

# XTRU-THERM

## Guide Specification

### GENERAL

All underground and aboveground chilled water, condensate return, and hot water lines with design temperatures up to 250°F shall be XTRU-THERM as manufactured by PERMA-PIPE. All straight sections, fittings, anchors and other accessories shall be factory fabricated, insulated, and jacketed. The piping system layout shall be analyzed by the piping system manufacturer to determine the stresses and displacements of the service pipe. The piping system design and manufacture shall be in strict conformance with ASME B31.1, latest edition. Installation of the piping system shall be in accordance with the manufacturer's instructions. Factory trained field technical assistance shall be provided for critical periods of installation, unloading, field joint instruction and testing.

### SERVICE PIPE\*

The service pipe shall be standard weight ASTM A53 Gr. B ERW carbon steel, except for condensate return lines, which shall be Schedule 80. All joints shall be butt-welded for 2 1/2" and larger, and socket or butt-welded for 2" and smaller. Where possible, straight sections shall be supplied in 40-foot random lengths with piping exposed at each end for field joint fabrication.

\*For alternate service pipe selections, contact PERMA-PIPE for specification details.

### ACCESSORIES

Elbows, tees, reducers, anchors, field joints, and end seals shall be designed and factory fabricated to prevent the ingress of moisture into the system.

### INSULATION

The service pipe insulation shall be polyurethane foam with 2.0 Lbs./Ft.<sup>2</sup> minimum density, 90% minimum closed cell content and initial thermal conductivity of 0.16 Btu in./Hr. FT<sup>2</sup> °F. The insulation shall completely fill the annular space between the service pipe and jacket and shall be bonded to both. Systems using open cell insulation or a non-bonded design shall not be allowed. The insulation shall be provided to the minimum thickness specified below:

Pipe Size (in.)	Minimum Insulation Thickness (in.)	
	Chilled Water	Hot Water
1 to 8	1	1
10 to 12	1	1 ½

14 to 36	1 ½	2
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## INSULATION JACKET

The outer protective insulation jacket shall be seamless high-density polyethylene (HDPE) in accordance with ASTM D1248, type 3, Class C. PVC or tape materials are not allowed. The minimum thickness of the HDPE jacket shall be as follows:

Jacket OD (in.)	Minimum Jacket Thickness (in.)
OD ≤ 12	0.125
12 < OD ≤ 24	0.150
OD > 24	0.175

## FITTINGS

All fittings shall be factory prefabricated and pre-insulated. Straight tangent lengths shall be added to all ends so that all field joints are at straight sections of pipe. Elbow jackets shall be molded HDPE. Tee jackets shall be extrusion welded or butt fusion welded HDPE. Gluing, taping or hot air welding shall not be allowed.

## FIELD JOINTS

The service pipe shall be hydrostatically tested to 150 psig or 1 1/2 times the design pressures whichever is greater. Insulation shall then be poured in place into the field joint area. All field-applied insulation shall be placed only in straight sections of pipe. Field insulation of fittings is not acceptable. The installer shall seal the field joint area with a heat shrinkable adhesive backed sleeve. Backfilling shall not begin until the heat shrink sleeve has cooled. All insulation and jacketing materials for the field joint shall be furnished by PERMA-PIPE.

## BACKFILL

A 4-inch layer of sand or fine gravel shall be placed and tamped in the trench to provide a uniform bedding for the pipe. The entire trench width shall be evenly backfilled with a similar material as ~~the bedding in 6 inch compacted layers to a minimum height of 6 inches above the top of the~~ insulated pipe. The remaining trench shall be evenly and continuously backfilled and compacted ~~in uniform layers with suitable excavated soil.~~

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