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***Piping Systems, Inc*.**

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**Part 1 – General**

* 1. **Insul-8® Below Ground – Ductile Iron x Foam x HDPE**

**1.02 This system** shall be **Pre-insulated Ductile Iron x HDPE with Polyisocyanurate Foam Piping System** as manufactured by **Rovanco Piping Systems** of Joliet, Illinois.

**Part 2 - Products**

**2.01 Carrier Pipe:** Shall be Ductile Iron Class 50 in nominal 20’ lengths per AWWA C 151 and Federal Specification WW-P-421-D, with gasketed joints. Gaskets for service under 150˚F shall be made of Styrene Butadiene Rubber. For services from 150˚F to 200˚F, Neoprene Gaskets are used. From 200˚F to 250˚F, E.P.D.M. Gaskets are required. No cement liner shall be used on systems operating at above 140˚F.

**2.02 Pipe Fittings:** Shall be mechanical joint and poured in a thrust block. All pipe fittings   
shall be furnished by the pre-insulated pipe manufacturer. Fittings shall be AWWA C110   
or AWWA C111.

**2.03 Carrier Pipe Insulation:** Carrier pipe insulation shall be a polyisocyanurate high temp foam injected with one shot into the annular space between carrier pipe and jacket. Insulation shall be rigid, >90% closed cell polyisocyanurate with a minimum 2.0 lbs per foot3 density, compressive strength of 30 psi @ 75˚F, a thermal conductivity K factor no higher than 0.14 @ 75˚F per ASTM C-518 and an E84 25/50 passive fire resistance rating. Maximum continuous operating temperature of polyisocyanurate foam shall not exceed 300˚F, except for intermittent spikes of 350˚F.

**2.04 Jacketing Material:** The outer casing shall be high density polyethylene (HDPE) conforming to ASTM D3350, Type III, Category 5, Class C and Grade P23/P34. With a minimum of 2% by weight of carbon black. Minimum thickness if 175 mils. No FRP overwrap or sprayed jacketing will be allowed. Minimum jacket thickness shall be in accordance with Table 1.

Table 1:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nominal Pipe Size in Inches | | Minimum Insulation Thickness in Inches | Jacket Size in Inches | Jacket Thickness in Mills |
| 2 | 1.81 | | 6.63 | 200 |
| 2-1/2 | 1.56 | | 6.63 | 200 |
| 3 | 1.25 | | 6.63 | 200 |
| 4 | 1.75 | | 8.00 | 200 |
| 5 | 2.22 | | 10.00 | 200 |
| 6 | 1.51 | | 10.00 | 200 |
| 8 | 1.68 | | 12.43 | 175 |
| 10 | 1.64 | | 14.06 | 175 |
| 12 | 1.46 | | 15.87 | 175 |
| 14 | 1.72 | | 17.83 | 200 |
| 16 | 1.70 | | 19.80 | 200 |
| 18 | 1.89 | | 22.17 | 200 |
| 20 | 2.24 | | 24.92 | 225 |

\*Larger pipe sizes are available upon request.

**2.05 Joining Method:** Shall be push-on type.

**2.06 End Seals:** Each length of pre-insulated pipe will be fitted with a watertight mastic end seal at jacket and pipe surfaces. All field cuts will be sealed with a field applied end seal. For non-insulated joints, the end seals shall have a letter of certification from an independent Testing Laboratory that they have been tested and proved watertight under the following test criteria:

Casing and End Seal Testing Certification: Test and certification procedures shall demonstrate that casing, factory and field applied end seal are capable of resisting penetration of water into the casing and insulation at 20 feet of head pressure, measured above the highest point of the test sample, subjected over the entire surface of an 8-foot casing test sample for not less than 48 hours.

**2.07 Insulation of Joints (if required):** All straight joints shall be insulated using polyisocyanurate foam and covered with the same material as pipe jacketing. 90˚-45˚ elbows, tees, etc. will not be insulated; they must be poured in concrete thrust blocks.

**2.08 Backfill:** Shall be tamped compactly in place to assure a stable surface. No rock should be used in first foot of backfill. 24 inches, from top of pipe to grade, of compacted fill shall meet   
H-20 Highway Loading.

**2.09 Manufacturer’s Assistance:** Rovanco will provide a field service man on-site to properly   
train the installing personnel in all phases of installation (if required).

**2.10 Approved Vendors:** Ductile Iron System by Rovanco, Joliet, Illinois or approved, ISO Certified, equal. Any alternate supplier must submit their technical data to the engineer ten days prior to bid date to be approved in writing as an equal.