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***Piping Systems, Inc*.**

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**Part 1 – General**

**1.01 Double Wall Containment with Red Mil Coated Steel Piping**

**1.02 This system** shall be **Above Ground** **Red Mil Coated Steel Containment Piping** manufactured by **Rovanco Piping Systems** of Joliet, Illinois.

**Part 2 - Products**

**2.01 Carrier Pipe:** A53B Black Steel pipe, Seamless or ERW, in pre-cut lengths. Pipe 10” and smaller shall be Schedule 40. Pipe 12” and larger shall be .375 wall. (Schedule 80) Other piping materials and thicknesses also available.

* 1. **Inner Pipe Supports:** All pipe shall be aligned and supported within the casing with

galvanized steel supports spaced on centers approximately 10’0”. The insulated inner pipe shall bear directly on the steel support. The support shall be designed as to permit drainage and free air passage. All pipe passing through supports shall be insulated. Concrete type pipe supports will not be allowed.

**2.03 Containment Casing:** Casing shall be black steel. Casing up through 24” shall be 10 gauge. Casing 26” and larger shall be 6 gauge.

The interior surface shall be smooth to permit free moisture drainage and removability of the inner assembly. The outer casing shall be sized to provide an adequate annular space between the outer surface of the carrier pipe and the interior surface of the casing.

No asphalt, coal tar coating, FRP casing or any other type will be allowed. Casing closures shall consist of 10-gauge steel suitably rustproofed and in cylindrical form with a single horizontal split and shall be field welded over adjacent units. After tests all exposed closures shall be painted with Red Mil Primer.

For above ground applications, the steel casing, fitting covers and closure joints shall be Red Mil primed.

The exterior surface will be coated with 4-6 mils of Red Mil Primer. Red Mil Primer must be corrosion resistant and meet class A for slip coefficient. It must also meet performance comparable to products formulated to Federal specifications: Mil-P-23377 and Mil-P-53022. Steel surface must be clean, dry and in sound condition. Remove all oil, dust, grease, dirt, loose rust and other foreign material to endure adequate adhesion. The Red Mil Primer shall conform to these ASTM standards:

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| --- | --- | --- |
| **Test Name** | **Test Method** | **Results** |
| **Abrasion Resistance** | ASTM D4060, CS17 wheel, 1000 cycles, 1kg load | 200 mg loss |
| **Accelerated Weathering –QUV1** | ASTM D4587,  QUV-A, 5,000 hours | Passes |
| **Adhesion** | ASTM D4541 | 1050 psi |
| **Corrosion Weathering** | ASTM D5894, 13 cycles,  4,368 hours | Rating 10 per ASTM D714 for Blistering; Rating 7 per ASTM D610 for Rusting |
| **Direct Impact Resistance** | ASTM D2794 | 160 in. lbs. |
| **Dry Heat Resistance** | ASTM D2485 | 250°F (121°C) (dis-colors) |
| **Flexibility** | ASTM D522, 180° bend,  1" mandrel | Passes |
| **Moisture Condensation Resistance** | ASTM D4585, 100°F (38°C), 2000 hours | Passes, no cracking or delamination |
| **Pencil Hardness** | ASTM D3363 | 3H |
| **Salt Fog Resistance1** | ASTM B117, 5,600 hours | Passes, no cracking or delamination |
| **Slip Coefficient, Red Oxide** | AISC Specifications for Structural Joints Using ASTM A325 or ASTM A490 Bolts | Class A, 0.50 |

**2.04 Weld Fittings:** All changes in direction shall be made with bent or weld fittings. Where tee branches are smaller than the mains they joint, weld-o-lets may be used. All fittings shall be same wall thickness as adjacent piping and should be Red Mil primed in the field.

**2.05 Anchors:** Anchors shall be pre-fabricated onto the piping units and shall be equipped with drainage and vent openings at the top and bottom of the anchor plate. Anchor plates shall be made of ½” steel plate. Anchor shall be Red Mil primed.

**2.06 End Seal:** Terminal ends inside manholes, pits, or building walls shall be equipped with end seals consisting of a steel bulkhead plate welded to the pipe conduit.

End seals shall be made of a ½” steel plate with drain or vent openings located diametrically opposite on the vertical center line of the mounting plate and shall be shipped to the jobsite with plugs in place. Terminate containment 2 inches beyond the inside face of building walls to protect any exposed piping from damp wall condensation. End Seals shall be Red Mil primed.

**2.07 Field Tests:** The inner pipe of the system shall be tested hydrostatically to 1-1/2 times the working pressure of the line. If a leak is found, it shall be repaired and the test repeated. The outer casing shall be tested with air at 15 psig and a soap solution shall be applied to the field joints to locate leaks. If leaks occur, they shall be repaired and the test repeated. After approved by test, all field joints shall be coated by the contractor. Before backfilling, the contractor shall test the containment coating with an electric holiday detector. Any breaks in the coating system will be repaired and the test repeated by the contractor.

**2.09 Installation:** The installation shall be made in accordance with plans and specifications, and manufacturers installation instructions. Manufacturer will provide a field service instructor   
on-site to train the contractor in all phases of installation.

**2.10 Approved Vendors:** Red Mil Steel Containment System by Rovanco, Joliet, Illinois or approved equal. Any alternative supppplier must be ISO 9001 certified and submit their technical data to the engineer ten days prior to bid date to be approved in writing as an equal.