

## PART 1 – GENERAL

### 1.01 SUMMARY

- A. This section specifies the surface preparation, painting, and finishing of process, mechanical, and electrical equipment specified in Divisions 11 through 28 of the Contract Documents.
- B. Painting includes field painting exposed bare and covered pipes, hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment. All galvanized components and surfaces shall be painted. ~~No exposed galvanized surfaces shall be allowed.~~
- C. The piping and appurtenances provided by the Owner are uncoated and shall be painted by the Contractor as detailed herein.

~~G.D.~~ Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.

~~D.E.~~ Prefinished items not to be painted include the following factory-finished components, except where color coding is required:

1. Light fixtures.
2. Switchgear.
3. Distribution cabinets.

~~E.F.~~ Finished metal surfaces not to be painted include:

1. Anodized aluminum (except all handrails, which ~~are to~~shall be painted "Safety Yellow").
2. Stainless steel.

~~F.G.~~ Operating parts not to be painted include moving parts of operating equipment such as the following:

1. Valve and damper operators.
2. Linkages.
3. Sensing devices.
4. Motor, pump, and fan shafts.

~~G.H.~~ Labels: Do not paint over Underwriter's Laboratories, Factory Mutual, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

### 1.02 SUBMITTALS

#### A. Data Sheets:

1. For each paint system furnish Material Safety Data Sheets (MSDS), the manufacturer's Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system.
2. Submit required information on a system-by-system basis.

#### B. Quality Control Submittals:

1. Applicator's Qualification: List of references substantiating experience.
2. Factory-Applied Coatings: Manufacturer's certification stating factory-applied coating system meets or exceeds requirements specified.
3. Manufacturer's written instructions and special details for applying each type of paint.

1.03 QUALITY ASSURANCE

- A. Qualifications – Applicator: Minimum 5 years of experience in application of specified products.
- B. Regulatory Requirements: Meet federal, state, and local requirements limiting the emission of volatile organic compounds:
  - 1. Perform surface preparation and painting in accordance with recommendations of the following:
    - a. Paint manufacturer's instructions.
    - b. SSPC-PA Guide No. 3, Guide to Safety in Paint Applications.
    - c. Federal, state, and local agencies having jurisdiction.
- C. Single Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the jobsite in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Federal specification number, if applicable.
  - 4. Manufacturer's stock number and date of manufacture.
  - 5. Contents by volume, for pigment and vehicle constituents.
  - 6. Thinning instructions.
  - 7. Application instructions.
  - 8. Color name and number.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at an ambient temperature greater than the minimum temperature recommended by the manufacturer. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
- C. Protect materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.05 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F and 90 degrees F.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F and 95 degrees F.
- C. Do not apply paint in snow, rain, fog, or mist when the relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point unless specifically allowed by the manufacturer, or to damp or wet surfaces.
- D. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature and humidity limits specified by the manufacturer during application and drying periods.

## **PART 2 – PRODUCTS**

### **2.01 MANUFACTURERS**

#### **A. AVAILABLE MANUFACTURERS**

1. Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
  - a. Fuller O'Brien (Fuller).
  - b. PPG Industries, Pittsburgh Paints (PPG).
  - c. Tnemec Company, Inc. (Tnemec).
  - d. Sherwin-Williams (SW).
  - e. Or approved equal.

### **2.02 PAINT MATERIALS, GENERAL**

- A. Material Compatibility: Provide primers, finish-coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application as demonstrated by the manufacturer based on testing and field experience.
- B. Material Quality: Provide the manufacturer's best-quality trade-sale paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.
- D. Colors: Provide color selections made by the Engineer from the manufacturer's full range of standard colors.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied:
  1. Do not begin to apply paint until unsatisfactory conditions have been corrected.
  2. Start of painting will be construed as the applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work:
  1. Review other sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  2. Notify the Engineer about anticipated problems using the materials specified over substrates primed by others, or over existing coated surfaces that are to be prepared and recoated.

### **3.02 PREPARATION**

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and

painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation:

1. Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.
2. Provide barrier coats over incompatible primers and existing coatings or remove and redo. Notify Engineer in writing about anticipated problems using the specified finish-coat material with substrates primed by others.
3. Ferrous Metals:
  - a. Clean ungalvanized ferrous-metal surfaces that have not been shop-coated and previously painted metals indicated for painting; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).
  - b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.
4. Galvanized Surfaces:
  - a. Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants.
  - b. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
5. PVC Pipe:
  - a. Prepare PVC surfaces in accordance with manufacturer's instructions. All PVC pipe exposed to sunlight shall be painted.
  - b. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
  - c. Scarify PVC surfaces.
  - d. Painting of MH and CLS pipe not required.
6. Ductile Iron Pipe:
  - a. Prepare ductile or cast iron surfaces in accordance with manufacturers' instructions.
  - b. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants. Provide solvent cleaning per National Association of Pipe Fabricators Standard NAPF 500-03-01.

D. Materials Preparation:

1. Carefully mix and prepare paint materials according to manufacturer's directions.
2. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
3. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
4. Use only thinners approved by the paint manufacturer and only within recommended limits.

E. Tinting:

1. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied.
2. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General:

1. Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth, even surface according to the manufacturer's directions.
5. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
6. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
7. Paint surfaces behind movable equipment the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment with prime coat only.
8. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

B. Scheduling Painting:

1. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures:

1. Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.
  - a. Brushes: Use brushes best suited for the material applied.
  - b. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  - c. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer and as specified, whichever is greater.

E. Electrical items to be painted include, but are not limited to, the following:

1. Exposed conduit and fittings in occupied spaces.
2. Motors provided without factory-applied coatings.

F. Prime Coats:

1. Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others.
2. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

G. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Completed Work:

1. Match approved samples for color, texture, and coverage.
2. Remove, refinish, or repaint work not complying with specified requirements.

### 3.04 CLEANING

A. Cleanup:

1. At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
2. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Do not scratch or damage adjacent finished surfaces.

### 3.05 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Protect adjacent walls, floors, and ceilings against splash and overspray. Correct damage by cleaning, repairing or replacing, and repainting. The Contractor shall be solely responsible for costs to repair damages to Owner's property or private property due to splash and overspray.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.06 PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates indicated. Unless otherwise specified, the word "interior" shall mean the inside of a building or structure, and the word "exterior" shall mean outside exposure to weather elements.
- B. Exterior Ferrous Metal: Provide the following finish systems over exterior ferrous metal that is not immersed. Valve vaults and wet wells are considered exterior installations. Primer is not required on shop-primed items or previously painted ferrous metals with sound existing coatings.
  1. Satin or Semigloss, Polyamide Epoxy with Polyurethane Finish Coat: Two coats over a rust-inhibitive primer to achieve a total dry film thickness of not less than 10 mils:
    - a. Surface Preparation: SSPC-SP6.
    - b. Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 3 mils:
      - 1) Fuller: DP45U902 High Solids Epoxy.
      - 2) PPG: 97-680 Modified Alkyd Primer.

- 3) Tnemec: Series N69 Hi-Build Epoxoline.
  - 4) Or approved equal.
  - c. First Coat: Satin or semigloss polyamide epoxy applied at spreading rate recommended by the manufacturer:
    - 1) Fuller: DP45U902 High Solids Epoxy.
    - 2) PPG: 97-53 Aquapon.
    - 3) Tnemec: Series N69 High Build Epoxoline.
    - 4) Or approved equal.
  - d. Second Coat: Aliphatic polyurethane applied at spreading rate recommended by manufacturer:
    - 1) Fuller: Alithane II DP47U902.
    - 2) PPG: Pitthane Series 95-8400.
    - 3) Tnemec: Endura-Shield Series 73.
    - 4) Or approved equal.
- C. Immersed Ferrous Metal, Zinc-Coated Metal, and Ductile Iron Pipe: Provide the following system:
- 1. Polyamidoamine Epoxy:
    - a. AWWA D102 Paint System: ICS-1.
    - b. ANSI/NSF 61 Certified for use inside potable-water storage tanks.
    - c. Surface Preparation: SSPC-SP 10/NACE 2.
    - d. Primer: Rust-inhibitive primer applied at spreading rate recommended by the manufacturer to achieve a total dry-film thickness of not less than 4 mils:
      - 1) Tnemec, Series 20 Pota-Pox.
      - 2) SW, Epolon II Multi-Mil Epoxy.
      - 3) Or approved equal.
    - e. Finish Coat: Applied at spreading rate recommended by the manufacturer to achieve a total dry-film thickness of not less than 11 mils:
      - 1) Tnemec, Series N140 Pota-Pox Plus.
      - 2) SW, Epolon II Multi-Mil Epoxy.
      - 3) Or approved equal.
- D. Interior and Exterior Zinc-Coated Metal:
- 1. Provide the following finish systems over exposed zinc-coated (galvanized) metal surfaces, ~~including existing piping at the aeration basin above the high water mark,~~ unless otherwise specified:
    - a. Full-Gloss, Alkyd-Enamel Finish: Two finish coats over a galvanized metal primer.
      - 1) Surface Preparation: For existing surfaces, power tool cleaning per SSPC SP-3. For new galvanized surfaces, solvent cleaning per SSPC SP-1.
      - 2) Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils:
        - a) Fuller: 621-05 Blox-Rust Latex Metal Primer.
        - b) PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
        - c) Or approved equal.

- 3) First and Second Coats: Full-gloss, exterior, alkyd enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils:

- a) Fuller: 312-XX Compliant Heavy-Duty Enamel.
- b) PPG: 6-282 Speedhide Interior/Exterior Gloss-Oil Enamel.
- c) Or approved equal.

E. Interior Ferrous Metals:

1. Semigloss Enamel Finish: Two coats over primer with a dry film thickness of not less than 2.5 mils per coat:

- a. Primer: Synthetic, quick-drying, rust-inhibiting primer.
  - 1) Fuller: 621-04 Blox-Rust Alkyd Metal Primer.
  - 2) PPG: 6-208 Red Inhibitive Metal Primer.
  - 3) Or approved equal.
- b. Undercoat: Interior enamel undercoat:
  - 1) Fuller: 220-07 Interior Alkyd Enamel Undercoat.
  - 2) PPG: 6-6 Speedhide Quick-Dry Enamel Undercoater.
  - 3) Or approved equal.
- c. Finish Coat: Interior, semigloss, odorless, alkyd enamel:
  - 1) Fuller: 110-XX Fullerglo Alkyd Semigloss Enamel.
  - 2) PPG: 27 Line Wallhide Semigloss Enamel.
  - 3) Or approved equal.

F. Interior and Exterior Ductile and Cast Iron Pipes, Equipment, and Valves: Provide the following finish systems over ductile and cast iron equipment and pipe:

1. Same as for interior and exterior ferrous metal, except as noted below:
  - a. Surface Preparation: As recommended by equipment manufacturers. Exposed ductile iron pipe to be painted shall be supplied from the manufacturer uncoated.

G. PVC Pipe: Provide the following finish system over exposed PVC pipe:

1. Same as for exposed ferrous metal except as noted below:
  - a. Surface Preparation: Scarify.
  - b. Total Dry Film Thickness: 4 mils minimum.

### 3.07 COLORS

A. Pipe Identification Painting:

1. Color code non-submerged piping except electrical conduit. Paint fittings and valves the same color as pipe.
2. Piping Color Coding: As selected by Owner or Engineer.
3. Pipe Supports: No. 70 light gray as specified in ANSI 359-A-85.

B. Proprietary identification of colors is for identification only. Selected manufacturer may supply matches.



C. Equipment Colors:

1. Equipment includes the machinery or vessel itself plus the structural supports and fasteners and attached electrical conduits. Provide as designated herein and as selected by Owner or Engineer.
2. Paint equipment and piping one color as selected.
3. Paint non-submerged portions of equipment the same selected color as the piping it serves, except as itemized below:
  - a. Dangerous Parts of Equipment and Machinery: OSHA Orange.
  - b. Fire Protection Equipment and Apparatus: OSHA Red.
  - c. Radiation Hazards: OSHA Purple.
  - d. Physical Hazards in Normal Operating Area and Energy Lockout Devices: OSHA Yellow.
  - e. Safety Equipment, Including, but Not Limited to, Eyewashes and Safety Showers: OSHA Green.
4. Fiberglass reinforced plastic (FRP) equipment with an integral colored gel coat does not require painting, provided the color is as selected.

**END OF SECTION**

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