



CHILL-THERM

Specification Guide

CTSG
5.101

STANDARD SPECIFICATION

2.03.2021

Pre-insulated PVC Piping Systems suitable for Chilled Water, Potable Water, and Low Temperature Process Fluids.

Part 1 – Products

1.1 Pre-insulated Piping - Furnish a complete system of factory pre-insulated PVC piping for the specified service. All pre-insulated pipe, fittings, insulating materials, and technical support shall be provided by the Pre-insulated Piping System manufacturer.

1.2 The system shall be **CHILL-THERM** manufactured by **Thermacor Process Inc.** of Fort Worth, Texas.

Part 2 – Products

2.1 Carrier pipe shall be PVC, SDR-26, Class 160, bell and spigot, gasket joint pipe conforming to ASTM D-2241 and D-1784. PVC resin compound shall be PVC-1120, Class Designation 12454-B. Pipe is rated for 160 psi at 73°F. (*At the Engineer's option*, SDR-21, Class 200 PVC, having a pressure rating of 200 psi at 73°F, C900 or C905 DR rated pipe, or Schedule 40 or Schedule 80 PVC or CPVC, may be specified.) Pre-insulated pipe sections shall be insulated from the bell end to just short of the spigot insertion stop mark.

2.2 Insulation shall be polyurethane foam either spray applied or injected with one shot into the annular space between carrier pipe and jacket, and shall be bonded to both. Insulation shall be rigid, minimum 90% closed cell polyurethane with a minimum 2.0 lbs per cubic foot density, compressive strength of 30 psi @ 75°F, and coefficient of thermal conductivity (K-Factor) of not higher than 0.18 @ 75°F per ASTM C-518. Maximum operating temperature of urethane shall not exceed 250°F. Insulation thickness shall be specified by calling out appropriate carrier pipe and jacket size combinations as listed on drawing CTSG 5.103 and CTSG 5.104.

2.3 Jacketing material shall be extruded, black, high density polyethylene (HDPE), having a minimum wall thickness of 100 mils for jacket sizes less than or equal to 12", 125 mils for jacket sizes 12" to 24", and 150 mils for jacket sizes larger than 20". No tape jacket allowed. The inner surface of the HDPE jacket shall be oxidized by means of corona treatment, flame treatment (patent pending), or other approved methods. This will ensure a secure bond between the jacket and foam insulation preventing any ingress of water at the jacket/ foam interface.

2.4 Straight Run Joints are not insulated to allow for expansion and contraction of the gasketed joint. At the Engineer's option, straight field joints may be covered with an HDPE split sleeve and sealed with heat shrink tape to prevent the ingress of moisture or debris.

2.5 Fittings shall be PVC with a gasket joint similar to that of the PVC pipe. Cast or Ductile iron fittings conforming to the pipe dimensions may be used for sizes greater than 12". Fittings are not insulated and are poured in concrete thrust blocks at all changes of direction. *Thrust block design and sizing is the responsibility of the design engineer.*

Part 3 – Execution

3.1 Underground systems shall be buried in a trench of not less than two feet deeper than the top of the pipe and not less than eighteen inches wider than the combined O.D. of all piping systems. A minimum thickness of 24 inches of compacted backfill over the top of the pipe will meet H-20 highway loading.

3.2 Trench bottom shall have a minimum of 6" of sand, as approved by the engineer, as a cushion for the piping. All field cutting of the pipe shall be performed in accordance with the manufacturer's installation instructions. At least the center 75% of each section of pre-insulated pipe shall be covered (approximately one foot of cover per 100 psi of test pressure) with select backfill material and all fittings shall be suitably thrust blocked before attempting any pressure tests of the system.

(Continued)



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CTSG

5.102

STANDARD SPECIFICATION

2.03.2021

3.3 A hydrostatic pressure test of the carrier pipe shall be performed per the engineer's specification with a factory recommendation of one and one-half times the normal system operating pressure for not less than two hours. Care shall be taken to insure all trapped air is removed from the system prior to the test. *Appropriate safety precautions shall be taken to guard against possible injury to personnel in the event of a failure.*

3.4 Field service, if required by project specifications, will be provided by a certified manufacturer's representative or company field service technician. The technician will be available at the job to check unloading, storing, and handling of pipe, joint installation, pressure testing, and backfilling techniques. This service will be added into the cost as part of the project technical services required by the pre-insulated pipe manufacturer.

Carrier Pipe:

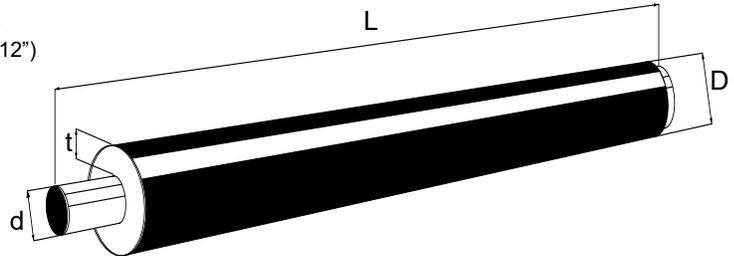
- PVC Class 160 (SDR 26) Bell and Spigot, Gasketed (2" - 12")
- PVC Class 200 (SDR 21) Bell and Spigot, Gasketed (1 1/2" - 12")
- PVC or CPVC, Schedule 40 or 80 (1/2" - 12")

Jacketing Material:

High Density Polyethylene (HDPE)

Insulation:

Polyurethane Foam



Pipe Size	Jacket Size	Standard Length L	Insulation Thickness t	External Diameter D	Weight Per Foot (lbs.)
1/2"	5.4"	20'	2.18"	5.40"	.98
3/4"	5.4"	20'	2.08"	5.40"	1.20
1"	5.4"	20'	1.94"	5.40"	1.45
1-1/4"	5.4"	20'	1.77"	5.40"	1.52
1-1/2"	5.4"	20'	1.65"	5.40"	1.66
2"	5.4"	20'	1.41"	5.40"	2.06
2-1/2"	6.7"	20'	1.80"	6.68"	2.22
3"	6.7"	20'	1.49"	6.68"	2.46
4"	8.7"	20'	1.99"	8.68"	4.01
6"	10.9"	20'	2.01"	10.85"	6.95
8"	12.9"	20'	1.99"	12.85"	10.30
10"	14.1"	20'	1.56"	14.12"	15.31
12"	16.1"	20'	1.57"	16.14"	19.50

* Other pipe and jacket size combinations are available.

** Insulation thickness is calculated using minimum wall thickness. Actual wall thickness may be greater than stated, thereby minimally decreasing actual foam thickness.



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5.104

POLYURETHANE FOAM IN HDPE JACKET

2.03.2021

Carrier Pipe:

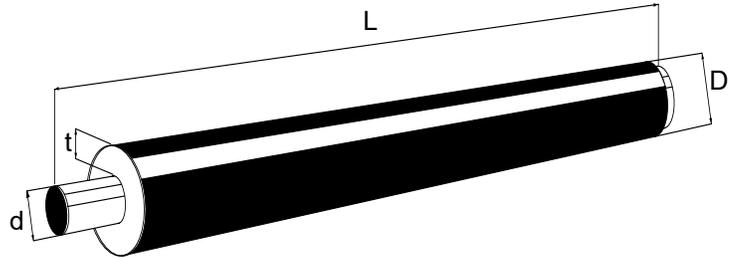
- C900 DR 18 (4" - 12")
- C905 DR 25 (14" - 24")

Jacketing Material:

High Density Polyethylene (HDPE)

Insulation:

Polyurethane Foam

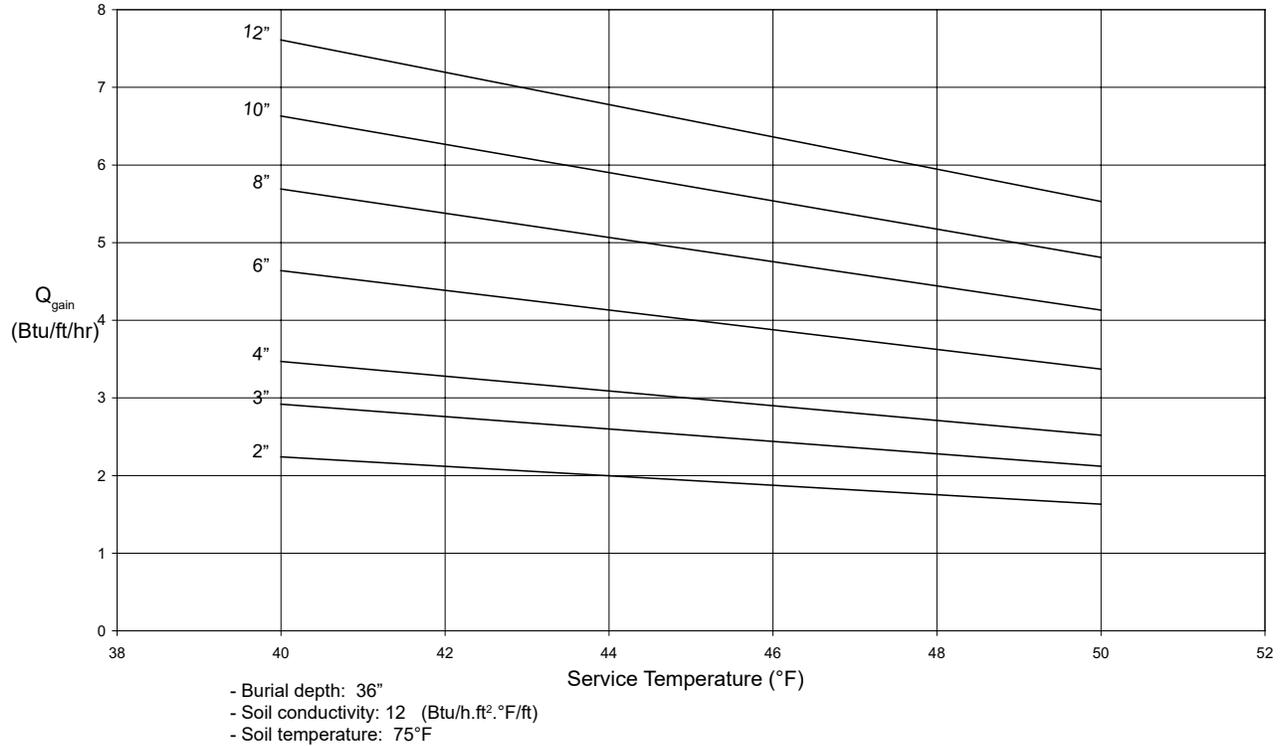


Pipe Size	Jacket Size	Standard Length L	Insulation Thickness t	External Diameter D	Weight Per Foot (lbs.)
4"	8.7"	20'	1.81"	8.68"	5.21
6"	10.9"	20'	1.84"	10.85"	9.04
8"	12.9"	20'	1.74"	12.85"	13.44
10"	14.1"	20'	1.35"	14.13"	18.82
12"	16.1"	20'	1.31"	16.14"	25.80
14"	18.2"	20'	1.30"	18.23"	26.84
16"	20.3"	20'	1.22"	20.28"	34.73
18"	22.3"	20'	1.15"	22.25"	42.12
20"	24.4"	20'	1.17"	24.38"	50.54
24"	28.3"	20'	1.00"	28.25"	70.28

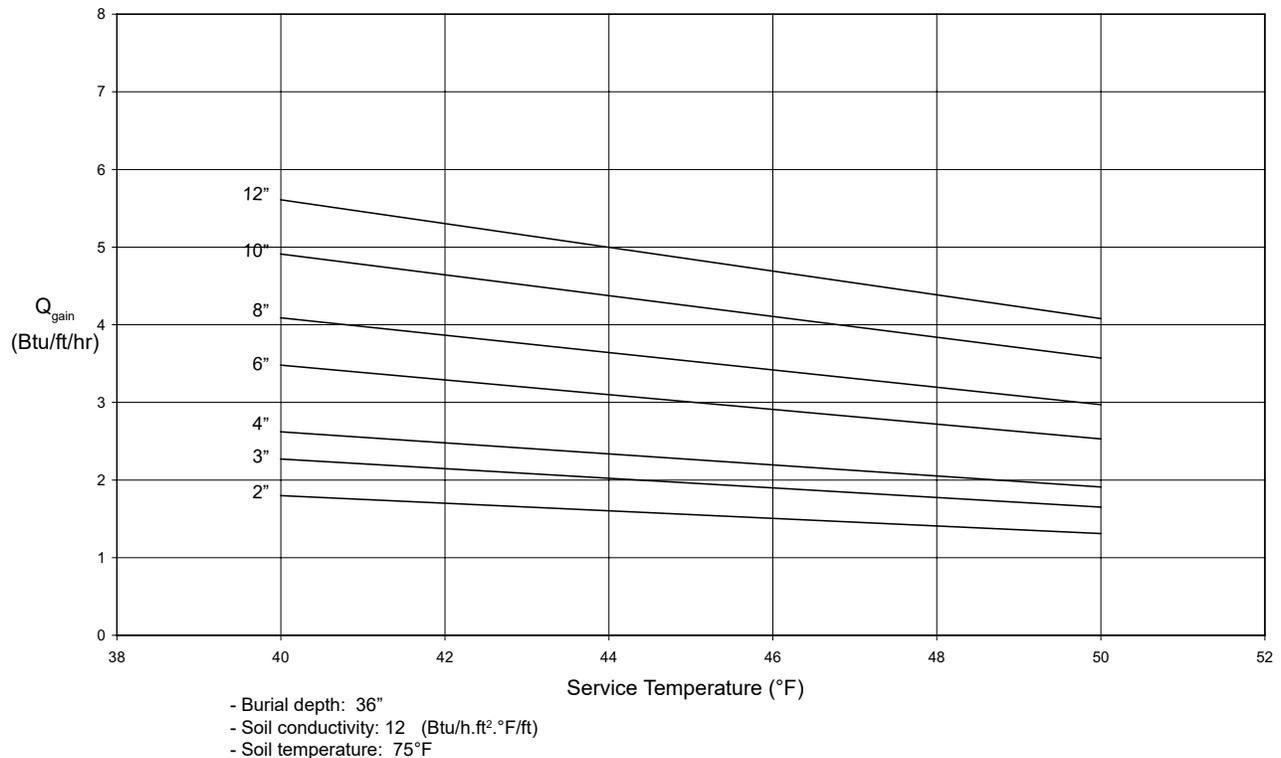
* Other pipe and jacket size combinations are available.

** Insulation thickness is calculated using minimum wall thickness. Actual wall thickness may be greater than stated, thereby minimally decreasing actual foam thickness.

HEAT GAIN FOR 2" OF POLYURETHANE FOAM*



HEAT GAIN FOR 3" OF POLYURETHANE FOAM*



* Values are calculated using 3E Plus in accordance with ASTM C680 and are subject to the terms and limitations stated in the software. Actual heat gain may vary.