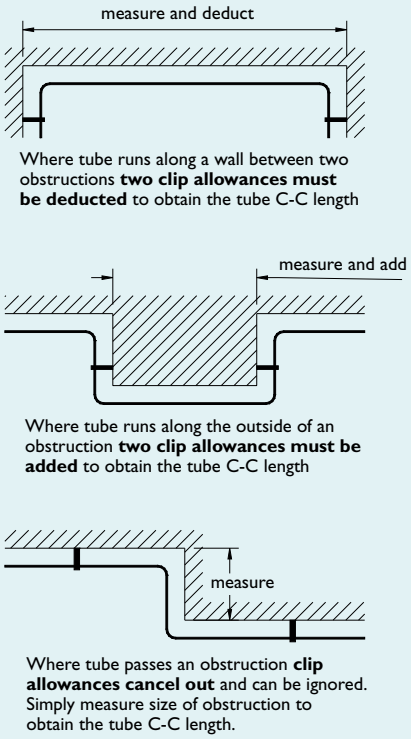


Figure 2 Fixing clip allowances

The method is based on two basic principles.

First, the ability to determine accurate cutting lengths for tube - cutting lengths that allow for bends, fittings and clip stand off dimensions. Actual lengths of walls and positions of fixed points, such as tap-tails and other connections are measured. Tube cutting lengths are then easily worked out.

Second, an ability to prepare clear, dimensioned single line sketches of the tubes to be fabricated, either by the measurer or by another operative. A chart to facilitate this is the subject of the second half of the article.

To enable accurate fabrication of tubes, either from drawings or from actual structures, it is necessary to have a method of determining the actual tube cutting lengths required.

Fixing clip allowances

It is necessary to allow for fixing clips to obtain tube centre to centre lengths. The allowance for a clip is the measurement by which the tube centre line is off the fixing surface, see Figure 1. For a typical plastic spacing clip to hold 15mm tube this allowance is about 22mm.

When allowing for clips on tube fixed to walls or other surfaces there are four possibilities. These depend on whether the tube is passing between, going around, going past obstructions or connecting to a fixed point, see Figure 2.

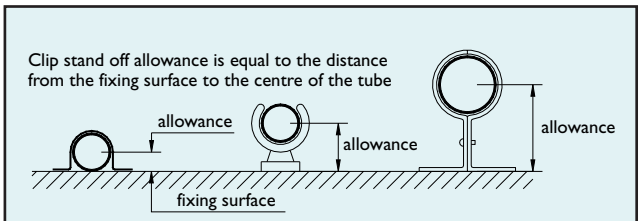


Figure 1

By measuring the actual length of the wall and then either deducting, adding or ignoring clips the tube centre to centre length is obtained.

Where a tube connects to a fixed point and this has been measured to, only one clip needs to be allowed for.

Fitting allowances

To allow for a fitting and to obtain the tube cutting length, the operative needs to know the measurement from the centre line of the fitting back to the tube-stop, see Figure 3. For a typical 15mm elbow this is about 12mm and for a 15mm equal tee it is about 8mm.

These measurements are easily determined by measuring the actual pattern of fittings to be used when installing the tube. They can then be deducted from the centre to centre tube length, see Figure 3.

Note: fitting allowances are ALWAYS

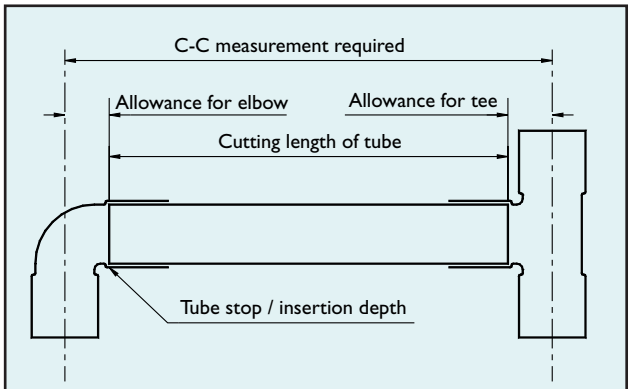


Figure 3 Fitting allowance and cutting length

deducted.

A simple example:

Figure 4 shows the plan of a wall along which a 15mm copper tube is to be installed using elbows to change direction. First the tube is sketched and each piece is identified. Next, the actual lengths of the walls are measured accurately. Finally cutting lengths are determined before work on the installation commences, see table 1 for method.

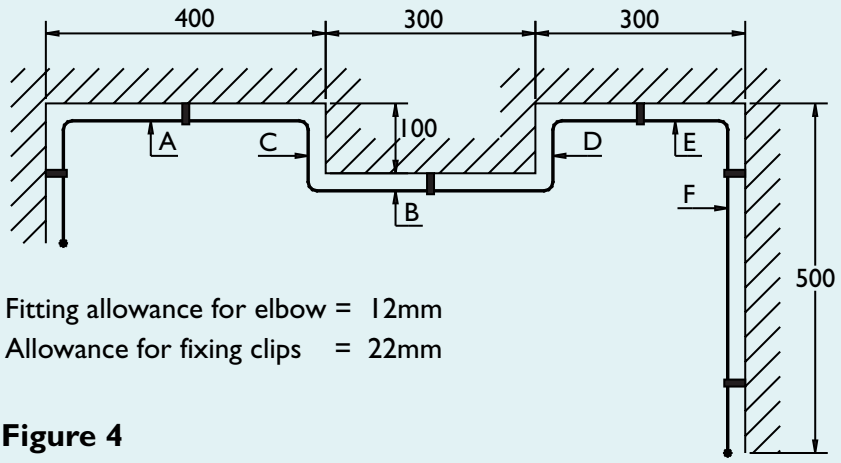
Where tube is to be bent a similar technique is used. Walls are measured as before and fixing clips allowed for to determine centre to centre lengths. These are then used to set up the tube accurately in the bending machine to enable multiple bends to be made on one piece of tube.

Note: as tube is gained when forming simple 90° bends no extra need be allowed. The cutting length is determined by adding the centre to centre lengths of the various sections of the tube run. Once the tube has been bent, one end will need to be trimmed to the correct length due to gains from each bend. This can be done when it is installed.

A further worked example and a layout chart that can be used as the basis of a simple prefabrication system are discussed in the following article.

Table 1

Tube identity	Tube diameter	Measured length	Clip allowance	Fitting allowance	Cutting length
A	15	400	-2 @ 22	-2 @ 12	332
B	15	300	+2 @ 22	-2 @ 12	320
C	15	100	0	-2 @ 12	76
D	15	100	0	-2 @ 12	76
E	15	300	-2 @ 22	-2 @ 12	232
F	15	500	-1 @ 22	-2 @ 12	454



Fitting allowance for elbow = 12mm
Allowance for fixing clips = 22mm

Figure 4