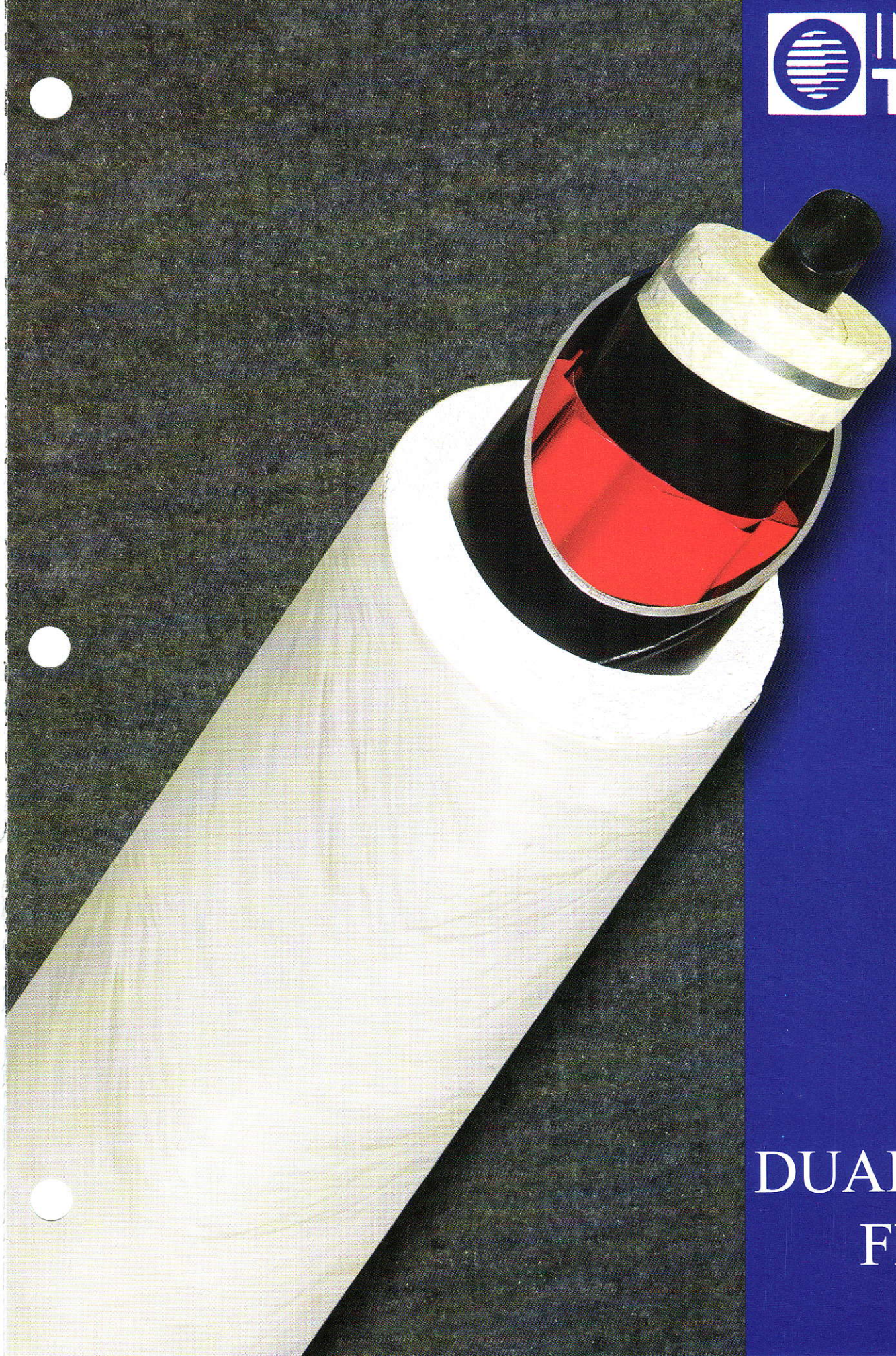
INSUL® TEK



DUAL-CON FRP

INSUL-TEK® DUAL-CON FRP

Dual-Con FRP is both the most thermally efficient system, and the most corrosion resistant preinsulated piping system available today.

Features

Dryable, Drainable, Air Testable system means reliability.

Exterior filament wound FRP casing has much higher heat limitations than HDPE casing.

Exterior layer of spray applied void-free polyurethane foam insulation.

Fiberglass Reinforced Plastic (FRP) casing filament wound directly on to spray applied void-free polyurethane foam insulation.

Options

Prefabricated Manholes

Leak Detection Systems

Heat Trace Systems

Multiple carrier Pipe System

Insul-Tek® Dual-Con FRP

- Steam and Condensate Distribution
- District Heating and Cooling
- High Temperature Hot Water
- Cogeneration
- Process Fluids

Insul-Tek® Dual-Con FRP Preinsulated Piping System

- Drainable, Dryable, Air Testable, Class "A"
- Steel Conduit system utilizing a non-corrosive
- Fiberglass Reinforced Plastic (F.R.P.) Exterior Casing

Insul-Tek® Dual Con FRP is the ideal system for use on those sites that pose the most difficult of conditions for an underground preinsulated piping system. The FRP system provides "double protection" for your underground piping systems.

The Dual Con FRP system utilizes two (2) separate protective casings. The Exterior Casing is a Corrosion Proof, non-metallic Fiberglass Reinforced Plastic (FRP) casing, which is filament wound directly on to the void-free spray applied polyurethane foam insulation. Fiberglass Reinforced Plastic (FRP) casings have much higher heat limitations than thermal plastic casings such as H.D.P.E. The Inner Casing is a Steel Conduit which provides the strength of steel and is easily welded in the field and air tested to prove its integrity (tightness). The Dual-Con FRP system utilizes Two (2) different types of Insulation Systems, an Exterior Layer of the most thermally efficient Polyurethane Foam insulation, in conjunction with an Inner Layer of High Temperature Insulation consisting of; mineral wool, Foamglas®, calcium silicate or perlite insulation. Insul-Tek® FRP is manufactured to withstand the most severe and corrosive conditions that can be found in an underground heat distribution site. Dual-Con FRP is both the most thermally efficient system, and the most corrosion resistant preinsulated piping system available today.

PRODUCT DESCRIPTION

Carrier Pipe

The carrier pipe(s) is typically Schedule 40 A53 Grade B, ERW, except for condensate service which is generally Schedule 80 A53 Grade B, ERW. Sizes above 10" are typically standard wall dimension. Other types and grades of carrier pipe are available depending upon applications. Please consult factory for recommendation.

Carrier Pipe Insulation

The carrier pipe is insulated with the customer's choice of one of today's thermally efficient dryable insulation materials. The insulation shall be the type that has passed the U.S. National Bureau of Standards Boiling Test. The standard insulation materials include; mineral wool, Foamglas®, calcium silicate, and perlite insulation. The insulation thickness will be properly sized to ensure that the piping system is thermally efficient.

Inner Steel Conduit

The carrier pipe with attached insulation will be supported within a smooth wall steel conduit having a wall thickness of not less than 10 gauge. Piping shall be suitably spaced and supported in the conduit by specially designed pipe supports which allow for continuous air flow and drainage of the conduit system in place. The pipe supports will be placed at not less than 10' intervals.

Outer Layer of Insulation

An outer layer of the most thermally efficient insulation, polyurethane foam, will be spray applied to the steel conduit and will be protected by the external casing of non-corrosive FRP, which will be filament wound directly onto the polyurethane foam insulation. The utilization of polyurethane foam allows for the service pipe insulation to be reduced in thickness, while still maintaining a low heat loss.

Exterior Fiberglass Reinforced Plastic (FRP) Casing

The entire piping system will be protected by a non-corrosive, filament wound Fiberglass Reinforced Plastic (FRP) casing. FRP is one of the toughest and most durable casing materials available today. FRP has a much higher temperature limitation than thermal plastic matericals such as HDPE. The filament wound FRP casing is impervious to most chemicals as well as electrolytic attack, thus, there is no need for expensive and maintenance oriented cathodic protection systems.

Typical Insulation Thickness and Casing Sizes

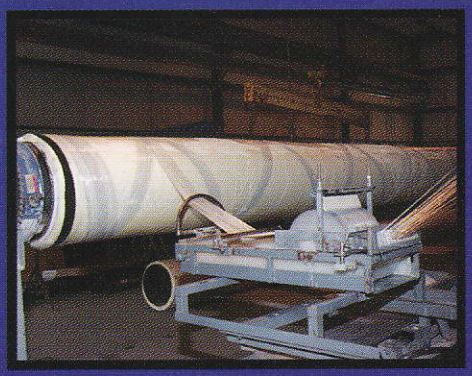
(Based upon Operating Temperature of 353 Degrees Fahrenheit, 3ft Depth of burial and 40 Degrees Fahrenheit ground temperatures)

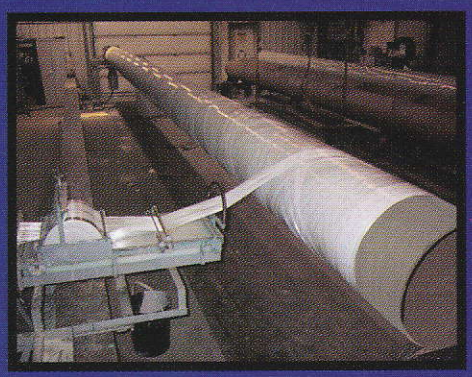
Note: All exterior conduits are insulated with 1" thick polyurethane foam insulation.

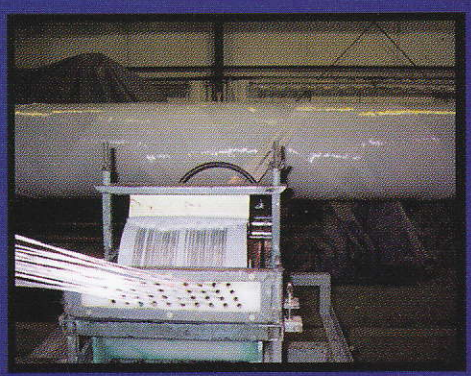
Nominal Pipe Size (inches)	Mineral Wool Insulation Thickness (inches)	Inner Steel Conduit O.D. (inches)	Nominal Polyurethane Foam Thickness (inches)	FRP Wall Thickness (inches)	FRP Casing O.D. (inches)
2	1-1/2	8-5/8	1	0.100	11.00
3	1-1/2	8-5/8	1	0.100	11.00
4	1-1/2	10-3/4	1	0.100	13.00
6	2	12-3/4	1	0.100	15.00
8	2	16	1	0.100	18.00
10	2	18	1	0.100	20.00
12	2-1/2	20	1	0.100	22.00

* For larger pipes, please consult factory.
* For higher temperatures, please consult factory.

The Filament Winding Operation







Specifications for Insul-Tek® DUAL-CON FRP System

General

All underground heat distribution piping shall be Dual-Con FRP Preinsulated Piping System as manufactured by Insul-Tek® Piping Systems, Inc. All straight lengths of pipe, fittings, anchors, and accessories shall be factory prefabricated by the manufacturer. No field fabrications of fittings, anchors or other accessories will be allowed. The design and layout of the piping system shall be in strict compliance with the latest edition of ANSI B31.1. On-site technical field support will be performed at critical times by a certified field service technician. Critical times include: unloading, field joint instruction, cold springing (if required) and testing of the piping system.

Carrier Pipe

The carrier pipe shall be carbon steel, beveled for welding. Pipe sizes 2" through 10" shall be Schedule 40 A53 Grade B, ERW Steel. Sizes larger than 10" shall be standard wall thickness. Pipe sizes 1-1/2" and smaller shall be A106/A53 seamless type. All joints for pipe 2-1/2" and larger in size shall be butt welded. Sizes 2" and smaller shall be socket welded. Schedule 80 steel pipe will be utilized on all condensate piping in lieu of Schedule 40 steel pipe. Straight lengths of piping will be supplied with 6" of piping exposed at each end for field joint fabrication.

Sub-Assemblies

Gland seals, end seals and anchors shall be designed and factory prefabricated to prevent the ingress of moisture into the piping system. All sub-assemblies shall be designed and manufactured to allow for complete draining, drying and testing of the conduit system.

Insulation

Carrier pipe insulation shall be one of the following types; mineral wool, foamglas, or calcium silicate. (Please specify type desired.) The insulation will be held in place by stainless steel bands on 18" centers. The insulation shall be applied to a thickness of _____. (Please specify thickness.)

Inner Conduit

The inner conduit shall be a smooth wall, spiral welded steel casing of the thickness specified below

Conduit Size	Conduit Thickness
6"-26"	10 Gauge
28"-36"	06 Gauge
38"-42"	04 Gauge

Carrier pipe expansion will be accommodated with oversized casing utilized in conjuction with eccentric and/or concentric fittings, which will allow for continuous draining of the piping system shall it be necessary.

Pipe Supports

All pipe within the inner-conduit shall be supported at not more than 10' intervals. The supports shall be designed to allow for continuous airflow and draining of the conduit system in place. The support shall be the type whereby an insulation material thoroughly isolates the carrier pipe from the inner steel conduit.

Outer Conduit Insulation

The outer conduit insulation shall be spray-applied, void-free polyurethane foam, 1" in thickness. The polyurethane foam shall have a minimum density of 2.2 to 3.0 PCF, shall be 90% to 95% closed cell content per ASTM D-2856, and shall have a "K" factor of .14 per ASTM C-518. A visual inspection of the polyurethane foam insulation shall be completed, prior to the application of the filament wound Fiberglass Reinforced Plastic (FRP) casing. This will ensure that there are no voids in the exterior layer of the polyurethane foam insulation. No poured in place sytems will be allowed.

Outer Casing

The outer casing shall be filament wound Fiberglass Reinforced Plastic (FRP) casing which is filament wound directly on to the spray applied polyurethane foam insulation. No HDPE, PVC or tape type casings will be allowed.

Installation

The installing contractor shall handle the piping system in accordance with the directions furnished by the manufacturer and as approved by the architect and/or engineer. The inner-steel conduit casing shall be air tested at 15 psig. The carrier piping shall be hydrostatically tested to 150 psig or 1-1/2 times the operating pressure, or as specified in the contract documents. The test shall be maintained for a minimum time of 2 hours.

Backfill

A 4" layer of sand or fine gravel shall be tamped in the trench to provide a stable and uniform bedding for the conduit system. Once the conduit system is in place, the trenches shall be carefully backfilled and hand tamped in 6" layers until a cover of at least 24" from the top of the pipe has been achieved. The first 12" of backfill shall be sand or fine gravel less than the 1/2" in diameter. The remainder of the backfill shall be void of rocks, frozen earth and foreign material over 6" in diameter. The trench shall be compacted to comply with H-20 Highway loading.

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