

SECTION 09905

CLEANING AND PAINTING EXPOSED PIPING, VALVES AND RELATED ITEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The work to be performed under this section of the specifications shall comprise the furnishing of all labor, materials and equipment necessary to clean, paint and prepare for service the facilities as specified herein.
- B. The term "paint", as used in this section, means the protective coatings specified. Other paints/coatings may be required in other sections of the specifications. All coatings which will be in contact with potable water or vapor areas shall comply with the American National Standards Institute, Inc./National Sanitation Foundation (ANSI/NSF), Standard 61 and shall be applied in conformance with the manufacturer's published specifications.
- C. Work performed and materials used shall comply with the requirements of the Steel Structure Painting Council's Vol. No. 1, "Good Painting Practices", and Vol. 2, "Systems and Specifications", and these technical specifications. Where a conflict exists between these technical specifications and the Steel Structures Painting Council's Specifications, these technical specifications govern.

1.02 MEASUREMENT AND PAYMENT

- A. No direct measurement or payment will be made for the work to be done or the equipment to be furnished under this item, but shall be considered subsidiary to the particular items of work for which unit prices are required in the proposal.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials Specified The materials specified herein under the sections titled "Coating Systems" and "Coating Schedule" are based on Tnemec paint systems acceptable to the Engineer/Owner. Substitutes will be allowed subject to approval of the Owner.
- B. Materials Used. Contractor shall submit the materials to be used in accordance with Section 01300 SUBMITTALS.

- C. Color for exterior finish coat will be selected by owner.
- D. Submittals of Alternate Materials
- E. Contractor must provide data proving equality of products and performances at no expense to the Owner. Such data will include manufacturer's data sheets and any specific test results requested by the Engineer/Owner. Test results must be from an independent testing laboratory.
- F. Contractor shall provide proof of acceptable performance for a minimum of five (5) years in similar applications.
- G. Contractor shall provide five (5) names of cities or users with contacts, addresses and telephone numbers for references.

2.02 MANUFACTURER'S INSTRUCTIONS

- A. The manufacturer's published instructions for use in specifying and applying the manufacturer's proposed paint, if different from or not included on their product data sheet, shall be submitted to the Engineer. Paint shall not be delivered to the job site before review of the manufacturer's instructions by the Engineer. The manufacturer's published instructions must meet the following requirements:
 - 1. The instructions must have been written and published by the manufacturer for the purpose and with the intent of giving complete instruction for the use and application of the proposed paint in the locality and for the conditions for which the paint is specified or shown to be applied under this contract.
 - 2. All limitations, precautions and requirements that may adversely affect the paint; that may cause unsatisfactory results after the painting application; or that may cause the paint not to serve the purpose for which it was intended shall be clearly and completely stated in the instructions. These limitations and requirements shall include, but not be limited to, the following:
 - a. Surface preparation.
 - b. Methods of application.
 - c. Thickness of each coat.
 - d. Drying time of each coat, including primer.
 - e. Drying time of final coat before placing in service.
 - f. Time allowed between coats.
 - g. Primer required to be used.
 - h. Thinner and use of thinner.

- i. Weather limitations during and after application with emphasis on dry time which may affect appearance and uniformity of color (temperature and humidity).
- j. Physical properties of paint, including percent solids content by volume and weight per unit surface per dry mil thickness.
- k. Equipment settings (air cap, fluid tip, equipment pressure settings, etc.)

2.03 DELIVERY AND STORAGE

- A. All paint shall be delivered to the job in original containers marked with the name of the manufacturer and the specification number or formula of the paint contained therein. The paint shall not show excessive settling in a freshly opened can, and shall be easily redispersed with a paddle to a smooth, homogenous state. The paint shall show no curdling, livering, caking or color separation, and shall be free from lumps or skins. The paint shall dry to a smooth, uniform finish, free from roughness, grit, unevenness and other surface imperfections.
- B. Store materials in an approved location. Keep the storage clean and repair any damage done. Remove oily rags, waste, or other fire hazards from buildings each night; take adequate precautions to avoid damage by fire. Place cloths and waste material which might constitute a fire hazard in metal containers or destroy at the end of each day. Maintain all coatings in compliance with local, state and federal regulations. Do not allow water based coatings to freeze. Maintain all other coatings within temperature ranges approved by manufacturer.

2.04 MAINTENANCE MATERIAL

- A. At the end of the project, the Contractor shall turn over to the Owner a gallon of each type and color of paint, primer, thinner, or other coatings used in the field painting. The material shall be delivered in unopened labeled cans, just as it comes from the factory. If the manufacturer does not package the material in gallon cans, and in the case of special colors, the materials shall be delivered in new gallon containers, properly closed with typed labels indicating brand, type, color, etc.
- B. Where multiple component materials are used, the Contractor shall supply an unopened kit of the necessary materials in the manufacturer's smallest standard packaging size (i.e., a 2-component epoxy with a 1:1 mix ratio would require a 1-gallon can of resin and a 1-gallon can of curing agent). The manufacturer's literature describing the materials and giving directions for their use shall be furnished in three bound copies. A typewritten inventory shall be furnished at the time of delivery.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. Steel Surfaces.
 - 1. Touch-ups. Damaged areas on steel surfaces shall be required using the same materials used originally or compatible equal approved by the Engineer.
 - 2. Exterior. All such steel surfaces shall be prepared in accordance with the latest revision of Steel Structures Painting Council Surface Preparation Specifications.
 - 3. Steel surfaces include carbon steel, cast iron and ductile iron.
- B. Galvanized Surfaces. All galvanized surfaces which are to be painted shall be prepared in accordance with the latest revision of Steel Structures Painting Council definition SSPC-SP1-82, Solvent Cleaning, or as specified by the coatings manufacturer.
- C. Masonry Surfaces. All masonry surfaces shall be free of all oil, dirt, form release agents, laitance, efflorescence or other deleterious matter. Cleaning may include acid etching and/or abrasive grit blasting.
- D. Wood Surfaces. All wood surfaces shall be free of all dirt, oil, grease or other foreign matter. Surfaces shall be dry and free of gouges and sanded smooth. All knots shall be cleaned and sealed in accordance with the manufacturer's recommendations.
- E. Dry Walls. All dry wall surfaces shall be dry and free of all dirt, oil and other contaminants. All nail heads must be counter sunk and sealed.
- F. Aged Existing Coatings. Aged existing coatings which are to be topcoated after power washing, sweep blasting and/or spot blasting and priming shall be tested for adhesion prior to topcoating using a crosshatch test method according to ASTM D-3359.
- G. Plastic Surfaces. All plastic piping or reinforced fiber-glass plastic surfaces to be coated shall be lightly sanded and/or solvent cleaned prior to coating in accordance with manufacturer's recommendation.
- H. Other Surfaces. Other surfaces may require surface preparation in accordance with the following Steel Structures Painting Council definitions:
 - 1. SSPC-SP1 Solvent Cleaning
 - 2. SSPC-SP2 Hand Tool Cleaning
 - 3. SSPC-SP3 Power Tool Cleaning
 - 4. SSPC-SP5 White Metal Blast Cleaning

5. SSPC-SP6 Commercial Blast Cleaning
 6. SSPC-SP7 Brush-Off Blast Cleaning
 7. SSPC-SP8 Pickling
 8. SSPC-SP10 Near White Blast Cleaning
 9. SSPC-SP11 Power Tool Cleaning to Bare Metal
- I. Abrasive Materials. All abrasive materials shall be graded and free of all contaminants. The grade shall be of such size to achieve an anchor pattern or surface profile required by the coating manufacturer.
- J. Equipment. All abrasive blast and other equipment shall be equipped with, but not limited to, the following:
1. Hose coupling safety devices
 2. Electrical grounding devices
 3. Appropriate moisture traps and filters
 4. Fresh air hoods for all blasters
 5. "Dead Man" switches on all blast hoses
- K. All Cleaned Surfaces. All cleaned surfaces which are subject to rusting or contamination shall be painted the same day they are cleaned. If for any reason the surfaces cannot be coated the same day, they must be re-cleaned by methods approved by the Engineer or his representative, inspected and brought up to standard prior to coating application.
- L. Other Conditions.
1. Grease and/or oil contamination cannot be removed by abrasive cleaning. All such contamination shall be removed in accordance with SSPC-SP-1, Solvent Cleaning, prior to manual, power tool or abrasive blast cleaning.
 2. Care must be taken not to allow detrimental solvent or detergent residues to remain on surfaces to be coated.
 3. Where abrasive blast cleaning will not remove or properly prepare metal surfaces, hand and/or power tool cleaning shall be used to handle such conditions.
 4. Shop Primed Surfaces. Where metalwork, equipment, valves and the like are shop primed, the primer used must be compatible with the coating system to be applied in the field. Full information shall be furnished regarding the shop prime coat and, if not compatible with succeeding coats, in the opinion of the Owner's Representative, the shop prime coat shall be removed as directed by the coatings manufacturer or the Owner's Representative.

5. Unknown or Noncompatible Materials. Items coated with an unknown paint system, or a primer or system which is not compatible with the specified system, shall be cleaned by an acceptable method and recoated with the specified coating system at the job site. When cleaning is not feasible, the Contractor shall notify the Engineer and request permission to apply a barrier coat over the unknown or non-compatible material. The proposed barrier coat must be recommended in writing by the paint system manufacturer and is subject to review by the Engineer. Following application of the barrier coat, if permitted, the specified coating system shall be applied. Minimum dry film thickness shall be increased an amount equal to the barrier coat and unknown or non compatible coats.

- M. Surface Profile. The surface profile (anchor pattern) shall be as recommended by the coatings manufacturer and determined by visual comparators or profile tape.

3.02 APPLICATION

A. General

1. All materials shall be applied in accordance with the coatings manufacturer's recommendations and shall be performed in a workmanlike manner by experienced workmen.
2. All surfaces shall be free of dust and other contaminants prior to coating.
3. All application equipment shall be electrically grounded as required and have clean operating gauges, moisture traps, etc.
4. Manufacturer's Representative. The coating manufacturer shall be responsible, through an authorized representative, to provide technical assistance to the paint contractor as needed.

- B. Environmental Conditions. Coatings shall not be applied under the following conditions unless specifically authorized in writing by the coatings manufacturer and/or Engineer.

1. Surface temperature of the surface to be coated is at/or below 50°F or is expected to fall to or below 50°F within four hours of coating application.
2. Surface temperature of the surface to be coated is at 135°F or above.

3. The relative humidity is 85% or greater.
 4. The temperature is within 5°F of the dew point or is expected to drop to that level within 8 hours of application.
 5. Surfaces to be coated are wet or damp.
 6. Misting rain, snow, fog or dust-laden air.
 7. Excessive wind velocity (exterior).
- C. System Compatibility. Unless specifically approved by the Engineer/Owner, coatings from different manufactures may not be mixed within a coating system.
- D. Safety Precautions.
1. Contractor shall comply with applicable regulations set forth in the Code of Federal Regulations, OSHA Health and Safety Standards 29CFR-1926/1910, latest edition.
 2. Contractor shall comply with the applicable regulations set forth in the TAC Title 30 Chapter 101, General Rules, Paragraph 101.4, concerning Nuisance Emissions and Chapter 111, Control of Air Pollution From Visible Emissions and Particulate Matter, Abrasive Blasting Of Water Storage Tanks Performed By Portable Operations, Paragraphs 111.131 through 111.139.
 3. Surrounding equipment, fixtures, etc., shall be protected with drop cloths or other appropriate shielding from drops and overspray. Surfaces which are contaminated shall be cleaned and, if necessary, repainted.
 4. The Contractor must provide adequate forced air ventilation, while cleaning and painting. Ventilation shall be adequate to remove fumes, preventing injury to workmen or possible accumulation of volatile gases.
 5. Proper and adequate illumination equipment shall be provided including explosion proof equipment where required by the Engineer/Owner.
 6. Fresh air hoods shall be provided for painters and inspectors as necessary.

7. Warnings. Display caution signs in necessary areas advising of spray painting and warning against open flames.

E. Special Instructions.

1. In multi-coat systems, each coat shall be a different color to verify adequate coverage. However, the coat just prior to the finish coat, as necessary, may be tinted to approximately the same color as the finish coat to ensure adequate hiding.
2. The use of spray-painting equipment which diffuses paint and compressed air or generates paint fog or permits paint spray to become air-borne will not be permitted. Paint shall not be applied when conditions are such that windblown driftage, insects or moisture can collect on the freshly applied paints.
3. The Contractor shall take all necessary precautions to prevent paint from being scattered or windblown during application and shall be responsible for any and all damages due to settlement of paint on dwellings, structures, vehicles, or property in the vicinity of the work.
4. All cloths and cotton waste which might constitute a fire hazard shall be placed in covered metal containers or destroyed at the end of each work day. Upon completion of the work, all scaffolding, and containers shall be removed from the site or destroyed in a manner approved by the Engineer. Paint spots, oil or stains upon adjacent surfaces shall be removed and the entire job left clean and acceptable to the Engineer.
5. The sequence to be followed in painting shall be such that a minimum of damage to finished coatings will result.

- F. Curing. Special consideration shall be given to drying and curing times of coatings as recommended by the coatings manufacturer.

3.03 INSPECTION/QUALITY ASSURANCE

- A. Materials, Equipment and Coating System. All materials and equipment used in the accomplishment of the job are subject to inspection at any time by the Engineer and/or Construction Observer. All steps in the coating system shall be subject to inspection prior to progressing to succeeding steps. Phases of inspection shall include but not be limited to:

1. Pre-cleaning (surface preparation) survey of facilities to painted.
 2. During surface preparation and prior to coating inspection.
 3. During and immediately after each coating application.
- B. General Conditions for Inspection. Contractor shall not move or remove scaffolding, ladders or other fixtures necessary to provide proper inspection until such action has been approved by Construction Observer.
- C. Surface Preparation.
1. Metal surfaces shall be inspected using the latest revision of the Steel Structures Painting Council definitions and approved equipment and procedures. NACE (National Association of Corrosion Engineers) definitions and standards and SSPC-Vis1-89 may also be used at the discretion of the Engineer.
 2. Other surfaces shall be inspected in accordance with these specifications as previously defined.
- D. Dry Film Thickness Measurements.
1. Ferrous metal surfaces will be checked using an acceptable magnetic pull-off (Type I) or single fixed probe (Type II) gauge as described in SSPC-PA-2.
 2. Non-magnetic surfaces will be checked with an approved wet film gauge.
 3. Where non-magnetic surfaces are too irregular to be checked with a wet film gauge, estimated film thicknesses will be arrived at using coating manufacturer's published coverage rates and uneven color or shadowy appearance.
- E. Methods and Procedures. Unless otherwise specified, inspection procedures shall be in accordance with the latest revision of AWWA Specification D-102, Section 8.
- F. Finish. All finish coats shall be inspected visually and shall be free of all unsightly sags, runs, bubbles, drips, waves, laps, unnecessary brush marks, overspray, environmental contaminants or other physical defects and shall be uniform in color.

- G. Inspection Tools. The inspection tools which may be used without precluding the use of others are shown below:
- a. Wet Film Gauge
 - b. Magnetic Pull-Off (Type I) or Single Probe (Type II) Gauge
 - c. National Bureau of Standards Calibration Chips for Type I DFT Gauge
 - d. Plastic Shims for calibrating Type II DFT Gauge
 - e. Low voltage, wet sponge pinhole/holiday detector such as a Tinker & Razor Model M-1
 - f. SSPC or ISO Pictorial Standards
 - g. Profile Comparators (Clemtex-K-Tator)
 - h. Replica Tape for measuring anchor pattern (surface profile)
 - i. Blast Hose Needle Gauge
 - j. Blast Nozzle Aperture Gauge
 - k. Sling Psychrometer with Charts
 - l. Inspection Mirror
 - m. Surface Temperature (thermometers)

3.04 REPORTING/RECORDS

- A. Inspections. All inspections shall be recorded and shall include, not be limited to, the following information:
- 1. Date
 - 2. Time of Day
 - 3. Job Identification
 - 4. Engineer
 - 5. Contractor and Sub-Contractor
 - 6. Specified Coating System

7. Specified Surface Preparation
 8. Coatings Manufacturer and Product Batch Numbers being used
 9. Weather Conditions –
 - i. Temperature (Air and Surface)
 - ii. Humidity/Dew Point
 - iii. Wind Velocity/Direction
 10. Remarks/Results of Inspection
- B. Daily Work Reports. The Contractor will be required to furnish to the Engineer or Owner's Representative copies of daily work reports. These work reports shall include, but not be limited to, the following information:
1. Date – Start up and shut down time
 2. Names of personnel on job
 3. Tasks performed by individual personnel with time frame required to perform tasks
 4. Equipment being utilized
 5. Materials and quantities used
 6. Weather conditions and time taken (minimum twice daily) –
 - i. Temperature (air and surface)
 - ii. Humidity/dew point
 - iii. Wind velocity/direction
 7. Work accomplished with remarks concerning equipment breakdown and/or any job irregularities.

3.05 REPAIRS OF DEFECTS

- A. Exterior and Cosmetic Surfaces. Exterior and/or cosmetic surfaces will be repaired using the same material and matching color.
- B. Low Film Thicknesses. Inspections discovering low film thicknesses at a significant number of inspection points may require additional coat(s) of material at the discretion of the Engineer/Owner or Construction Observer. These additional coats will be at the Contractor's expense.

3.06 GUARANTEE

- A. The Contractor shall guarantee the job against defective materials and workmanship for a period of one (1) year from the date of acceptance of the job by the Owner. On or about the eleventh month of service, the facilities will be cleaned and inspected. At that time, all rust spots and other defects in the coating system shall be repaired as necessary at the Contractor's expense. Repairs will be made within thirty (30) days after written notice by the Engineer/Owner.

3.07 COATINGS SYSTEMS AND SCHEDULE

- A. **Valves.** Shall include Check Valves, Gate Valves, Butterfly Valves, Surge Relief Valves, Pump Control Valves, and appurtenances to be located above ground or in a vault.

Coating System.

Shop Coat: Tnemec Series 20-1211 Red Pota-Pox applied at 3.0-5.0 dry mils

Second Coat: Tnemec Series 140-1255 Beige Pota-Pox Plus applied at 6.0-8.0 dry mils

Third Coat: Tnemec Series 140-AA90 White Pota-Pox Plus applied at 6.0-8.0 dry mils

Total dry film thickness shall be 15.0 mils. minimum and 21.0 mils. maximum.

- B. **Steel Pipes.** Shall include Steel Pipe, Steel Fittings, Dresser Couplings, Steel Spool Pieces and appurtenances to be located above ground or in a vault.

Coating System.

Prime Coat: Tnemec Series 140 Pota-Pox Plus applied at 6.0-8.0 mils.

Finish Coat: Tnemec Series 75 Endura-Shield applied at 3.0-5.0 mils

Total dry film thickness shall be 9.0 mils. minimum and 12.0 maximum.

- C. **Pumps.** Shall include all pumps with Suction and Discharge Flanges, Sole Plates and appurtenances to be located above ground.

Coating System.

Shop Coat: Tnemec Series 20-1211 Red Pota-Pox applied at 3.0-5.0 dry mils

Second Coat: Tnemec Series 140-1255 Beige Pota-Pox Plus applied at 6.0-8.0 dry mils

Third Coat: Tnemec Series 140-AA90 White Pota-Pox Plus applied at 6.0-8.0 dry mils

Total dry film thickness shall be 15.0 mils. minimum and 21.0 mils. maximum.

- D. **Pipe Supports.** Shall include all steel pipe supports and appurtenances to be located above ground or in a vault.

Coating System.

Shop Coat: Tnemec Series 20-1211 Red Pota-Pox applied at 3.0-5.0 dry mils

Second Coat: Tnemec Series 140-1255 Beige Pota-Pox Plus applied at 6.0-8.0 dry mils

Third Coat: Tnemec Series 140-AA90 White Pota-Pox Plus applied at 6.0-8.0 dry mils

Total dry film thickness shall be 15.0 mils. minimum and 21.0 mils. maximum.

3.08 TOTAL DRY THICKNESS

- A. For all exterior surfaces: Total dry film thickness of the new coating system shall be as specified above per SSPC dry film thickness inspection standards.
- B. Engineer shall verify and record the average dry film thickness of the existing coating system, if applicable, (per SSPC average dry film thickness standards) prior to application of the new coating system. The total dry film thickness of the existing system and newly applied system shall be the sum of the two.

END OF SECTION