



CLASS "A" STEEL

Specification Guide

CASG
4.111

FUSION BONDED EPOXY SPECIFICATION

7.01.08

Pre-insulated Class "A" Steel Piping Systems with FBE coating suitable for Steam, High Temperature Hot Water, Pumped Condensate and Gravity Condensate Service.

Part 1 - General

1.1 Pre-insulated Piping - Furnish a complete system of factory pre-insulated steel piping for the specified service. The piping system shall be of the drainable, dryable, testable type, suitable for all ground water and soil conditions, site Classification "A" (Federal Agency Guide Specification, UFGS-02552 & UFGS-02556). The system shall be provided as specified below and shown on the drawings.

1.2 The pre-insulated pipe manufacturer shall make a complete layout of the system showing anchors, expansion provisions, and building entrance details. Means for expansion must be made in pipe off-sets or loops unless this is compensated for integrally in the system.

1.3 The system shall be Class "A" STEEL as manufactured by **Thermacor Process, L.P.**, of Fort Worth, Texas.

Part 2 – Products

2.1 The conduit shall be 10 gauge, welded, smooth-wall black steel conforming to A-134, A-135, and A-136. Conduit shall be tested at the factory to insure air and watertight welds prior to any fabrication or application of coating. The outside conduit surface shall be blasted to clean, bright metal. Immediately after blasting, the outer conduit surface shall be given a factory coat of Fusion Bond Epoxy (FBE). Coating application shall be a minimum of 20 mils thickness.

2.2 Conduit closures shall be 10 gauge steel, furnished with the conduit at a ratio of one closure for each fabricated item or length. Closures shall be field welded over adjacent units after pipe insulation. After testing, all exposed closures shall be covered in the field with a heat shrinkable sleeve, furnished with the conduit.

2.3 Piping in the conduit shall be standard weight (Std. Wt. is the same as Sch. 40 through 10") or extra strong (XS is the same as Sch. 80 through 8"), steel, ASTM A-53, Grade B, ERW or Sml. Pipe joints shall be welded in accordance with the Power Piping Code for ASME/ ANSI B 31.1.

2.4 The pipe insulation shall be mineral wool/ calcium silicate (or equal specified), of the thickness listed on the drawings.

2.5 Pre-fabricated ells, loops, and tees shall be furnished and installed where shown on plans and shall consist of pipe, insulation, and conduit conforming to the same specification as hereinbefore stated for straight runs. Expansion loops shall be designed in accordance with the stress limits indicated by the Code for Pressure Piping, ASME B31.1. Loop piping shall be installed in conduit suitably sized to handle indicated pipe movement.

2.6 Terminal ends of conduits inside manholes, pits, or building walls shall be equipped with end seals consisting of a 1/2" steel bulk head plate welded to the pipe and conduit. If there is no anchor within five feet of a terminal end, conduits shall be equipped with gland seals consisting of a packed stuffing box and gland follower mounted on a steel plate welded to the end of the conduit. End seals or gland seals shall be equipped with drain and vent openings. Terminate all conduits 2" beyond the inside face of manhole or building walls.

2.7 Pre-fabricated anchors shall be furnished and installed where shown on plans and shall consist of a steel plate, welded to pipe and conduit. The steel anchor plate shall be 1/2" thick and shall be 1-1/2" larger horizontally and 1-1/2" larger vertically than nominal conduit diameter.

2.8 A concrete thrust block shall be cast over the anchor plate and conduit, large enough for firm anchorage into undisturbed trench sidewalls and/or bottom. The concrete block shall be at least 36" in length and extend a minimum of 12" beyond the top and bottom of the anchor plate.

2.9 Wall sleeves with leak plates shall be provided at all building and manhole entries to provide an effective moisture barrier. The wall sleeve and leak plate shall be electrically isolated from building rebar. The space between the conduit and wall sleeve shall be made watertight by use of Link-Seal® pipe penetration seals or equal assemblies, which will also provide electrical isolation.

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2.10 Cathodic protection shall be provided for the protection of the external surface of the conduit. The design Engineer shall furnish the soil resistivity for CP design purposes. The Cathodic protection system, complete with test stations, shall be designed for the particular site conditions. Cathodic protection drawings shall provide installation details, including anode location, test station location, wiring diagrams, electrical isolation, and cadwelding procedures. A CP Test report is to be furnished.

Part 3 – Execution

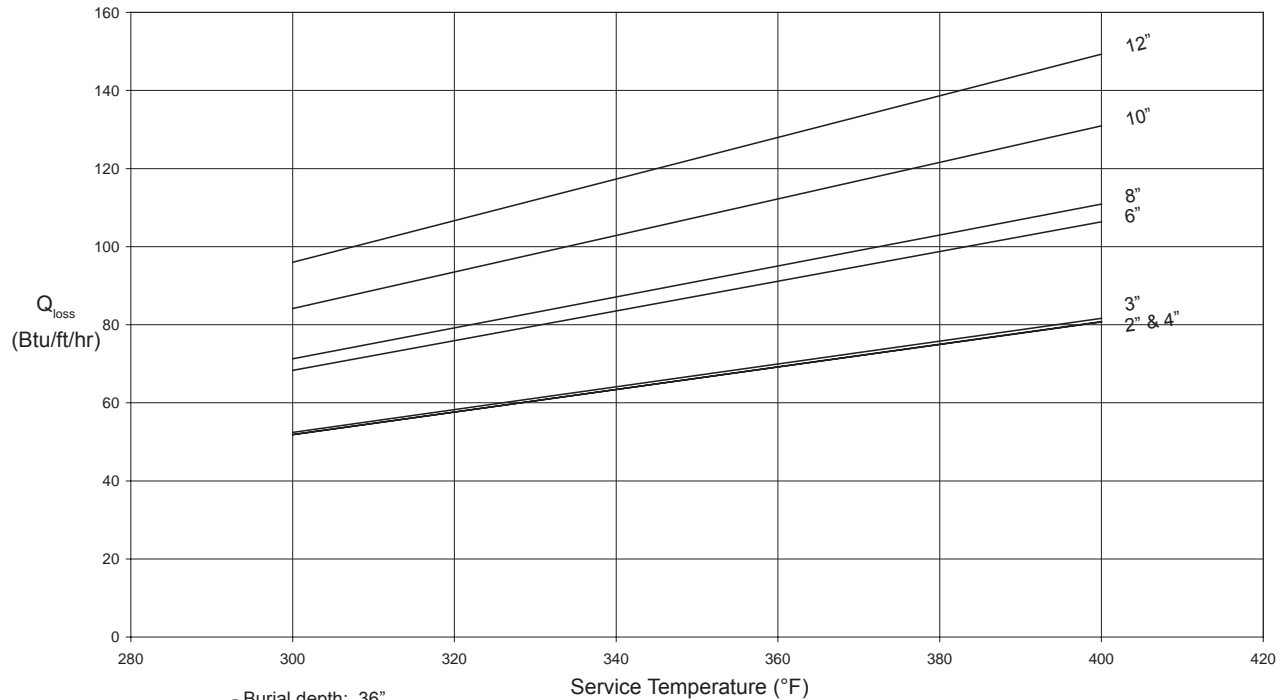
3.1 The installing contractor shall be responsible to excavate, string conduit, weld test, place in trench, back-fill, or otherwise treat and install the system as per the specifications and the directions furnished by the manufacturer and approved by the design engineer in accordance with plans and specifications.

3.2 The conduit shall be air tested at 15 psi for two hours. Repair any carrier pipe leaks and retest prior to making field closure. Holiday testing of the conduit shall be the responsibility of the contractor under the directions furnished by the manufacturer. Holiday test the 20 mil fusion bond epoxy coating at 2500+/- 10%, volts. All holidays shall be recoated and retested.

3.3 A factory trained or qualified representative of Thermacor Process, L.P. shall be present at the jobsite during critical periods of the installation such as unloading, commencement of the installation, and testing. Backfilling shall not begin until approval of pressure tests by the Thermacor field representative.

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.*

HEAT LOSS FOR STANDARD SIZES OF MINERAL WOOL *



- Burial depth: 36"
- Soil conductivity: 12 (Btu/h.ft².°F/ft)
- Soil temperature: 50°F

Pipe Size	Mineral Wool Thickness	Conduit O.D.
2"	1-1/2"	8-5/8"
3"	1-1/2"	8-5/8"
4"	1-1/2"	10-3/4"
6"	2"	12-3/4"
8"	2"	16"
10"	2"	18"
12"	2-1/2"	20"

* Other pipe sizes and pipe, insulation thickness, and conduit size combinations are available.