



FERRO-THERM PTS

Specification Guide

FPSG
7.107

PRESSURE TESTABLE CLOSURE SPECIFICATION

3.04.08

Pre-insulated HDPE-Jacketed Steel Piping Systems suitable for Chilled Water, Heating Water, Domestic Hot Water, Process Fluids, Low Pressure Steam (15 PSIG Max.), Condensate Return, and Cryogenic services.

Part 1 - General

1.1 Pre-insulated Piping - Furnish a complete HDPE jacketed system of factory pre-insulated steel piping for the specified service. The jacket throughout the entire system shall incorporate electric fusion, butt fusion, or extrusion welding at all fittings, joint closures, or other points of connection. This shall create a jacket that is seamless throughout the entire system with the exception of anchors, whose water shed rings are sealed with a Raychem Dirax or Canusa GTS-65 wrap prohibiting the ingress of water. All pre-insulated pipe, fittings, insulating materials, and technical support shall be provided by the Pre-insulated Piping System manufacturer.

1.2 A complete layout of the system, showing anchors, expansion provisions, and building entrance details, shall be provided by the pre-insulated pipe manufacturer. Means for expansion must be made in pipe off-sets or loops.

1.3 The system shall be **FERRO-THERM PTS** as manufactured by **Thermacor Process Inc.** of Fort Worth, Texas.

Part 2 - Products

2.1 Carrier pipe shall be steel ASTM A-53, Grade B., ERW (Type E) or seamless (Type S), standard weight for sizes 2" and larger, and shall be ASTM A-106/ A-53, seamless, standard weight for sizes 1-1/2" and smaller (Std. Wt. is the same as Sch. 40 through 10"). Condensate return piping shall be Extra Strong (XS is the same as Sch. 80 through 8"). When practical, piping shall be provided in 40-foot double-random lengths. All carbon steel pipe shall have ends cut square and beveled for butt-welding. Straight sections of factory insulated pipe shall have 6" of exposed pipe at each end for field joint fabrication.

2.2 Insulation shall be polyurethane foam either spray applied or injected with one shot into the annular space between carrier pipe and jacket. Insulation shall be rigid, 90% minimum closed cell polyurethane with a minimum 2.0 lbs per cubic foot density, compressive strength of 30 psi, and coefficient of thermal conductivity (K-Factor) of not higher than 0.15 @ 75°F per ASTM C-518. Maximum operating temperature shall not exceed 250°F. Insulation thickness shall be specified by calling out appropriate carrier pipe and jacket size combinations as listed on drawing FTSG 7.103.

2.3 Jacketing material shall be extruded, black, high density polyethylene (HDPE), having a minimum wall thickness of 125 mils for jacket sizes less than or equal to 12", 150 mils for jacket sizes larger than 12" to 20", and 175 mils for jacket sizes greater than 20". The jacket throughout the entire system shall incorporate electric fusion, butt fusion, or extrusion welding at all fittings, joint closures, or other points of connection. This shall create a jacket that is seamless throughout the entire system with the exception of anchors, whose water shed rings are sealed with a Raychem Dirax or Canusa GTS-65 wrap prohibiting the ingress of water. 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 insulated using the manufacturer's specified insulation, to the same thickness of the pipe, and jacketed with an electro-fusion welded split sleeve. The manufacturer will provide the fusion machine, straps, rubber bands, pressure gauges, and closure patches for the pressure testable joint cover. Heat shrink sleeve materials will not be accepted as the primary sealing method. **ALL FIELD JOINTS ARE REQUIRED TO BE PRESSURE TESTED** at 5 psi for 5 minutes while simultaneously soap tested at the joint closure's seams for possible leaks. After passing the pressure test, the field joint is insulated and a closure patch is welded (as per joint closure instructions) over the foam holes. All field joint closures and insulation shall occur at straight sections of pipe only. Field insulation of fittings is not permitted.

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2.5 Fittings are factory pre-fabricated and pre-insulated with polyurethane foam to the thickness specified and jacketed with a one piece seamless molded HDPE fitting cover, a butt fusion welded, or an extrusion welded and mitered HDPE jacket. **NO TAPING OR HOT AIR WELDING SHALL BE ALLOWED.** All fitting jackets/ covers shall be connected to the straight lengths of pipe by electro fusion, butt fusion, or extrusion welding. Carrier pipe fittings shall be butt-welded, except sizes smaller than 2" shall be socket-welded. Fittings include expansion loops, elbows, tees, reducers, and anchors. Elbows, loops, offsets, or any other direction changes shall conform to the standards set by ASME B31.1, Code for Power Piping.

2.6 Expansion/ contraction compensation will be accomplished utilizing factory pre-fabricated and pre-insulated expansion elbows, Z-bends, expansion loops, and anchors specifically designed for the intended application. External expansion compensation utilizing flexible expansion pads (minimum one inch thickness), extending on either side, both inside and outside the radius of the fittings used, with all fittings having expansion in excess of 1/2".

2.7 The system shall be leak detection ready by means of manufacturing into the system a copper wire through each piece of pre-insulated pipe and fittings. The piping system manufacturer shall install the wire in a manner that has the wire embedded in the foam insulation and not touching the steel carrier pipe. The contractor shall connect the wire together at each field joint with a recommended crimping tool. After crimping the wire at a joint, the contractor shall check the joined pieces for continuity of the wire and electrical isolation from the carrier pipe by use of a standard volt ohmmeter. This check shall be repeated after each crimp, until the entire system is connected. After the piping system is installed, the owner at any time may check the system for a leak by using a standard volt ohmmeter. If a leak is detected (a leak is signaled by a drastic drop in the electrical resistance of the circuit) the owner should contact the system manufacturer for a TDR instrument to determine the location of the leak. (At owner's option, an ohmmeter panel may be purchased which will provide continuous leak detection monitoring.)

Part 3 - Execution

3.1 Pre-engineered systems shall be provided with all straight pipe and fittings factory pre-insulated and pre-fabricated to job dimensions.

3.2 Underground systems shall be buried in a trench 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 placed over the top of the **pipe will meet H-20 highway loading.**

3.3 Trench bottom shall have a minimum of 6" of sand, pea gravel, or specified backfill material as a cushion for the piping. All field cutting of the pipe shall be performed in accordance with the manufacturer's installation instructions.

3.4 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.*

3.5 Field Service is required and will be provided by a certified manufacturer's representative or company field service technician. The technician will be available at the job a minimum of one day (or more if required by job size) to check unloading, storing, and handling of pipe, pipe installation, pressure testing, field joint insulation, and backfilling techniques.