INITIATIVE COPPER

Underground Copper Water Services

When laying underground water services into buildings it makes sense to use copper. Copper's corrosion resistance and long term resistance to degradation, as well as it's excellent protective properties, mean that nothing can be absorbed by it or permeate through it. Because of this it will keep the water supply safe and healthy for the consumer for many years.

Copper tube suitable for underground use is made to comply with EN 1057 half hard thick wall formerly Table Y. It is supplied coiled in long lengths in the annealed or soft condition (in sizes 12 to 28mm O.D.) or half-hard in 6M straight lengths (sizes 6 to 108mm O.D.). It can be joined using either capillary joints or flared type 'B' manipulative compression fittings to EN 1254.

Requirements

Water Regulations require that underground water services are laid between 750 and 1350mm deep from the finished ground level, see Figure 1. Burying the service pipe 750mm deep gives it adequate frost protection in normal situations and stipulating a maximum depth of 1350mm means that the service pipe is reasonably accessible should the need arise. The installation of pipes and water fittings in foul soil, refuse or ash pits or cesspools, drains etc. is prohibited. Water fittings need to be able to resist damage from: external loads, vibration, stress and settlement, internal water pressure, temperature and corrosion. A correctly installed copper system will meet this requirement in all respects.

Trench excavations

Trenches should follow a straight route from the boundary stop valve to the service entry point at the building. This will facilitate easy location of the service in the future. Also, joints below

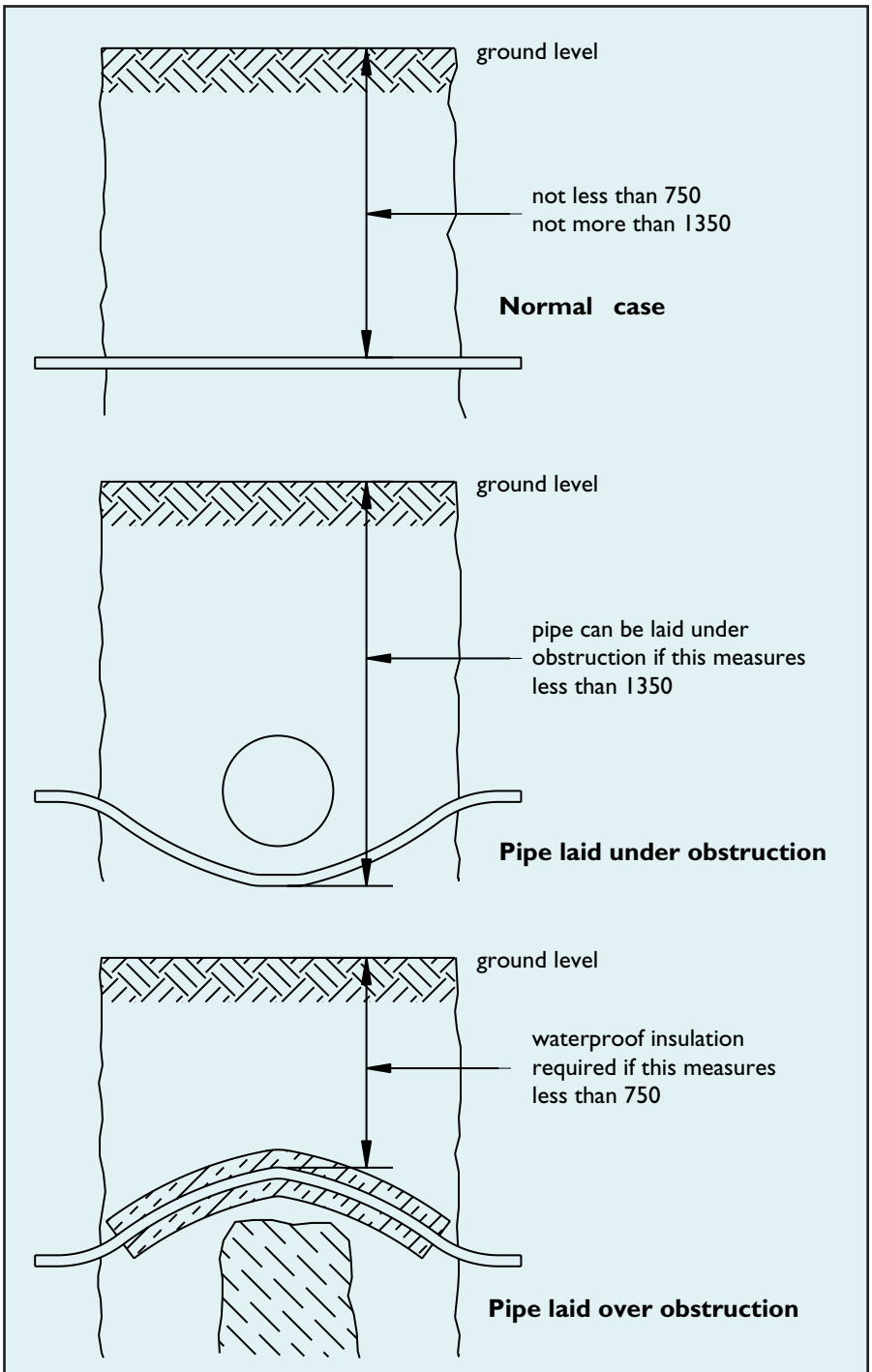

Figure 1 Depth of cover for water services.

ground should be kept to a minimum, ideally the service should be laid in one length. Surface boxes for valve access must be provided, they should be supported on concrete or bricks so that they do not rest on the tube. The trench bottom should be prepared to give a firm even surface. Any boulders or rock projections or mud patches should be removed and be replaced with selected fill material.

Laying the tube

When laying the coiled tube into the trench it should be snaked slightly, this is to allow for any shrinkage of the sub-soil. As in Figure 2. Snaking the tube has the effect of adding length which can then allow any movement to take place without placing undue strain on the tube. This is particularly important where the tube connects to the ferrule valve on the water main where a goose neck bend should be formed. Open ends of tube should be crimped or temporarily sealed with tape to prevent dirt entering the tube before joints are made. Any sheathing or wrappings which have to be cut back to enable jointing should be replaced and the sheathing checked for damage before the trench is backfilled. It is important to make sure that the tube is surrounded by selected material without large stones or sharp objects. This should be consolidated before the remainder of the trench is filled.

Aggressive soils

The type and nature of the soil through which the tube is to be laid can occasionally have an effect on the tube. For example, where the soil is known to be strongly acidic, in this case the water company might require that polyethylene coated copper tube be used. It makes sense to use coated copper rather than polyethylene tube alone because some plastics can be permeated by gases. Copper is completely impervious and if protected against the aggressive nature of the soil by the plastic will deliver safe water over the long term.

Aggressive soils are usually acidic and contain humus, or vegetable matter, or certain minerals, such as sulphur. The flower colour of the Hydrangea bush can give an indication of the acidity of the soil in which it grows. This is because the flower colour varies with the acidity of the soil. In acid soil, blue and mauve-coloured blooms are produced; in alkaline soil, pink. Where the nature of the soil is not known it is quite easy to determine this by testing with an white absorbent paper which have been impregnated with small areas of indicator chemicals which change colour when they come into contact with acids or alkali's. The acidity is measured on the 'pH' scale. This runs from 0, the strongest acid, to 14, the most alkaline. Neutral, neither acid nor alkaline, is 7 on the scale. In use the indicator paper is moistened and the resulting colour change can be compared to a scale to indicate the 'pH'. Ideally water should be neutral or slightly alkaline, with a 'pH' of 7 or 7.5.

Water quality and brass fittings

Certain types of water, either supplied by the water company or ground water in which the tube is laid, can result in a form of corrosion on brass known as dezincification which is the selective removal of zinc from the brass. This can be identified by the formation of a meringue-like whitish coloured growth on fittings. Because of the problem of dezincification the Water Regulations require that copper alloy fittings containing zinc, if laid in the ground, should be made from gunmetal or dezincification resistant brass. The fitting is immune from dezincification and therefore safe for use in the ground, it can normally be identified by a 'CR' mark.

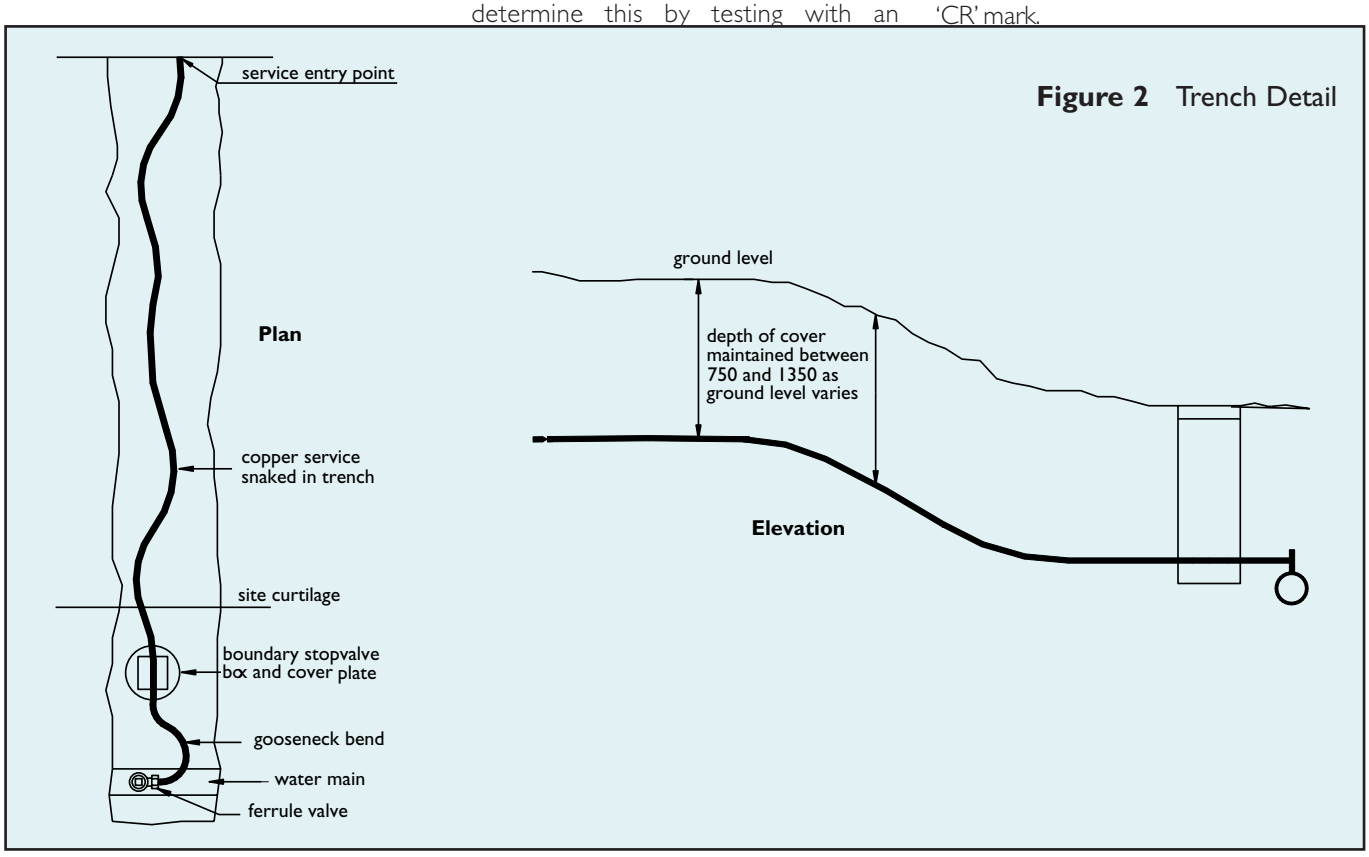

Figure 2 Trench Detail