



## Insulation of Pipes Installed Underground with Armaflex

### » Water Supply Regulations 1999

Although it is still common to hear references to water by-laws, in 1999 the water bylaws were officially replaced by the new water supply regulations. The primary aim of the new regulations is to prevent the unnecessary wastage of water.

All pipework and fittings outside the heated envelope of a building, including any pipework less than 750mm below ground, coming under the new water supply regulations should be insulated, in order to minimise the risk of freezing, using thermal insulation of the closed cell type.

This applies to mains cold water pipes however the guidance also explicitly includes hot water pipes outside the heated envelope of a building[1].

Some pipework entering a building below 750mm beneath the surface may also require insulation depending on the distance inside the building at which the pipe begins to rise vertically[2].

### » Conditions

The regulations define "normal" conditions<sup>[3]</sup> as being the conditions likely to be encountered within the heated envelope a building but in an unheated space such as a cloakroom.

	Normal Conditions	Extreme Conditions
Pipe freezing rate	50%	50%
Time until freezing	12 hours	≥12 hours
Ambient temperature	-6°C	≤-6°C
Line temperature	7°C	≤7°C

Any pipework in a constantly unheated space is deemed to be liable to experience "extreme" conditions. In "extreme" conditions the thickness should be calculated to ensure freezing will not occur, even in the harshest possible conditions.



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### » Considerations of Insulating Pipes Underground

Insulating pipework underground presents particular challenges.

- Burst pipes underground generally prove particularly inaccessible and expensive to remedy. The primary aim of insulating underground is therefore to prevent pipe bursting due to the freezing of water.
- Underground pipework may be occasionally or permanently below the water table.
- Any material which cannot be adequately sealed against the ingress of water will be unsuitable for use on underground pipework. Moisture, especially under compression, will force its way through any inadequately sealed joints and seams. As such all insulation used should be sufficiently sealed and water proofed to prevent the ingress of water and water vapour (insulation must be installed in accordance to BS 5970<sup>[4]</sup>).
- Water pipework should be laid at a depth of at least 750mm<sup>[6]</sup>. Partially this is to take advantage of the natural

insulative effect of the soil, concrete or aggregates but the guidance is also driven by the requirement to keep water pipework away from other utilities pipework<sup>[6]</sup>.

- Excessive compression can damage insulation causing rigid insulation to crack and flexible insulation to reduce in thickness. Provision must be made to protect any insulation installed underground from the adverse effects caused by compression during its service life and during construction.

### » Why Use Class O Armaflex

Class O Armaflex is a closed cell, dust and fibre free elastomeric insulation material with a built in water vapour barrier. Particularly flexible it will not fracture and crack under minimal compression or impact and is easy to apply, even in tight spaces.

Unlike traditional rigid and polyethylene materials, Class O Armaflex can be fully sealed along the seam and at the butt



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joints. This makes Armaflex more effective at preventing moisture ingress through the seam and jointing details than the other traditional material types.

As a result, correctly applied Class O Armaflex will minimise water ingress to the pipe effectively eliminating the issue of under insulation corrosion. What's more, due to its in built water vapour barrier, any thickness of Class O Armaflex will perform this role without the need for any further foil vapour barrier.

### Armaflex TuffCoat

Particularly suited to installation underground, Armaflex Tuffcoat is Class O Armaflex with an external weather protection covering pre-applied. When using Armaflex Tuffcoat no additional weather/water protection covering layer such as Densotape is required, reducing installation time, simplifying the process into a single step.

For some pipe sizes Armaflex Tuffcoat is also available in 15m endless coils which make obtaining a seamless finish solution easier than ever.

### » Installation

When installing Class O Armaflex or Armaflex Tuffcoat underground follow the standard installation advice given in the Armaflex installation manual.

1. All butt joints and seams should be sealed using Armaflex 520 adhesive in accordance with the instructions given on the label. At both ends and at any termination points the Armaflex should be directly sealed to the pipe.

For any valves, flanges or bends in the pipework then the insulation thickness should be maintained around them in order to reduce the risk of localised freezing.

2. **If using Class O Armaflex** it will be necessary to install an additional weather proof covering in order to give enhanced protection to the material underground. Arma-Chek R covering would be suitable for this purpose as an alternative to the traditionally used Densotape.

In order to ensure time for the Armaflex adhesive



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to cure, sufficient time should be allowed between the application of the Class 0 Armaflex and the application of the covering. Do not apply the covering tightly and do not compress the Armaflex.

**If using Armaflex Tuffcoat** no additional weather proof covering should be required in most cases.

3. It is recommended to sleeve the fully insulated and covered pipe within a rigid PVC soil pipe to fully shield the insulation from the compressive weight of the soil.

For applications permanently above the water table put 10 mm drain holes at approximately 600 mm intervals along the bottom centre of the PVC soil pipe (prior to fabrication).

For applications where the system may on occasion be below the water table DO NOT put in any drain holes but seal the pushfit joints of the soil pipe with a waterproof mastic or use a continuously welded PVC pipe system.

- [1] - Water Supply Regulations Guidance Document Section 3 point G4.9
- [2] - Water Supply Regulations Guidance Document Section 3 recommendation R7.2
- [3] - Water Supply Regulations Guidance Document Section 3 point G4.11
- [4] - Water Supply Regulations Guidance Document Section 3 point G4.6
- [5] - Water Supply Regulations Guidance Document Section 3 point G7.7
- [6] - Water Supply Regulations Guidance Document Section 3 recommendation R4.15



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## Calculation tool: Time until freezing of insulated underground pipe work



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