



# THERMACOR<sup>®</sup> PROCESS, L.P.

## FERRO-THERM HDPE SKIN-EFFECT HEATING

### *Specification Guide*

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**Preinsulated Skin-Effect Heat Traced Steel Piping Systems** suitable for temperature maintenance and freeze protection in the transport of Process Fluids, Heating Water, and Heavy Petroleum Products.

#### **Part 1 - General**

**1.1 Electrically Heated Preinsulated Piping-** Furnish a complete system of factory preinsulated steel piping with a skin-effect, electric heat trace system for the specified service. All preinsulated pipe, fittings, insulating materials, electric heat trace system, and technical support shall be provided by the Preinsulated Piping System manufacturer.

**1.2** The system shall be **Thermafab FERRO-THERM HDPE Skin-Effect System** 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. 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 A steel heat tube of A106, Seamless, Sch. 40 pipe will be continuously welded** to the entire length of the carrier pipe at the factory before insulation is applied. The heat tube will be bent up from the pipe ends approximately 1/2" to facilitate welding of the carrier pipe. All heat tubes will be checked after welding and insulating is complete to insure no blockage of the heat tube. A test plug, 1/16" smaller than the I.D. of the heat tube, shall be pulled through the heat tube to verify that no internal raised surfaces will prevent the installation of the electric heat trace wire. All heat tubes will be capped for shipment.

**2.3 An electric skin-effect heat trace system will be custom designed** and furnished for the specific application and installation conditions.

**2.4 Polyurethane foam insulation** shall be injected with one shot into the annular space between carrier pipe and jacket with a minimum thickness of one inch. Insulation shall be rigid, 90-95% closed cell polyurethane with a 2.0-to-3.0 pounds per cubic foot density and coefficient of thermal conductivity (K-Factor) of 0.14 and shall conform to ASTM C-591. Maximum urethane 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 Thermacor Drawing NO. A-5059A.

**2.5 Moisture barrier end seals shall be factory applied** and sealed to the jacket and carrier pipe. End seals shall be certified as having passed a 20-foot head pressure test. End seals shall be mastic, completely sealing the exposed end of the insulation.

**2.6 Jacketing material** shall be extruded, black, high density polyethylene (HDPE), manufactured in accordance with ASTM D-1248 having a minimum wall thickness of 150-mils, and meeting the specifications shown below.

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**HDPE JACKET SPECIFICATIONS**

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.
Resistance to Heat, Continuous: Vicat Softening Temperature	250°F min.

**2.7 Straight run joints are insulated** using urethane foam to the thickness specified, jacketed with a full length heat-shrinkable wrap-around sleeve.

**2.8 Fittings are factory prefabricated and preinsulated** with urethane to the thickness specified and jacketed with a molded or mitered, extrusion welded PE jacket. Carrier pipe fittings shall be 2D long radius bends for 6" and smaller, complying with ASME B31.1 or butt-welded, except sizes smaller than 2" shall be socket-welded. If required by project specifications, welds shall be radiographically inspected. The skin-effect heat tube shall be factory routed and welded onto the carrier pipe fittings to maintain proper heat tube orientation. Fittings include expansion loops, elbows, tees, reducers, and anchors. 2D long radius bends for 6" and smaller, complying with ASME B31.1.

**2.9 Expansion/contraction compensation** will be accomplished utilizing factory prefabricated and preinsulated expansion elbows, Z-bends, expansion loops, and anchors specifically designed for the intended application. External expansion compensation utilizing flexible expansion bolsters minimum one inch thick, extending on either side, both inside and outside the radius of the fittings is used, with all fittings having expansion in excess of 1/2".

**Part 3 - Execution**

**3.1 Pre-engineered systems** shall be provided with all straight pipe and fittings factory preinsulated and prefabricated to job dimensions. No field cutting of the piping is required. Contractor shall only make up straight pipe joints.

**3.2 Underground systems** shall be buried in a trench not less than two (2) 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**, gravel, or clean, select fill 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**, as required by project specifications, shall be performed at 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**, 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 a minimum of three times to check unloading, storing, and handling of pipe, joint installation, pressure testing and backfilling techniques. This service will be added to the cost as part of the project technical services required by the preinsulated pipe manufacturer.