

PERMA-PIPE® / RICWIL®

Preinsulated Piping Systems

DUAL-GARD D.I.™

*For Underground Chilled Water
and Low Temperature
Hot Water Installations*

- Ductile Iron Service Pipe Provides High Corrosion Resistance for Underground Applications
- Closed-Cell Polyurethane Foam Insulation Offers Low Heat Loss and High Resistance to Water Absorption
- Outer PVC or PE Jacket Protects Insulation and Service Pipe



PERMA-PIPE® / RICWIL®

DUAL-GARD D.I.™ is a factory fabricated, insulated piping system designed for underground chilled, hot or dual temperature water distribution. The system consists of ductile iron service piping with integral, gasketed bell joint, polyurethane foam insulation and a PVC or PE outer jacket.

DUAL-GARD D.I.™ Features Service Pipe

Ductile Iron (D.I.) service pipe is supplied in Class 51 (3" and 4") and Class 50 (6" - 24") with a working pressure of 250 psi, plus a 100 psi surge allowance. The service pipe is cement lined with or without asphaltic sealcoating depending on application/specification to ANSI/AWWA C104/A21.4 standards. The exterior is asphaltic coated. SBR rubber gaskets

are designed for constant operation up to 150°F. EPDM gaskets are available for operating temperatures to 225°F. Pipe is furnished in 18 foot to 20 foot nominal lengths.

Insulation

Rigid closed-cell polyurethane foam insulation completely fills the annular space between the service pipe and the outer jacket, providing low thermal conductivity and high resistance to water absorption. Insulation nominal density is 2 lb/ft³. The coefficient of thermal conductivity (K) is 0.18 BTU-in/hr/ft²/°F at 73°F. Closed-cell content is 90 to 95%.

Jacket

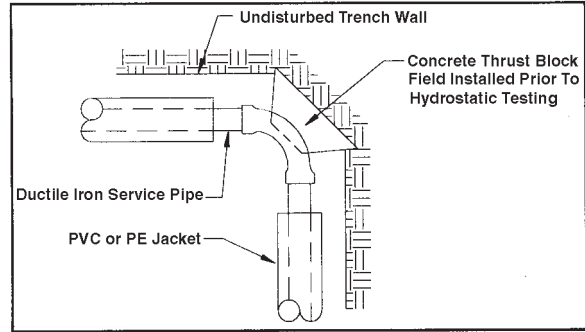
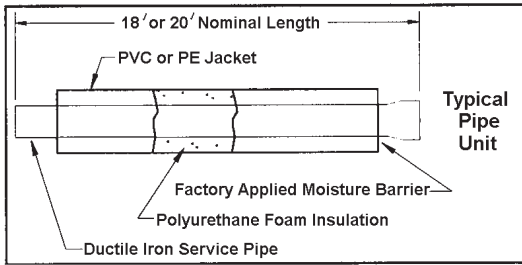
Polyvinyl Chloride (PVC) or polyethylene (PE) plastic outer jacket provides tough, rigid yet flexible protection for

both the insulation and the service pipe. Jackets can withstand H-20 loading with two feet of cover and ends have a factory-applied moisture barrier.

Fittings

Fittings are push joint, mechanical joint or restrained joint and manufactured from ductile iron. Fittings are rated to a minimum of 250 psi (3" - 12") and 150 psi (14" - 24") and meet applicable requirements of ANSI/AWWA C110/A21.10. Push joint and mechanical joint components are in accordance with ANSI/AWWA C110/A21.11. All fittings are cement lined depending on applications/specifications. Exteriors are coated with asphalt. Thrust blocks are required at all changes of direction for push joint and mechanical joint systems.

DUAL-GARD D.I.™ Spec & Data



DUAL -GARD D.I.™ Product Data

Nominal Pipe Size	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
PVC/PE Jacket O.D.	6.14"	8.16"	10.20"	12.24"	14.32"	16.00"	17.83"	19.80"	22.17"	24.92"	28.07"
Jacket Wall Thickness (mills)	70	80	100	120	140	160	200	200	200	225	275
Insulation Thickness	1.0"	1.6"	1.6"	1.5"	1.5"	1.2"	1.1"	1.0"	1.1"	1.4"	0.8"
Heat Gain* at ▲ T 30°F	4.83	4.02	5.43	7.00	8.29	10.93	13.87	16.21	16.23	14.77	25.12
Heat Loss* at ▲ T 150°F	33.26	27.91	37.44	47.92	56.46	73.48	92.12	106.74	107.32	98.66	161.24
Unit Length	18'	18'	18'	18'	18'	18'	18'	18'	18'	18'	18'
Unit Weight	183	250	375	535	710	925	1087	1272	1464	1689	2149

* Gain/Loss expressed in Btu/hr per foot of length

DUAL-GARD D.I.™ Specification

1.0 GENERAL

All underground chilled water or hot water pipe shall be the PERMA-PIPE / RICWIL® DUAL-GARD D.I.™ System composed of integral sealed 18 or 20 foot (nominal) units of cement lined and asphaltic seal coated* ductile iron pipe, insulated with polyurethane foam and covered with a PVC or PE jacket. Unit ends shall be protected with a factory-applied moisture barrier.

* Delete asphaltic seal coat for hot water applications above 150°F.

2.0 BASIC PIPE UNITS

2.1 The service pipe shall be ductile iron, Class 51 (3" and 4"), Class 50 (6" and larger) with bell x spigot push joints conforming to ANSI/AWWA C151/A21.51. The pipe shall be cement lined and asphaltic sealer coated* to ANSI/AWWA C104/A21.4, externally coated with asphaltic coating. The pipe shall be suitable for use at a maximum working pressure of 250 psig (plus 100 psi surge allowance) and maximum temperature of 150°F (SBR gasket) or 225°F (EPDM gasket).

* Delete asphaltic seal coat for hot water applications above 150°F.

2.2 The insulation shall be polyurethane foam completely filling the annular space between the service pipe and the outer protective jacket. The insulation will be rigid 90 to 95% closed-cell polyurethane foam with a nominal density of 2 lb/ft³ and a coefficient of thermal conductivity

(K) of 0.18 Btu-in/hr/ft²/°F at 73°F. Insulation thickness shall be in accordance with the table above.

2.3 The ends of the insulation shall be sealed with a moisture barrier.

2.4 The jacket shall be PVC for service pipes 12 inches and smaller and PE for pipes 14 inches and larger.

2.5 PVC – The jacket shall be seamless PVC, cell class 12454-B (formerly Type 1, Grade 1) per ASTM D1784. Jacket wall thickness shall be in accordance with the table above.

2.6 PE – The jacket shall be seamless PE per ASTM D1248 and D3350. Jacket wall thickness shall be in accordance with the table above.

3.0 JOINT FITTINGS

3.1 Units shall be joined with integral bell and spigot push joints with gaskets to accommodate expansion and/or contraction.

3.2 Fittings are uninsulated and shall be either push joint, mechanical joint or restrained joint and manufactured from ductile iron. Fittings are pressure rated in accordance with ANSI/AWWA 110/A21.10.

4.0 INSTALLATION

4.1 All pipe and fittings shall be installed in accordance with the manufacturer's recommendations. All steel pipe adjoining this system shall be anchored at or near the point of connection.

4.2 Immediately after the system is installed in the trench, a partial backfill shall be made in the middle of each unit leaving the joints exposed for inspection prior to the hydrostatic tests. The initial backfill is to be 12 inches of select materials, hand placed and tamped in 6 inch layers above the jacket. Do not use frozen fill, sod, cinders or stones greater than ¼ inch as backfill.

4.3 The contractor shall pour concrete thrust blocks at every change of direction or pipe size change prior to testing the pipe. Size the block according to the engineer's design.

4.4 After all thrust blocks are poured and cured, a hydrostatic test of 1½ times the operating pressure shall be required for a period of four hours or as directed by the engineer's design.

4.5 After hydrostatic testing, backfill all remaining exposed pipe as instructed in 3.2. Final backfill of selected earth shall be hand-placed and tamped in 12 inch layers over the top of the initial backfill. The backfill shall be free of rocks over ½ inch in diameter, frozen earth or foreign matter. Complete backfill operation by any convenient means. Do not use wheeled or tracked vehicles for tamping.

PERMA-PIPE®

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