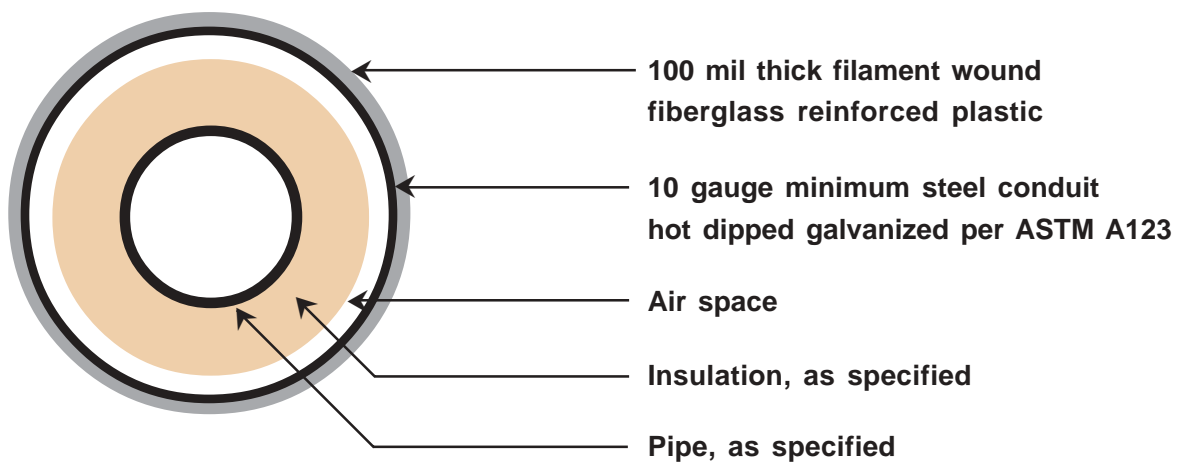


GALVA-GARD®

"The Ultimate Corrosion Fighter™"

- *The Best Just Got Better*
- *Hot Dipped Galvanized Inside and Out*
- *Corrosion Resistance of Galvanized Steel and Fiberglass*
- *No Pipe Coating Can Equal the Thick Fiberglass Cladding*
- *No Cathodic Protection Required*



For over 30 years, PERMA-PIPE/RICWIL has been offering Hot Dip Galvanized outer casings for underground distribution systems. The galvanization was applied to the exterior, as well as the interior of the outer pipe providing a clean, corrosion resistant and highest quality Class A system for underground heat distribution.

We have now added an additional thick cladding of fiberglass reinforced plastic on top of the galvanized system for maximum resistance to adverse corrosion and environmental conditions.

This system is "The Ultimate Corrosion Fighter™".

GALVA-GARD has the strength of steel and the corrosion resistance of galvanizing and fiberglass. The fiberglass cladding is highly resistant to acids, alkalis, salts and chemicals found in the soil. This material has a high dielectric

strength and is designed to withstand 35,000 volt spark testing, thus eliminating the need for cathodic protection. No pipe coating can meet the performance of the GALVA-GARD fiberglass cladding.

The GALVA-GARD fiberglass cladding is filament wound directly onto a hot dipped galvanized surface that has been coated with a bonding layer. GALVA-GARD has been developed especially for underground application and for severe above grade environments. The smoothwall conduit is chosen for this product because of its small seam, providing complete contact of the cladding to the conduit.

The casing is capable of withstanding earth and H2O traffic loads. The cladding also resists the stresses of handling, soil movement and backfill compaction. GALVA-GARD is manufactured in 20-foot lengths or 40-foot lengths with fittings, odd lengths and accessories as required.

GALVA-GARD®

Fiberglass Clad Galvanized Steel Conduit Systems

GENERAL

All underground heat distribution lines, as shown on the contract drawings, shall be fiberglass clad hot dipped galvanized steel, conduit GALVA-GARD, as manufactured by PERMA-PIPE. The system supplier shall have at least five years experience in fabricated systems of the composition defined herein. All straight sections, fittings, anchors and other accessories shall be factory prefabricated to job dimensions. Each system layout shall be analyzed by the piping system manufacturer to determine stresses and movements of the service pipe. The system design shall be in strict conformance with ANSI B31.1 latest edition and stamped by a Registered Professional Engineer. Factory trained field technical assistance shall be provided for critical periods of installation, unloading, field joint instruction and testing.

SERVICE PIPE

Internal piping shall be standard weight carbon steel except for condensate piping which shall be Schedule 80 carbon steel. All joints shall be butt welded for sizes 2.5 inches and larger and socket welded for 2 inches and below. Where possible, straight sections shall be supplied in 40-foot random lengths with 6 inches of piping exposed at each end for field joint fabrication.

SUBASSEMBLIES

End seals, gland seals and anchors shall be designed and factory prefabricated to prevent the ingress of moisture into the system. All subassemblies shall be designed to allow for complete draining and drying of the conduit system.

SERVICE PIPE INSULATION

Service pipe insulation shall be mineral wool. Split insulation shall be held in place by stainless steel bands installed on 18-inch centers. The insulation shall have passed the boiling test and other requirements specified in the Federal Agency Guidelines. The insulation shall be applied to a thickness of _____ inches.

OUTER CONDUIT

The steel conduit casing shall be hot dipped galvanized per ASTM A123 with minimum 2oz per ft² and 3.4 mils thick. The steel conduit casing shall be smoothwall, welded steel conduit of the thicknesses specified below:

Conduit Size	Conduit Thickness
6" - 26"	10 Gauge
28" - 36"	6 Gauge
38" - 42"	4 Gauge

Changes in casing size, required to allow for service pipe expansion, shall be accomplished by eccentric and/or concentric fittings and shall provide for continuous drainage.

PIPE SUPPORTS

All pipes within the outer casing shall be supported at not more than 10-foot intervals. These supports shall be designed to allow for continuous airflow and drainage of the conduit in place. The straight supports shall be designed to occupy not more than 10% of the annular air space. Supports shall be of the type where insulation thermally isolates the service pipe from the outer conduit. The surface of the insulation shall be protected at the support by a sleeve not

less than 12-inches long, fitted with traverse and, where required, rotational arresters.

OUTER CONDUIT CLADDING

The conduit surface shall be clad with filament wound fiberglass reinforced plastic to a minimum thickness of 100 mil. All fitting assemblies shall be clad with chopped fiberglass to the same thickness. The final outside cladding shall be designed to withstand 35,000 volt spark testing, thus eliminating the need for cathodic protection.

INSTALLATION

The installing contractor shall handle the system in accordance with the directions furnished by the manufacturer and as approved by the architect and engineer. The casing shall be air tested at 15 psig. The service piping shall be hydrostatically hammer tested to 150 psig or 1.5 times the operating pressure, or as specified in the contract documents. The test pressure shall be held for not less than one hour.

BACKFILL

A 4-inch layer of sand or fine gravel shall be placed and tamped in the trench to provide a uniform bedding for the system. The entire trench shall be evenly backfilled with a similar material as the bedding in 6-inch compacted layers, to a minimum height of 6 inches above the top of the insulated piping system. The remaining trench shall be evenly and continuously backfilled in uniform layers with suitable excavated soil.



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