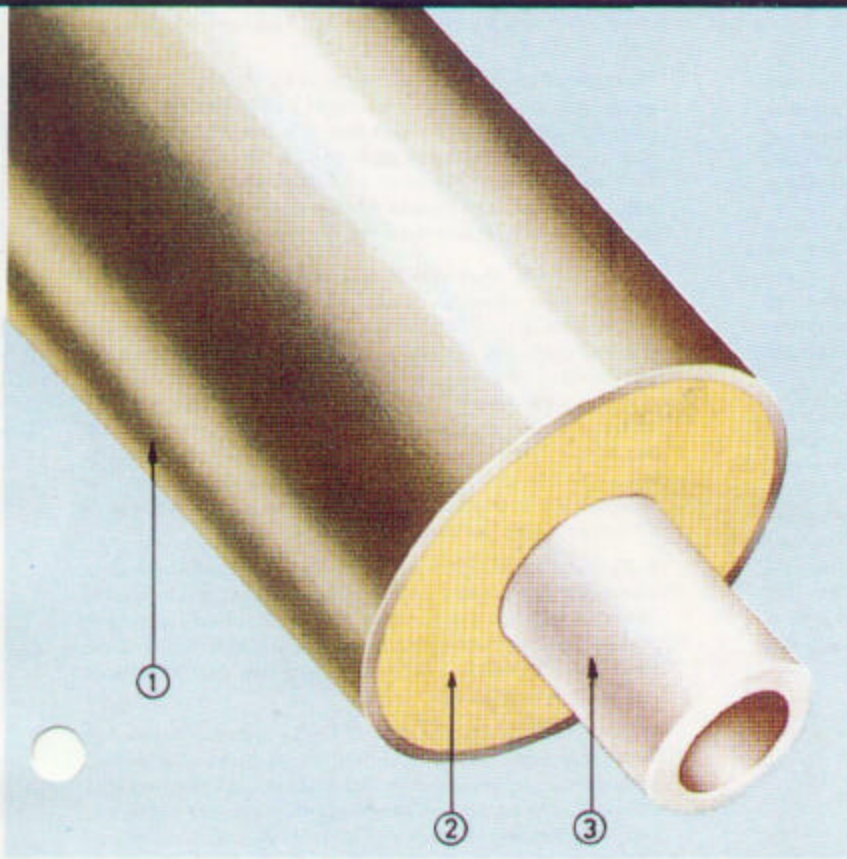




FIBER-GARD

(ADI - FRP) ALTERNATE DIRECTION INTERWOVEN FIBERGLASS REINFORCED PLASTIC JACKET



1. (ADI-FRP) ALTERNATE DIRECTION INTERWOVEN FIBERGLASS REINFORCED PLASTIC JACKET

2. INSULATION, AS SPECIFIED

3. PRESSURE CARRIER PIPE. AS SPECIFIED

Ric-Wil Fiber-Gard prefabricated, insulated piping systems are designed for the under ground distribution of steam.. condensate returns.. chilled water.. hot water.. oil.. and process piping. The non-corrosive Fiber-Gard jacket is constructed of isophthalic polyester resin with filament-wound fiberglass reinforcement. Filament winding is done by machine under tension at a 53° to 55° angle in alternating directions to produce interwoven layers with strength characteristics similar to thin wall steel pipe.

Composition of the filament-wound reinforced plastic is 70% to 75% fiber glass (by weight), the remainder is polyester resin. No fillers are added to the resins. The inner surface of the jacket has a reinforced resin-rich liner consisting of 90% resin and 10% fiberglass reinforcement. The fiber-gard spaced filament winding at specific angles in alternating direction makes possible the manufacture of high strength, large diameter pipe with uniform

It is non-corrosive, light weight (approximately 1/3 the weight of steel); is electrically non-conductive, and provides long lasting, reliable service life.

Polyurethane Foam Insulation completely fills the annular space between the carrier pipe and the outer jacket and has the lowest thermal conductivity of all commercial insulation.

Cell structure provides high resistance to water absorption. In place density (core pcf. 1.9-2.1K Factor, BTU-IN/hr-ft²-°F.0.14 Closed cell content, 90%.

Field joints are made with Ric-Wil supplied full-round ADI-FRP connector bands using a chemical welding procedure (resin/catalyst). Substantial savings are made in material handling costs because of the light weight of FRP jacket (approximately 30% of comparable steel conduit). Shipped in 20' or 39' lengths with odd lengths and accessories as required.

RICWIL®

SPECIFICATIONS

RIC-WIL FIBER-GARD PIPING SYSTEM

(ADI-FRP) ALTERNATE DIRECTION INTERWOVEN FIBERGLASS

REINFORCED PLASTIC

All steam, condensate returns, drip and discharge, chilled water, hot water, oil or process piping to be installed overhead or underground between manholes and buildings, as shown on plans, shall be installed in Ric-Wil FRP Jacketed Insulated Pipe System, with all necessary fittings, anchors expansion loops and accessories, etc. as hereinafter specified. The supplier of the piping system shall have a minimum of _____ years continuous experience in fabricating and supplying preinsulated piping systems for underground high temperature services.

1. CARRIER PIPE - All carrier pipe shall be as hereinafter specified for the service required. All ferrous pipe field joints shall be welded by competent mechanics and hammer tested under hydrostatic pressure of 250 psig or twice the working pressure, whichever is greater, unless other wise specified. Concealed pipe welds in prefabricated pipes or fittings shall be factory tested the same as specified for field welds.

2. PIPE INSULATION - Polyurethane foam insulation completely fills the annular space between the carrier pipe and the outer jacket and has the lowest thermal conductivity of commercial insulation. Cell structure provides high resistance to water absorption. In-place density (core), pcf. 1.9-2.1k Factor, BTU-in/hr-ft²-°F.O.M Closed cell content, 90%.

3. FRP JACKET - The jacket shall be Ric-Wil FRP constructed of isophthalic polyester resin with Filament wound fiberglass reinforcement. The heat distortion point of the isophthalic plastic shall not be less than 245°F at 264 psi (ASTM D-648). The filament Winding shall be done by machine under tension at a 53°-55° angle in alternating directions to produce interwoven layers for maximum strength. The filament-wound reinforced plastic shall contain (by weight) 70%-75% fiberglass; the remainder to be polyester resin. The color shall be natural or clear. No fillers are to be added to the resins. Entire jacket shall be of uniform thickness, watertight and electrically non-conductive. The minimum wall thickness shall be:

JACKET INSIDE DIA	WALL THICKNESS 4",
6", 8"	0.120"
10", 12", 14"	0.140"
16", 18"	0.160"
20", 24", 26"	0.185"

Where the piping is subject to highway loadings, the pipe shall be sleeved in that area or the manufacturer's recommendations for minimum depths of bury shall be followed.

4. FIELD JOINTS- The field closure shall be in a cylindrical form with a single longitudinal split and shall be the same thickness as the pipe. All edges of the closure shall be beveled. The closure shall be chemically welded to the factory applied jacket and at the longitudinal overlap with isophthalic polyester resin. In addition, each circumferential and longitudinal overlap shall be wrapped with multiple layers, minimum 6" wide fiberglass cloth, mat, and isophthalic polyester resin. The overlap shall be the same thickness as the factory applied jacket. The field joints shall be made exactly according to the manufacturer's recommendations and under his direct instructions. The contractors personnel making field joints shall be trained and shall prove their competence by qualifying tests before making and actual closure.

1. EXPANSION LOOPS, ELLS, AND TEES - Prefabricated ells, loops and tees shall be furnished and installed where shown on plans and shall consist of pipe, insulation and FRP jacket conforming to the same specifications as hereinbefore specified for straight runs. All mitre construction of factory prefabricated fittings shall be made with clear or natural colored fiberglass reinforced isophthalic polyester plastic. No pigments are permissible. Expansion loops and expansion joints shall be of proper design in accordance with stress limits indicated by the USA Standard Code for Pressure Piping, Power Piping Section.

6. END SEALS AND GLAND SEALS - Terminal ends of pipes inside manholes, pits, or building walls shall be equipped with end seals welded directly to the pipe providing there is an anchor located within 5 feet. The steel end plate shall have a steel sleeve welded to the periphery of the plate and bonded to the FRP jacket with epoxy cement.

Where there is no anchor within five feet of a terminal end, pipes shall be equipped with gland seals consisting of a packed stuffing box and gland follower mounted on a steel plate. The gland seal plate shall be attached to the FRP jacket in the same manner as an end seal plate. Terminate all pipes 2" beyond the inside face of mainhole or building walls to protect any exposed piping insulation from dampwall condensation. All exposed metal surfaces shall be plastic covered.

7. ANCHORS - Prefabricated plate anchors shall be furnished and installed where shown on plans. Anchor units shall be completely prefabricated by the pipe system supplier. The anchor shall consist of a steel plate welded to the pipe. The exposed steel surfaces shall be coated with fiberglass reinforced isophthalic polyester plastic. The steel plate shall be 3/8" thick for 6" to 10" dia jacket, 1/2" thick for 12" to 22" dia jacket, and 3/4" thick for jacket over 24" dia. A concrete block shall be cast over the plate and pipe and shall be large enough for firm anchorage into undisturbed trench side-walls and/or bottom. The concrete block to be at least 30" in length, and extend a minimum of 9" beyond the top and bottom of anchor plate.

8. BUILDING ENTRIES - If an anchor is located immediately outside a building or manhole wall, the terminal end of the pipe shall be equipped with a plastic coated steel leak plate for direct embedding in the wall. All other pipes shall be installed through a caulked wall sleeve with leak plate. Leak plates are to be 4" in diameter greater than the jacket or wall sleeve outside diameter.

9. FIELD SERVICE INSTRUCTIONS - A manufacturer's field service instructor, who is, and has been for the preceding six months, in the full-time employment of the manufacturer, shall be present at all times during installation (the only exceptions: inner pipe welding and trenching). The field instructor shall be technically qualified to instruct the contractor's personnel in making field joints, as well as determining whether the installation is in accordance with the manufacturer's recommendations.

10. CERTIFICATION - On completion of the installation, the contractor shall deliver to the owner a certificate from the manufacturer stating that the installation has been made in accordance with the manufacturer's recommendations.

11. SHIPMENT - All open ends of the pipes shall be covered with heavy plastic securely attached to the pipe to prevent entry of dust or water.

12. HANDLING - The pipe, shall be handled with fabric or other non-metallic slings. Wire ropes or chains will not be permitted. Handling and placement shall be in strict accordance with the manufacturer's recommendations. At no time and under no conditions shall the pipes be placed on planks, cinder blocks, wood blocks, etc. in the trench. The pipes shall be set on three sandbags per 20' length and leveled to proper grade. Backfill shall be done after all connections and testing are completed as herein specified. Sandbags shall be broken at the proper time to prevent any point loading.

13. BACKFILL - Using select materials, the backfill shall be placed by hand in 6" layers and tamped to a minimum distance of 6" over the top of the pipe. The backfill material shall be compacted to 85-90% density. Do not use frozen fill, sod, cinders, or stones as backfill. Do not compact the backfill with heavy wheeled or tracked equipment. Backfilling of the trench shall be carried on simultaneously on both sides of the pipe in such manner that unequal or unbalanced side pressures do not occur. Heavy machine or traffic crossings shall be protected until the fill has settled to prevent excessive deflection.



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DESIGN AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

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