

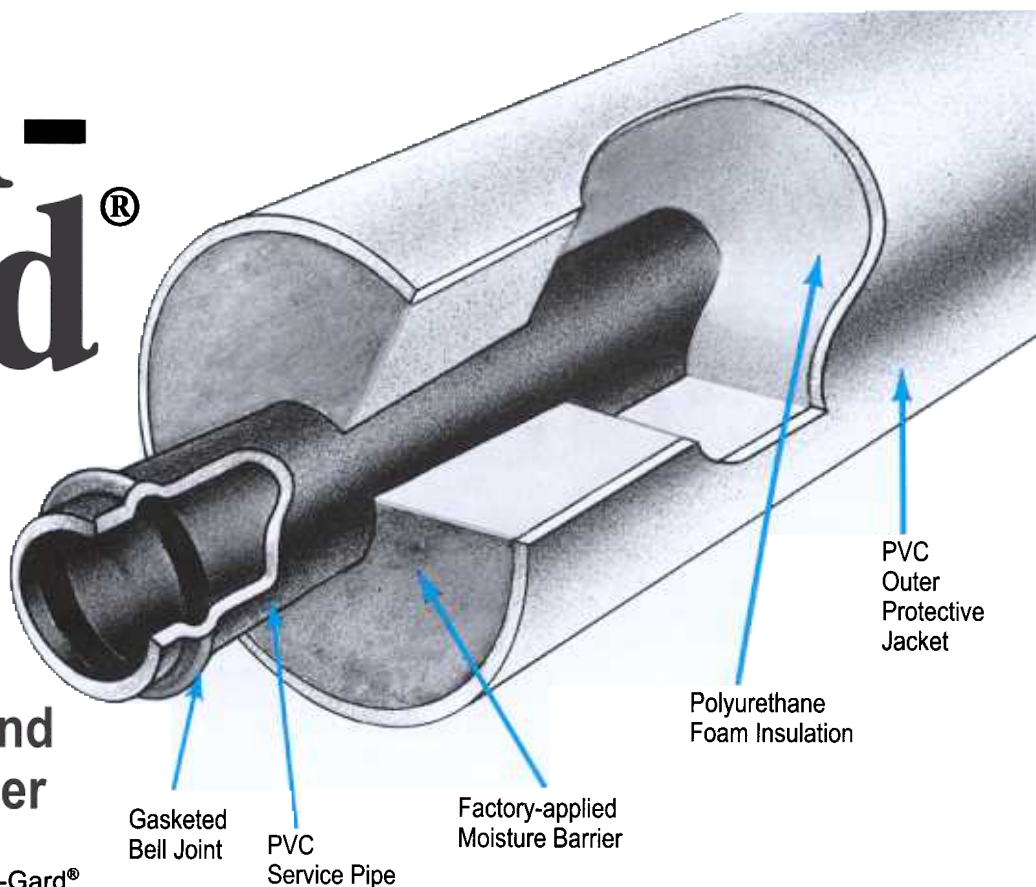
PERMA-PIPE / RICWIL®

Preinsulated Piping Systems

LOW TEMPERATURE SYSTEMS – BELOW 100°F.

Chil-Gard®

Preinsulated PVC Piping System for the Underground Distribution of Chilled Water and Condenser Water



Product Description:

PERMA-PIPE®/RICWIL® Chil-Gard® is a completely preinsulated system designed for underground chilled water distribution. Installation costs can be accurately established in advance. All components used are made of the same basic materials offering considerable savings in heat gain because of the combined insulation efficiency.

PVC Service Pipe:

Gasketed bell joint construction accommodates pipe movement and eliminates expansion and contraction stresses within the system. No additional expansion devices are needed. PVC pipe will not rot, rust or corrode and is impervious to electrolic environments. Glassy, smooth, inner walls cut pressure losses by nearly 50%. PVC pipe has a flow coefficient of $C = 150$ as compared to new steel pipe with $C = 130$. "New Pipe" interior is maintained for the life of this pipe. Bell and spigot connections eliminate waiting time necessary for a chemically

welded joint. Pressure can be applied immediately after joints are made and piping is properly anchored. Pipe is designed for use at maximum hydrostatic working pressure of 160 psi at 73°F (Class 160) and 200 psi at 73°F (Class 200). PVC pressure pipe is in accordance with ASTM D-2241.

Polyurethane Foam Insulation:

Polyurethane foam insulation completely fills the annular space between the service pipe and the outer jacket and has the lowest thermal conductivity of all commercial insulation 0.16 Btu-in/hr-ft²-°F. The insulation shall be a nominal 2.0 lb/ft³ density and 90% closed cell structure, providing a high resistance to water absorption.

PVC Outer Jacket:

Polyvinyl chloride plastic outer jacket provides tough, rigid, yet flexible protection for both the insulation and inner service pipe. The PVC jacket's

corrosion-resistant composition makes it immune to galvanic or electrolytic attack. Unaffected by most chemicals, it will not oxidize. It also has adequate load-bearing strength to withstand H-20 loading with two feet of properly compacted cover. Used as an outer jacket, PVC increases the efficiency of an insulated piping system. To complete the vapor barrier provided by the PVC jacket, each end of each unit is sealed against moisture by means of a factory applied moisture barrier coating.

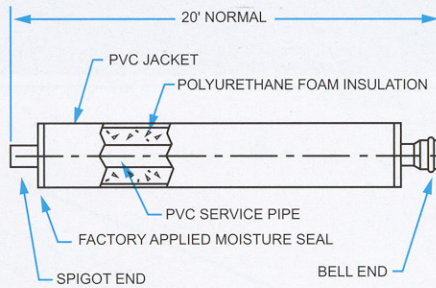
Fittings:

Straight lengths and fittings are joined with integral bell and spigot joints, including a rubber sealing ring. Steel pipe connections at a building and/or manhole area are easily accomplished by inserting beveled steel pipe into a PVC bell, or by flanged connections. When Chil-Gard® units terminate with a spigot end, double belled couplings are available for making connections.

Standard Sizes*

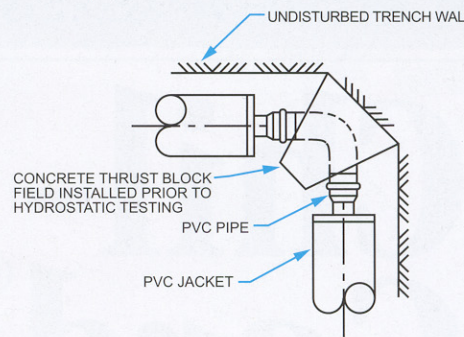
Pipe Size	Jacket Size	Insulation Thickness	Class 160 Weight Per Unit	Class 200 Weight Per Unit
1½"	4"	1.24	40#	40#
2"	5"	1.48	40#	42#
2½"	6"	1.56	45#	45#
3"	6"	1.25	60#	64#
4"	8"	1.75	83#	87#
6"	10"	1.69	140#	155#
8"	12"	1.69	200#	225#
10"	14"	1.65	280#	320#
12"	16"	1.47	360#	415#

Typical Unit



EASY FIELD INSTALLATION

For complete instructions see installation manual



*Other sizes and combinations available on request

PERMA-PIPE® / RICWIL® CHIL-GARD – GUIDE SPECIFICATION

1.0 GENERAL

1.1 Underground chilled water supply and return shall be a PERMA-PIPE®/RICWIL® Chil-Gard® system composed of integral sealed units of PVC outer jacket, PVC service pipe and insulated with polyurethane foam, completely filling the annular space between the pipe and jacket. Jacket ends shall be protected with a factory applied moisture barrier (Heat shrink end caps are available as an optional extra.)

2.0 MATERIALS

2.1 Pipe shall be PVC (Class 160 or Class 200) in accordance with ASTM D-2241.

2.2 Insulation shall be a rigid 90% to 95% closed cell polyurethane with a nominal 2.0 lb/ft³ density and a coefficient of thermal conductivity (K) .16 Btu-in/hr-ft².

2.3 Jacket shall be ASTM 1784 Polyvinyl Chloride (PVC) with a minimum wall thickness of .060 inches.

3.0 JOINTS

3.1 Units and fittings shall be joined with integral bell and spigot joints, including a rubber sealing ring.

4.0 INSTALLATION AND TESTING

4.1 All steel pipe adjoining this system shall be anchored at, or near the point of connection. Connection between PVC

and steel pipe shall be made by inserting steel pipe into PVC bell end or by flanged connections. The installer shall pour concrete thrust blocks at every change of direction prior to testing pipe. The block size to be in accordance with normal water line installation for the existing soil conditions and with the engineer's approval.

4.2 Immediately after the system is installed in the ditch, a partial backfill shall be made in the middle of each unit leaving the joints exposed for inspection prior to the hydrostatic test of ___psig shall be required for a period of four hours.

Note: Air or gas is not recommended for pressure testing of plastic lines (PVC). Water should be used as the test medium and all air should be removed.

4.3 After hydrostatic testing, final backfill of selected earth shall be hand-placed and hand-tamped to 12" minimum over the top of the jacket. Remainder of the backfill shall be free of large boulders, rocks over 6" in diameter, frozen earth or foreign matter. The backfill operation shall now be completed. Do not use wheeled or tracked vehicles for tamping.

Thrust Blocking: Chil-Gard® is a rubber ring jointing system. Thrust blocks are used to resist movement in the pipeline by

transferring the pressure thrust to solid (undisturbed) soil. For this reason, the bearing capacity (pounds per square foot) of the soil is very important.

Thrust blocks are required at changes in direction (tees and bends, vertical and horizontal)... change in size (reducers, etc.)... dead ends (plugs or valves)... valves (opening and closing)... and slopes (line tends to shift due to surges in line and gravitational force).

The installer will pour concrete thrust blocks prior to testing, at every change in direction. The block size to be in accordance with normal water line installation for the existing soil conditions and the engineer's approval.

Note: While PVC pipes provide excellent service for chilled water systems, the installation and operation of the system must be controlled. The installer must take precautions against damaging the pipe during handling, joining and backfilling. The system must be completely restrained before testing or operation. Finally, the user must insure that flow velocities are kept below 5 ft/sec. and that water hammer is not caused by sudden starting or stopping of the flow.

PERMA-PIPE®

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