

## Direct Burial of Flexible Elastomeric and Polyethylene/Polyolefin Pipe Insulations

Several important concerns arise when any thermal pipe insulation is to be directly buried. These concerns may govern the way the insulation or the entire mechanical system is installed.

The first of these concerns deals with the effect of ground water infiltration and pipe corrosion. Ground water and rain seepage, by its very nature, can carry contaminants damaging to both steel and copper pipes. Of particular concern are chloride ions from brackish water or ground salts and nitrite ions from agricultural runoff or sewage. Both chlorides and nitrites are corrosive substances. This contaminated water can penetrate the insulation through cracks or breaks in the seams of the insulation. This corrosive mixture can then become trapped between the insulation and the pipe creating conditions favorable for corrosion to take place.

The second concern deals with the compression of the insulation due to the static load exerted from the soil. This static load can result in a 20% compression of the wall thickness of the insulation. This compression will adversely affect the thermal performance of the insulation. Simply increasing the wall thickness of the insulation will not totally compensate for this loss in thermal performance.

The last concern deals with the differences in heat transfer that occur due to underground conditions. Hydrostatic forces change the heat flow from what would normally be expected above ground. This changes most thermal calculations that have been made with above ground design conditions. The thickness of insulation for underground piping is not determined on the same basis as for above ground installations.

Considering all of these concerns,

it is not best practice to directly bury Armacell insulation products. Best practice is to encase the insulated pipe in a sealed conduit that will prevent water infiltration and compression. Either PVC pipe or corrugated drain pipe work well as conduits.

If pipe corrosion is not a concern, Armacell insulation can be buried with direct ground contact but it should be in a well drained trench and compacted as little as possible. The below ground installation must also be above the local water table to limit the water that enters the space between the pipe and the insulation. In addition, the trench should be backfilled with sand or dirt, and never stone, to prevent damage to the insulation. It is also advisable to move up at least one step in wall thickness so that the desired wall thickness and R-value are achieved after the insulation is compressed upon burial.

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