

SPECIFICATION GUIDE *

GENERAL

All underground and above ground piping materials transporting chill water, hot water, low-pressure steam (250° F) or condensate shall be **FERRO-THERM PTS** as manufactured by **THERMACOR PROCESS INC.** All straight pipe, fittings, anchors, and other components shall be factory-fabricated and pre-insulated. No field insulation of fittings shall be allowed. All piping connections shall incorporate Pressure Testable closures to create a seamless pressure testable jacket throughout the entire system. No PVC, FRP, or tape allowed, with the exception of anchors, whose water shed ring is sealed with a Raychem Dirax or Canusa GTS-65 wrap prohibiting the ingress of water.

SERVICE PIPE

The carrier or service pipe shall be A-53, Grade B, ERW, Standard Weight for pipe sizes 2" and larger and A106/A53, Grade B, seamless, standard weight for pipe sizes 1-1/2" and smaller. Condensate piping materials shall be extra strong. Pipe shall be butt-welded for sizes 2" and larger and socket-welded for 1-1/2" and smaller. Straight sections shall be supplied in 20 or 40 foot random lengths with cutbacks to allow for welding at the field joints.

INSULATION

Insulation of the service pipe shall be rigid polyurethane foam with a minimum 2.0 lbs/ft³ density, 90% minimum closed cell content, and a "K" factor not higher than .14 at 75°F per ASTM C518. The polyurethane foam shall be CFC-free. The polyurethane foam shall completely fill the annular space between the service pipe and jacket, and shall be bonded to both. Insulation shall be provided to the minimum thickness specified below:

Pipe Size	Minimum Insulation Thickness
1" to 12"	1.5"
14" to 36"	2"

JACKET

The outer protective jacket shall be High Density Polyethylene (HDPE) compatible with ASTM D-3350. The HDPE jacket shall be seamless and pressure-tested for watertight integrity. PVC, FRP, HDUP, or tape materials are not allowed.

FITTINGS

All straight sections, fittings, anchors, and other components shall be factory-fabricated and pre-insulated, and manufactured in accordance with ANSI B31.1. Fitting covers shall be molded HDPE, extrusion welded, or butt-fusion welded. No gluing, taping, or hot air welding of the jacket allowed. Tangent footage shall be added to all pipe ends up to 24" pipe, so that all field joints are at straight sections of pipe. No field insulation of fittings allowed.

FIELD JOINTS

Service pipe shall be hydrostatically tested as per the Engineer's specification with a factory recommendation of 1-1/2 times the specified pressure of the system. Straight joint sections shall be closed with a pressure testable joint closure, either an electro-fused split sleeve HDPE joint closure, Canusa SuperCase, or Raychem RayJoint. The joints will be field tested at 5 psi for up to 5 minutes while simultaneously soap testing the joint closure's seams for possible leaks. All joint closures and insulation shall occur at straight sections of pipe. No field insulation of fittings allowed. All insulation and jacketing materials shall be furnished by THERMACOR.

INSTALLATION

Installation of the piping system shall be in accordance with the manufacturer's instructions. Factory trained field technicians shall be provided for critical periods of installation, unloading, field joint instruction and testing.

* For alternate specifications, please contact THERMACOR.

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FERRO-THERM PRESSURE TESTABLE

WITH PRESSURE TESTABLE CLOSURES



FERRO-THERM PRESSURE TESTABLE

THERMACOR'S FERRO-THERM PRESSURE TESTABLE SYSTEM, or "PTS", is a factory-fabricated, pre-insulated piping system that incorporates pressure testable components for the highest level of insulation protection. The system is ideal for below or above ground distribution of hot and chill water, low pressure steam, condensate, or oil and viscous fluids. The system is designed with a steel carrier pipe (type and grade specified, as required), polyurethane foam insulation, and a High Density Polyethylene (HDPE) jacket.

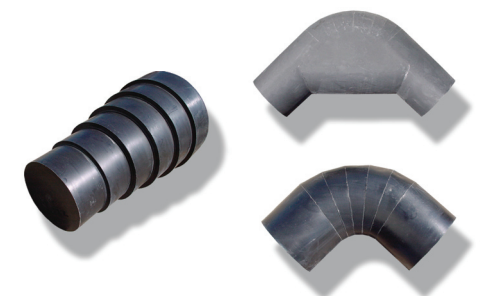
PRESSURE TESTABLE SYSTEMS

Insure the watertight integrity of the pre-insulated piping system with pressure testable joint closures. The insulation jacketing is tested with 5 psi resulting in a joint closure that is as mechanically strong as the HDPE jacket itself.



FITTING COVERS

Molded or mitered HDPE fitting covers, incorporating electro-fusion, butt-fusion, or extrusion welding, combine to create a seamless pressure testable jacket throughout the entire system.



THERMACOR'S FERRO-THERM PTS expands on the solid and economical tradition of our FERRO-THERM HDPE product by providing the highest quality, most economic, pre-insulated pipe available.

FERRO-THERM PTS utilizes the latest in pre-insulated piping technology to test the watertight integrity of the protective jacket. All jacketing connections and components incorporate electro-fusion, butt-fusion, or extrusion welding to create a seamless pressure testable jacket throughout the entire system. PRESSURE TESTABLE SYSTEMS are the only way to test, and thereby ensure, that the system will not take on water.

SEAMLESS HDPE JACKET

High Density Polyethylene (HDPE) has proven to be the most reliable and structurally strong material available as standard jacketing material. The definitive standard in the European piping market, HDPE is emerging as the benchmark for jacketing material in the United States and International markets. Over 90% of all pre-insulated piping systems in the world for below ground applications use HDPE jacket for protecting the insulation from moisture.

Thermacor's process yields a tough, fracture resistant, non-corrosive, seamless, HDPE jacket that provides the maximum in insulation protection. The inherent qualities of HDPE compliment its flexibility and

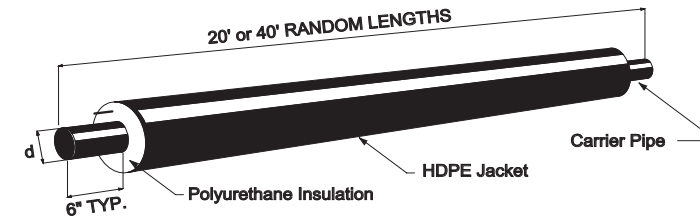
structural strength, guarding against cracking, star-crazing and other damage often caused by shipping and installation. HDPE is ideal for above and below ground applications and will insure the long life of the insulating system. Below ground, HDPE is non-corrosive and therefore no cathodic protection or special coatings are required. Above ground, HDPE contains carbon black, a natural ultra-violet (UV) inhibitor, and is therefore ideal.

POLYURETHANE INSULATION

FERRO-THERM PTS utilizes closed cell polyurethane foam with a K factor of 0.14 @ 75°F, providing excellent thermal efficiency for temperatures ranging from -300°F to 250°F. In contrast to open cell foam, closed cell foam is inherently resistant to the ingress and spread of water by virtue of its molecular structure which closes the pathway between adjacent foam cells. This is an imperative quality for the long life of any insulated system because water will not only destroy the thermal efficiency of the insulation, but over time, degrade the carrier pipe and insulation as well.

ENGINEERING

THERMACOR'S Engineering Department can assist in any stress or heat-loss calculations. They can also provide assistance in sizing expansion compensation, anchor placement, and recommendations for any other components that could aid in system design. BTU savings can also be provided.



Carrier Pipe

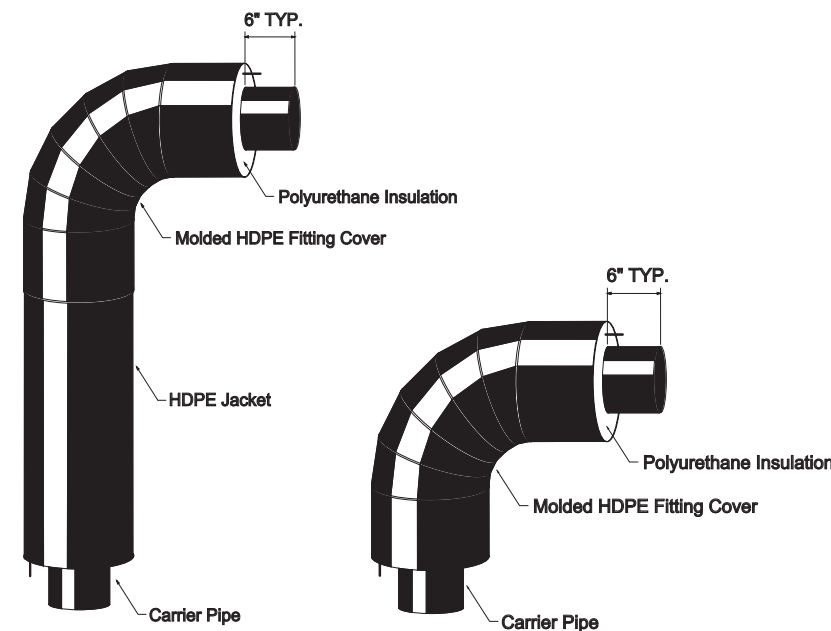
- d ≥ 2" - A53 ERW Grade B, Std. Wt. Black Steel
- d < 2" - A106 SML, Std. Wt. Black Steel
- Seamless & Schedule 80 pipe are available for all sizes.
- Std. Wt. is the same as Schedule 40 through 10".
- XS is the same as Schedule 80 through 8"

HDPE Jacket

- Compatible with ASTM D3350
- Specific Gravity (ASTM D792) 0.941 min.
- Tensile Strength (ASTM D638) 3100 psi min.
- Elongation Ultimate (ASTM D638) 400% min.
- Compressive Strength (ASTM D695) 2700 psi min.
- Impact Strength (ASTM D256) 2.0 Ft. Lb./in. North Min.
- Rockwell Hardness (ASTM D785) D60 (Shore) min.

Polyurethane Insulation

- Density > 2.0 lbs/ft³
- "K" Factor ≤ 0.14
- Compressive Strength > 30 psi
- Closed Cell Content ≥ 90%



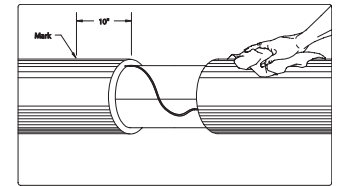
90° Pre-fab Elbow w/
Molded HDPE Fitting
Cover

90° SC Elbow w/ Mold-
ed HDPE Fitting
Cover

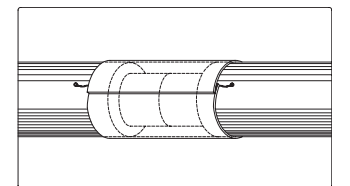
Field Joint Closure

Electro-fused Split Sleeve HDPE joint Closure Shown

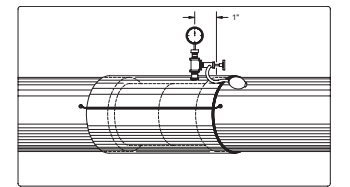
Step 1
Clean HDPE Jacket and connect ERM Wire



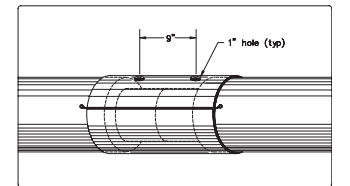
Step 2
Wrap pressure testable joint around field joint and fuse.



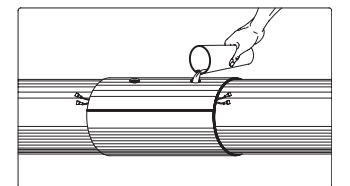
Step 3
Pressure test joint.



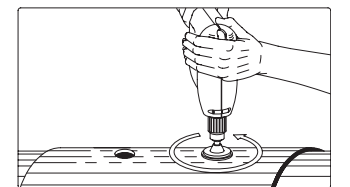
Step 4
Drill two 1" holes.



Step 5
Pour foam insulation



Step 6
Seal holes



Refer to pressure testable joint closure instructions for more detailed information.