

Insulating Underground Pipe and Ducting with Perlite Insulating Concrete



Photos courtesy Gulf Perlite

Perlite concrete pipe insulation provides a seamless, lightweight, quality thermal insulation that is also fire, rot, and vermin proof.

Top • Perlite concrete-encased metal pipe sections ready to place into the ditch. Pipeline was infilled with ready-mixed perlite lightweight concrete, at density of 1,000 Kg/m³. Perlite concrete was used to protect the pipeline from extreme hot weather and reduce the weight of the insulated sections, so the crane can lift it during installation, potential maintenance, or removal.

Above from Left • Pumping perlite concrete into form around pipe section; cured insulative sleeve around pipe; perlite concrete blocks placed to support insulated pipe; perlite concrete test cylinder.

Lightweight perlite insulating concrete can play multiple roles in underground pipe and duct installations. In addition to providing quality thermal insulation, perlite concrete insulation can also serve as a supporting envelope. This latter advantage is of special importance when pipe or ducts are laid under roadways, parking lots or other areas subject to traffic. Perlite concrete pipe insulation provides a monolithic (seamless) insulation for the length of a

Insulating Underground Pipe and Ducting with Perlite Insulating Concrete

TYPICAL UNDERGROUND PIPE INSTALLATION USING PERLITE INSULATING CONCRETE

ALTERNATIVE METHOD TO FORM-CASTING PERLITE CONCRETE AROUND PIPE/DUCT BEFORE BURIAL

- 1 • Poured perlite concrete insulative surround and cover.
- 2 • Perlite concrete support blocks.
- 3 • Perlite concrete base pad used when earth has been disturbed. Not used when earth is undisturbed or compacted.
- 4 • Parting material isolates pipe material from perlite concrete
- 5 • Pipe or duct

pipe or duct. Additionally, perlite insulating concrete is permanent, fire proof, rot proof and vermin proof.

Stable or Compacted Soils

Where there is stable or compacted soil, pipe or ducting may be supported on precast perlite concrete support blocks in the bottom of a trench and a perlite concrete cover poured into the trench area. Depth of concrete cover and pipe spacing will depend on the size of pipe or duct to be insulated as well as operating temperatures. The perlite cover should be water-proofed by encasing the perlite concrete with a polyvinyl chloride (PVC) membrane. Internal vent drain lines may be required. If operating temperatures are in excess of 800°F (427°C) Aluminite cement should be employed. Prior to pouring concrete, pipe and ducts should be wrapped with a parting material such as wax coated corrugated paper to prevent the perlite concrete from adhering to the pipe and to permit free longitudinal movement of the pipe as a result of temperature changes.

Disturbed or Loose Soils

When disturbed soils are encountered in the trench area, a perlite concrete base pad should be poured first. Precast perlite concrete support blocks are

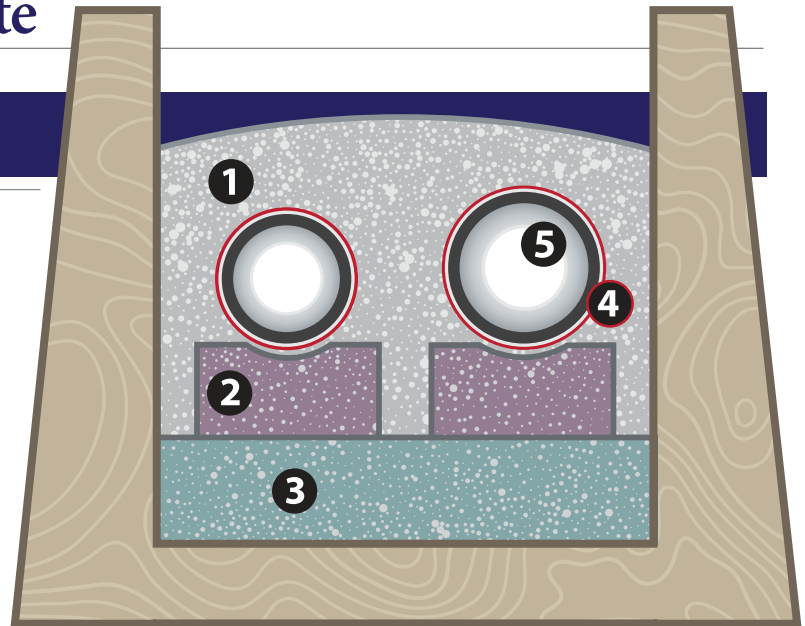


Figure 1 • Typical underground pipe installations with perlite concrete insulation. When below grade water is present, the installation should be completely encased with a PVC membrane and vent drains installed.

then placed on top of the base pad and the installation proceeds as for installations in compacted soils.

Expansion Loops or Ells

Expansion loops and ells must be carefully designed as there will be pipe or duct movement in the perlite concrete insulation as a result of temperature changes. Depending on the design, metal pan blockouts can be used to isolate the pipe or ducts from the insulation in those areas where there is excessive movement. Double wraps of 1-1/2 inch (4 cm) foil faced fiberglass may also be used to accommodate pipe movement at elbows, expansion loops, expansion Zs and U-bends.

Heavy Traffic Areas

Where there is heavy traffic loading on the soil above an insulated pipe as when running pipe under parking lots or highways, the designer should take this loading into account.