

Insulation, Ducting and Capping

This fact sheet provides information on the different types of insulation that can be used, suitable types of ducting, and the methods used to seal a duct that is used for a new water supply pipe.

Insulation information

The role of insulation is to delay the action of freezing by reducing the loss of thermal energy from the pipework. This will hopefully provide enough protection, slowing down the action of freezing, until the ambient temperature increases again.

Insulation should be of a closed cell type and comply with BS 5422 and installed according to BS 5970.

It should be installed in a continuous fashion over the pipework, with no breaks, protected from mechanical damage and be waterproof. Any insulation directly below ceiling or roof void insulation should be insulated to prevent condensation, saturation and subsequent failure of the ceiling insulation.

Water Regulations Guidance has two conditions for the protection of pipework against freezing:

- 1) **Normal Conditions** - this relates to domestic premises that are heated for up to 12 hours each day. Pipework in unheated rooms/areas will still need insulating even though it is within the thermal envelope of the building. Insulation should provide 12 hours protection from freezing.
- 2) **Extreme Conditions** – this relates to water fittings installed outside a building or inside a building that is unheated, or heated for less than 12 hours a day. This could include under suspended ground floors, above the ceiling insulation, in communal areas of flats or inside garages etc. Insulation in these areas should be substantially increased.

Free online calculators are available to help you determine the correct level of insulation for different conditions.

It is essential that the following is adhered to:

- There is no gap in the insulation at bends and valves etc. as heat loss due to these conditions could freeze local pockets of the pipe system in less than one hour;
- An external vapour barrier is provided and protected against mechanical or other damage;
- Where water pipes are located directly below ceiling or roof voids, insulation must either be the full calculated thickness or a minimum thickness of 9mm high-emissivity surfaced, closed cell insulation, whichever is the greater. This must be installed around the water pipe to prevent condensation, saturation and subsequent failure of the ceiling insulation.

Below details the pipework insulation alongside their thermal conductivities:

Less than 0.020 W/ (m.K)	Rigid phenolic foam.
0.020 to 0.025 W/ (m.K)	Polisocyanurate foam and rigid polyurethane foam.
0.025 to 0.030 W/ (m.K)	PVC foam.
0.030 to 0.035 W/ (m.K)	Expanded polystyrene, extruded polystyrene, cross linked polyethylene foam, expanded nitrile rubber and improved polyethylene foam.
0.035 to 0.040 W/ (m.K)	Standard polyethylene foam, expanded synthetic rubber and cellular glass.

Examples of the above pipework insulation is shown on the next page.

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[Rigid Phenolic Foam - requires waterproof protection for underground use]



[Polyisocyanurate Foam. – requires waterproof protection for underground use]



[Expanded Nitrile Rubber]



[Standard Polyethylene Foam - internal use only]

Ducting materials

Ducting should be a suitable material that is solid, non-permeable, smooth on the inside and does not have any other markings on the duct. It should ideally be blue plastic as this represents water or it can be plain black or brown with no other markings like “electric ducting” written on the side. The ideal size is 110mm diameter, but in certain circumstances where space is limited a 65mm diameter duct can be used. Coiled ducting is the preferred option to use because it allows for a nice smooth curve to form where the duct bends up into the property from underground. Suitable examples are shown below.



[Example ducting material]

Method of sealing each end of the duct

The duct has to be sealed internally and externally to prevent the ingress of gas, liquids or vermin into the building. It is recommended that a plastic or rubber end cap be used to seal off each end of the duct. We do not allow oil-based sealants or expanding foam to be used because the pipe should be easily removable and chemicals can leach from these products, leading to future water quality issues. Examples of suitable ends caps are shown on the next page.

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Please contact our Water Regulations team for further information.

For further information contact the Water Regulations team at
SES Water, London Road, Redhill RH1 1LJ
Email: waterregulations@seswater.co.uk