

SECTION 02629

POLYURETHANE COATINGS ON STEEL OR DUCTILE IRON PIPE

PART 1 - G E N E R A L

1.1 SECTION INCLUDES

- A. Two-component polyurethane coating system for use as an internal or external coating for steel or ductile iron pipe.

1.2 UNIT PRICES

- A. No separate payment will be made for work performed under this section. Include cost of polyurethane coatings in contract unit prices for steel pipe or ductile iron pipe.

1.3 SAFETY

- A. Secure, from manufacturer, Material Safety Data Sheet (MSDS) for polyurethane coatings and repair materials listed in this section.
- B. Safety requirements stated in this specification and in related sections apply in addition to applicable federal, state and local rules and regulations. Comply with instructions of coating manufacturer and requirements of insurance underwriters.
- C. Adhere to handling and application practices of SSPC-PA Guide 3; SSPC-PS Guide 17.00; Coating Manufacturer's Material Safety Data Sheet.

1.4 SUBMITTALS

- A. Submittals shall conform to requirements of all provisions and sections of these specifications.
- B. Submit coating manufacturer's catalog sheets and technical information for approval, prior to delivery of pipe.
- C. Obtain from coating manufacturer and furnish to Owner's Representative, a coating "affidavit of compliance" to requirements of this section stating that coatings were applied in factory and in accordance with manufacturer's minimum requirements.

PART 2 - PRODUCTS

2.1 COATING MATERIAL

- A. Coating Standard: ASTM D16.
- B. Coating System: Use a Coating Standard ASTM D16 Type, V system which is a 2-package polyisocyanate, polyol-cured urethane coating. The components are mixed in 1:1 ratio at time of application. The components are balanced viscosities in their liquid state and do not require agitation during use.
- C. Exterior Coating Material: CORROPIPE II-TX and Joint Coating Material CORROPIPE II-PW, as manufactured by Madison Chemical Industries, Inc., or approved equal.
- D. Internal Coating Material: Exterior Coating Material, CORROPIPE II-TX and Joint Coating Material CORROPIPE II-PW, as manufactured by Madison Chemical Industries, Inc., or approved equal.
- E. Cured Coating Properties:
 - 1. Conversion to Solids by Volume: 97 percent plus or minus 3 percent.
 - 2. Temperature Resistance: Minus 40 degrees F and plus 130 degrees F.
 - 3. Minimum Adhesion: 500 psi, when applied without primer to ductile iron pipe which has been blasted to comply with SSPC-SP10.
 - 4. Cure Time: For handling in 1 minute at 120 degrees F, and full cure within 7 days at 70 degrees F.
 - 5. Maximum Specific Gravities: Polyisocyanate resin, 1.20. Polyol resin, 1.15.
 - 6. Minimum Impact Resistance: 80 inch-pounds using 1-inch diameter steel ball where coating is applied at 30 mils to ductile iron pipe surface which has been blasted to SSPC No. 10 finish.
 - 7. Minimum Tensile Strength: 2000 psi.
 - 8. Hardness: 55 plus or minus 5 Shore D at 70 degrees F.

9. Flexibility Resistance: ASTM D1737 using 1-inch mandrel. Allow coating to cure for 7 days. Perform testing on test coupons held for 15 minutes at temperature extremes specified in Paragraph 2.01E.

2.2 REPAIR AND/OR TOUCHUP MATERIAL

- A. CORROPIPE II PW - TOUCHUP (two-component, brush applied); mix in accordance with coating manufacturer's recommendations.

2.3 PACKAGING AND LABELING

- A. Containers: Standard containers to prevent gelling, thickening deleteriously or forming of gas in closed containers within period of one year from date of manufacture.
- B. Labeling: Label each container of separately packaged component clearly and durably to indicate date of manufacture, manufacturer's batch number, quantity, color, component identification and designated name or formula specification number of coating together with special instructions. Do not use coating components older than one year.

2.4 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver coating materials to pipe manufacturer in sealed containers showing designated name, batch number, color, date of manufacture and name of coating manufacturer.
- B. Storage: Store material on site in enclosures, out of direct sunlight in warm, ventilated and dry area.
- C. Protection: Prevent puncture, inappropriate opening or other action which may lead to product contamination.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

1. Remove deposits of oil, grease or other organic contaminants before blast cleaning by using solvent wash as specified in SSPC-SP1. Clean and dry surfaces making them completely dry, free of moisture, dust, grit, oil, grease or any other deleterious substances prior to application of coating.

2. Exterior and Interior Surfaces: SSPC-SP10; near-white metal blast cleaning. The blasting shall be done with clean, hard, sharp cutting abrasives with no steel or cast iron shot in the mix.
3. Ductile Iron Pipe: Prior to the start of production blasting, the Contractor shall prepare specimens for a white metal blast and a near-white metal blast using the equipment and abrasives proposed for the work. During preparation of the specimens, the blasting intensity and abrasive shall be changed as necessary to provide the degree of cleaning required by SSPC-SP10, except that the color of the blasted substrate is not expected to match the color of blasted steel. After examination and concurrence by the Owner's Representative, the production blasting may begin. The production blasting shall be monitored and controlled by the Contractor so that production pipe surfaces match the surface of the approved blasting specimens.

3.2 THICKNESS

- A. External Coatings: Minimum DFT of 25 mils (0.025 inch).
- B. Internal Coatings: Minimum DFT of 35 mils.
- C. Thickness Determinations: Use Type 1 magnetic thickness gage as described in SSPC-PA2 specification. Individual readings below 90 percent of specified minimum are not acceptable. Average individual spot readings (consisting of three point measurements within 3 inches of each other) less than 95 percent of minimum are not acceptable. Average of all spot readings less than minimum thickness specified are not acceptable.

3.3 FACTORY APPLICATION OF POLYURETHANE COATING

- A. Equipment: Two-component, 1:1 mix ratio, heated airless spray unit.
- B. Temperature: Minimum 5 degrees F above dew point temperature. The temperature of the surface shall not be less than 60 degrees F during application.
- C. Humidity: Heating of pipe surfaces may be required to meet requirements of 2.01E if relative humidity exceeds 80 percent.
- D. Do not thin or mix resins; use as received. Store resins at a temperature above 55 degrees F at all times.

- E. Application: Conform to coating manufacturer's recommendations. Apply directly to substrate to achieve specified thickness. Multiple-pass, one-coat application process is permitted provided maximum allowable recoat time specified by coating manufacturer is not exceeded.
- F. Recoating: Recoat only when coating has cured less than maximum time specified by coating manufacturer. When coating has cured for more than recoat time, brush-blast or thoroughly sand coating surface. Blow-off cleaning using clean, dry, high-pressure compressed air.
- G. Curing: At ambient temperature above 0 degrees F. Do not handle pipe until coating has been allowed to cure as follows:

<u>Ambient Temperature</u>	<u>Minimum Full Cure Time</u>
Over 70°F	7 days
50 to 70°F	9 days
0 to 50°F	12 days

3.4 JOINTS

- A. Apply coating to unlined pipe surfaces including inside of bell socket and outside of spigot.
- B. Joint Coating Materials: CORROPIPE II PW (instant-set, two-component material, plural component spray applied), or CORROPIPE II PW -TOUCHUP (two-component, brush applied).
- C. Coating thickness on sealing areas of spigot end of pipe exterior: Minimum 8 mils (0.008 inch), maximum of 10 mils (0.010 inch). Maximum 10 mils may be exceeded in spigot end provided maximum spigot diameter as specified by pipe manufacturer is not exceeded.

3.5 INSPECTION

- A. Owner's Representative may inspect coatings at coating applicator's facilities.
- B. Holiday Inspection: AWWA C210, Section 5.3.3.1. Follow coating manufacturer's recommendation. Conduct inspection any time after coating has reached initial cure. Repair in accordance with paragraph 3.07, Repair and Field Touchup.

3.6 PIPE INSTALLATION

- A. For wastewater projects, provide services of manufacturer's representative for period of not less than 2 weeks at beginning of actual pipe laying operations to advise Contractor regarding installation including but not limited to handling and storing, cleaning and inspecting, coatings repairs, and general construction methods as to how they may affect pipe coatings.
- B. Handling, Shipment, and Storage: Nylon straps, padded lifts and padded storage skids are required. Field cuts should be kept to minimum. Repair damage to coating due to handling or construction practices at no additional cost to. See Section 02610 - Ductile Iron Pipe and Fittings and Section 02611 - Steel Pipe and Fittings for additional requirements.
- C. Just before each section of pipe is to be placed into the trench, conduct a visual and holiday inspection. Defects in the coating system shall be repaired before the pipe is installed.

3.7 REPAIR AND FIELD TOUCHUP

- A. Apply repair/touchup materials in conformance with factory application of polyurethane coating requirements specified in this section, excluding equipment requirements.
- B. Repair Procedure - Holidays:
 - 1. Remove all traces of oil, grease, dust, dirt, etc.
 - 2. Roughen area to be patched by sanding with rough grade sandpaper (40 grit).
 - 3. Apply one coat of repair material described above. Work repair material into scratched surface by brushing.
- C. Repair Procedure - Field Cuts or Large Damage:
 - 1. Remove burrs from field cut ends or handling damage and smooth out edge of polyurethane coating.
 - 2. Remove all traces of oil, grease, dust, dirt, etc.

3. Roughen area to be patched with rough grade sandpaper (40 grit). Feather edges and include overlap of 1 inch to 2 inches of roughened polyurethane in area to be patched.
 4. Apply thick coat of repair material described above. Work repair material into scratched surface by brushing. Feather edges of repair material into prepared surface. Cover at least 1 inch of roughened area surrounding damage, or adjacent to field cut.
- D. For Wastewater Projects; Repair Procedure - Thermite Brazed Connection Bonds:
1. Remove polyurethane coating from area on metal surface which is to receive thermite brazed connection with power wire brush.
 2. Grind metal surface to shiny metal with power grinder and coarse grit grinding wheel.
 3. Apply thermite brazed connection using equipment, charge and procedure recommended by manufacturer of thermite equipment.
 4. After welded surface has cooled to temperature below 130 F, apply protective coating repair material to weld, exposed pipe surface and damaged areas of polyurethane coating.
 5. Do not cover or backfill freshly repaired areas of coating at thermite brazed connection until repair material has completely cured. Allow material to cure in conformance with manufacturer's recommendations.

END OF SECTION