SECTION 099623 - PAINTING WATER TREATMENT PLANT

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Note on the drawings the items of work that this Section applies to.

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. Section includes surface preparation and the application of high-performance coating systems on materials common to wastewater treatment plants.
				2. Work under this Contract shall also include, but not necessarily be limited to:

Moisture testing of substrates.

Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas.

Specific pre-treatments noted.

Sealing / priming surfaces for repainting.

Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Primers in other Sections must be coordinated for compatibility with finish coats specified in this Section. Review other Sections for shop-primed exterior products, and insert references to this Section to establish primer requirements.

[**Section 051200 "Structural Steel Framing"**] [**Section 051213 "Architecturally Exposed Structural Steel Framing"**] for shop priming of structural steel with primers specified in this Section.

Section 055213 "Pipe and Tube Railings" for shop [**priming**] [**painting**] pipe and tube railings with coatings specified in this Section.

Section 099113 "Exterior Painting" for general field painting.

Section 099123 "Interior Painting" for general field painting.

* + - * 1. Refer to drawings and schedules (e.g., Finish Schedule) for type, location and extent of exterior and interior painting required.
			1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. Semi-Gloss: 35 to 70 units at 60 degrees, according to ASTM D523.
				2. Gloss: 70 to 85 units at 60 degrees, according to ASTM D523.
				3. High Gloss: More than 85 units at 60 degrees, according to ASTM D523.
			1. REFERENCES
				1. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of interior and exterior surfaces shall conform to the applicable requirements of the Steel Structures Painting Council, ASTM, current Local and Federal Health Standards, and the coating/paint manufacturer's printed instructions.
			2. SUBMITTALS
				1. General: Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Painting Schedule: Cross-referenced Painting Schedule listing all exterior and interior substrates to be painted and specified finish paint type designation; product name and manufacturer, recommended primers and product numbers, and finish paint color designation for each substrate to be painted.

Designate exterior substrates by building name and number, substrate to be painted and surface location.

Designate interior substrates by building name and number, floor, room name and number, and surface to be painted.

* + - * 1. Product Data: For each type of product. include manufacturer's name, brand name of product, manufacturer's identifying number (if applicable), color, formula analysis and percent by weight, flash point, surface preparation instructions, reducing and application instructions, and for products other than primers, the manufacturer's recommended primer.

Indicate VOC content.

Furnish color selection chart. Color selection for the various pieces of equipment and work will be made through the Director's Representative following approval of the Submittals Package.

* + - * 1. Sustainable Design Submittals:
				2. Color Charts for Initial Selection: For each type of topcoat product indicated.
				3. Delete "Color Charts for Initial Selection" Paragraph above if colors and other characteristics are preselected and specified or scheduled. Contractor’s Qualifications: Submit documentation demonstrating compliance with requirements in Quality Assurance Article.
				4. Certification of Volatile Organic Compounds: Submit certified list demonstrating compliance requirements in Quality Assurance Article.
			1. QUALITY ASSURANCE
				1. Quality assurance procedures and practices to be utilized to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Director's Representative.
				2. Volatile Organic Compounds (VOCs) Regulatory Requirements: Chapter III of Title 6 of the official compilation of Codes, Rules and Regulations of the State of New York (Title 6 NYCRR), Part 205 Architectural Surface Coatings.

Certificate of Compliance: List of each paint product to be delivered and installed. List shall include written certification stating that each paint product listed complies with the VOC regulatory requirements in effect at the time of job site delivery and installation.

* + - * 1. Contractor shall have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work. When requested by the Director’s Representative, Contractor shall provide a list of the last three comparable repainting jobs including, name, location, specifying authority / project manager, start / completion dates and value of the work.
				2. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

Director’s Representative will select one surface to represent surfaces and conditions for application of each coating system.

Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft..

Other Items: Director’s Representative will designate items or areas required.

Final approval of color selections will be based on mockups.

If preliminary color selections are not approved, apply additional mockups of additional colors selected by Director’s Representative at no added cost to the State.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Director’s Representative specifically approves such deviations in writing.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - * 1. Compatibility of Paint Materials: Primers and intermediate paints shall be products manufactured or recommended by the finish paint manufacturer.
			1. REGULATORY REQUIREMENTS
				1. Conform to work place safety regulations for storage, mixing, application and disposal of all paint related materials to requirements of those authorities having jurisdiction.
				2. To reduce the amount of contaminants entering waterways, sanitary / storm drain systems or into the ground the following procedures shall be strictly adhered to:

Retain cleaning water for water based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

Return solvent and oil-soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

Empty paint cans are to be dry prior to disposal or recycling (where available).

Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire safe area at moderate temperature.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Deliver painting materials in sealed, original labeled containers bearing manufacturer's name, brand name, type of paint or coating and color designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.

Coating and paint materials shall not be used until the Director's Representative has inspected the contents and has obtained data from information on the containers or label.

Materials exceeding storage life recommended by the manufacturer shall be rejected.

* + - * 1. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

Maintain containers in clean condition, free of foreign materials and residue.

Comply with requirements of authorities having jurisdiction, in regard to the use, handling, storage and disposal of hazardous materials.

* + - * 1. Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take necessary precautions and post adequate warnings (e.g. no smoking) as required.
				2. Take necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) to be stored in suitable closed and rated containers or removed from the site on a daily basis.

If necessary, insert special requirements for fire protection, heating, ventilation, and other conditions for storage areas on-site.

* + - 1. FIELD CONDITIONS

Some manufacturers' products may require higher temperatures for proper curing. Consult manufacturers and revise first paragraph below to suit requirements for specific products if necessary.

* + - * 1. Comply fully with the manufacturer's recommendations as to environmental conditions under which the coating and coating systems can be applied.
				2. Do not apply exterior coatings in snow, rain, fog, or mist.
				3. Provide adequate illumination while work is in progress, including explosion-proof lights and electrical equipment.

Whenever required by the Director's Representative, provide additional illumination and necessary supports to cover all areas to be inspected.

The level of illumination for inspection purposes shall be determined by the Director's Representative.

* + - * 1. Apply paint only to dry, clean, and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.
				2. Test suspect surfaces (concrete, masonry, plaster and wood surfaces) for moisture and alkalinity as required. Conduct all moisture tests using a properly calibrated electronic moisture meter.
				3. In locations where flammable vapors may be present, take positive action to prevent ignition by eliminating and controlling sources of ignition.

Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical and mechanical), spontaneous ignition, chemical and physical-chemical reactions, and radiant heat.

* + - * 1. Provide mechanical ventilation adequate to remove flammable vapors to a safe location and to confine and control combustible residues so that life or property is not endangered.

Equipment used to control hazardous exposure shall be explosion-proof.

Keep mechanical ventilation in operation at all times while coating or painting operations are being conducted and for a sufficient time thereafter to allow flammable vapors from drying coatings or paints to be exhausted. Ventilation shall reduce the concentration of air contaminant to the degree a hazard does not exist. The exhaust discharge point of fumes shall be not less than ten feet from any combustible exterior wall or roof nor shall the discharge be in the direction of any combustible construction or unprotected opening in any non-combustible exterior wall within 50 feet.

* + - * 1. Inside buildings, provide tight fitting temporary partitions as required to protect mechanical and other equipment from abrasive blasting particles and to contain the spread of paint fumes.
			1. SAFETY AND HEALTH REQUIREMENTS
				1. Provide and require use of personnel protective equipment for persons working in or about the project Site, all in accordance with requirements set forth by regulatory agencies applicable to the construction industry, the coating manufacturer's printed instructions, and appropriate technical bulletins and manuals.

Protective helmets shall be worn by all persons while in the vicinity of the Work.

Workers engaged in or near the Work during abrasive blasting shall wear eye and face protection devices, and air purifying half mask or mouthpiece respirator with appropriate filter.

Furnish protective clothing, gloves and barrier creams in accordance with the coating manufacturer's recommendations to prevent injury to workmen from strong chemicals during their application.

1. PRODUCTS
	* + 1. GENERAL

Retain "Products" Paragraph below and insert lists of manufacturers and products in high performance coating schedules to require specific products or a comparable product from other manufacturers.

* + - * 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, products listed in the Coating Systems article for the coating category indicated.
			1. SOURCE QUALITY CONTROL

Retain this article for large projects or critical coatings where additional control is desired. Delete if tests are not required.

* + - * 1. Testing of Coating Materials: The Director’s Representative reserves the right to invoke the following procedure:

The Director’s Representative will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

Testing agency will perform tests for compliance with product requirements.

The Director’s Representative may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

* + - 1. PAINT MANUFACTURERS
				1. Manufacturers of paints and coatings that may be incorporated into the work include, but are not limited to the following:

Carboline

PPG Protective & Marine Coatings.

The Sherwin-Williams Company

Tnemec Company, Inc.

* + - 1. COATING SYSTEMS

The coating systems specified herein are suitable for field painting water treatment plant construction throughout including constituent parts of aerators, clarifiers, filters, primary and secondary tanks, lift stations, piping, etc. Select the appropriate coating(s) from those given below. Base selection on surface (substrate) to be painted, required surface preparation, and specific exposure.

* + - * 1. Carbon Steel (structural steel, miscellaneous metal, tanks, piping and equipment):

Exterior Steel, Non-Immersion:

Shop Surface Preparation: SSPC SP6 Commercial.

Shop Prime Coat: Two component, not less than 63 percent solids by volume, aromatic urethane zinc-rich primer.

Dry Film Thickness: 2.5 to 3.5 mils.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Topcoat: Two component, not less than 58 percent solids by volume, aliphatic acrylic polyurethane.

Dry Film Thickness: 2.5 to 5.0 mils.

Total Dry Film Thickness: 8.0 to 13.5 mils.

Interior Steel, Non-Immersion (moderate chemical and dry exposure) for structural steel, pumps, valves, mechanical equipment:

Shop Surface Preparation: SSPC SP6 Commercial Blasting.

Shop Prime Coat: Two component, not less than 60 percent solids by volume, aromatic urethane zinc-rich primer.

Dry Film Thickness: 2.5 to 3.5 mils.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Total Dry Film Thickness: 8.5 to 13.5 mils.

Use system specified in subparagraph below for maintenance and conditions where blast cleaning is not practical.

Interior Steel, Non-Immersion:

Shop Surface Preparation: SSP SP2 Hand or SP3 Power Tool Cleaning.

Shop Prime Coat: Two component, not less than 58 percent solids by volume, polyamide epoxy tiecoat.

Dry Film Thickness: 4.0 to 6.0 mils.

Full Field Prime Coat: Single component, not less than 51 percent solids by volume, moisture-cured aromatic urethane.

Dry Film Thickness: 2.5 to 3.0 mils.

Topoat: Single-component, not less than 60 percent solids by volume, moisture-cured aliphatic polyurethane.

Dry Film Thickness: 2.0 to 2.5 mils.

Total Dry Film Thickness: 8.5 to 11.5 mils.

Interior or Exterior Steel, Immersion - Non-Potable:

Shop Surface Preparation: SSPC SP10 Near White Blast Cleaning.

Shop Prime Coat: Two component, not less than 63 percent solids by volume, zinc-rich aromatic urethane.

Dry Film Thickness: 2.5 to 3.5 mils.

Field Surface Preparation: Pressure wash to remove surface contamination. SSPC SP3 any damaged primer or welded connections. Spot prime with shop primer.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Total Dry Film Thickness: 8.5 to 13.5 mils.

Interior or Exterior Steel, Immersion - Potable:

Shop Surface Preparation: SSPC SP10 Near White Blast Cleaning.

Shop Prime Coat: Two component, not less than 63 percent solids by volume, zinc-rich aromatic urethane.

Dry Film Thickness: 2.5 to 3.5 mils.

Field Surface Preparation: Pressure wash to remove surface contamination. SSPC SP3 any damaged primer or welded connections. Spot prime with shop primer.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Total Dry Film Thickness: 10.5 to 15.5 mils.

Use system specified in subparagraph below for exposures to hydrogen sulfide, mild acids and industrial waste condensates.

Interior or Exterior Steel, Immersion - Non-Potable:

Surface Preparation: SSPC SP5 White Metal Blast Cleaning.

Minimum Anchor Pattern: 3.0 mils.

Prime Coat: Two component, not less than 85 percent solids by volume, vinyl ester.

Dry Film Thickness: 15.0 to 18.0 mils.

Topcoat: Two component, not less than 85 percent solids by volume, vinyl ester.

Dry Film Thickness: 15.0 to 18.0 mils.

Total Dry Film Thickness: 30.0 to 36.0 mils.

Interior or Exterior Steel, High Temperature Surfaces to 1200 degrees F:

Surface Preparation: SSPC SP10 Near White Blast Cleaning.

Minimum Anchor Pattern: 1.0 mil.

Prime Coat: Single-component, not less than 25 percent solids by volume, silicone aluminum.

Dry Film Thickness: 0.7 to 1.5 mils.

Topcoat: Single-component, not less than 25 percent solids by volume, silicone aluminum.

Dry Film Thickness: 0.7 to 1.5 mils.

Total Dry Film Thickness: 1.4 to 3.0 mils.

* + - * 1. Mill Coated Ductile Iron Pipe:

Interior or Exterior, Non-Immersion:

Shop Surface Preparation: SSPC SP6 Commercial Blast Cleaning.

Shop Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy primer.

Dry Film Thickness: 3.0 to 5.0 mils.

Field Surface Preparation: Pressure wash shop primer to remove surface contamination. SSPC SP3 damaged primer or welded connections. Spot prime with shop primer.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Topcoat: Two component, not less than 58 percent solids by volume, aliphatic acrylic polyurethane.

Dry Film Thickness: 2.5 to 5.0 mils.

Total Dry Film Thickness: 8.5 to 15.0 mils.

Interior or Exterior, Immersion - Non-Potable:

Shop Surface Preparation: SSPC SP10 Near White Blast Cleaning.

Shop Prime Coat: Two component, not less than 60 percent solids by volume, aromatic zinc-rich urethane primer.

Dry Film Thickness: 2.5 to 3.5 mils.

Field Surface Preparation: Pressure wash shop primer to remove surface contamination. SSPC SP3 damaged primer or welded connections. Spot prime with shop primer.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Total Dry Film Thickness: 10.5 to 15.5 mils.

Interior or Exterior, Immersion - Potable:

Shop Surface Preparation: SSPC SP10 Near White Blast Cleaning.

Shop Prime Coat: Two component, not less than 60 percent solids by volume, aromatic zinc-rich urethane primer.

Field Surface Preparation: Pressure wash shop primer to remove surface contamination. SSPC SP3 damaged primer or welded connections. Spot prime with shop primer.

Full Field Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Total Dry Film Thickness: 10.5 to 15.5 mils.

* + - * 1. Galvanized Steel - Piping and Miscellaneous Fabrications:

Exterior:

Surface Preparation: SSPC SP1 Solvent Cleaning and SSPC SP7 Brush-Off-Blast Cleaning to achieve a uniform 1.0 to 1.5 mil profile.

Spot Prime Coat: Single component, not less than 62 percent solids by volume, mio/zinc-filled, aromatic polyurethane primer.

Dry Film Thickness: 2.5 to 3.5 mils.

Full Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 4.0 mils.

Finish Coat: Two component, not less than 58 percent solids by volume, aliphatic acrylic polyurethane.

Dry Film Thickness: 2.5 to 5.0 mils.

Total Dry Film Thickness: 8.0 to 12.5 mils.

Interior:

Surface Preparation: SSPC SP1 Solvent Cleaning and SSPC SP7 Brush-Off-Blast Cleaning to achieve a uniform 1.0 to 1.5 mil profile.

Spot Prime Coat: Single component, not less than 62 percent solids by volume, mio/zinc-filled, aromatic polyurethane primer.

Dry Film Thickness: 2.5 to 3.5 mils.

Full Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 4.0 mils.

Finish Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 4.0 mils.

Total Dry Film Thickness: 8.5 to 11.5 mils.

* + - * 1. Concrete - Cast-in-Place and Precast Concrete Surfaces:

Exterior, Non-Immersion above Grade:

Surface Preparation: Clean and dry.

Two Coats: Single component, not less than 44 percent solids by volume, acrylic emulsion.

Dry Film Thickness: 4.0 to 8.0 mils per coat.

Total Dry Film Thickness: 8.0 to 16.0 mils.

Exterior, Below Grade:

Surface Preparation: Clean and dry.

Two Coats: Single component, not less than 64 percent solids by volume, coal tar.

 Dry Film Thickness: 8.0 to 12.0 mils per coat.

Total Dry Film Thickness: 16.0 to 24.0 mils.

Immersion, Non-Potable (pH range between 5.0 and 10.0):

Surface Preparation: SSPC SP7 Brush-off Blast Cleaning.

Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 5.0 mils.

Filler and Surfacer (holes and cracks): Two component, 100 percent solids, modified amine epoxy.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Total Dry Film Thickness: 7.0 to 11.0 mils.

Interior, Non-Immersion:

Surface Preparation: Clean and dry.

Two Coats: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness - Prime Coat: 3.0 to 5.0 mils.

Dry Film Thickness - Topcoat: 4.0 to 6.0 mils.

Total Dry Film Thickness: 7.0 to 11.0 mils.

Interior, Immersion-Potable:

Surface Preparation: SSPC SP7 Brush-Off Blast Cleaning.

Prime Coat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Filler and Surfacer (holes and cracks): Two component, modified amine epoxy.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 4.0 to 6.0 mils.

Total Dry Film Thickness: 8.0 to 12.0 mils.

Use system specified in subparagraph below for exposures to hydrogen sulfide, mild acids and industrial waste condensate.

Immersion, Non-Potable:

Surface Preparation: SSPC SP7 Brush-Off Blast Cleaning.

Prime Coat: Two component, not less than 85 percent solids by volume, vinyl ester.

Dry Film Thickness: 15.0 to 18.0 mils.

Filler and Surfacer (trowel or rubber float application): Two component, not less than 90 percent solids by volume, vinyl ester.

Topcoat: Two component, not less than 85 percent solids by volume, vinylester.

Dry Film Thickness: 15.0 to 18.0 mils.

Total Dry Film Thickness: 30.0 to 36.0 mils.

* + - * 1. Concrete Floors - Secondary Chemical Containment in Chemical Mixing and Storage Areas:

Pigmented Finish:

Surface Preparation: Brush-Off or Vacuum Blast Cleaning.

First Coat: Two component, 100 percent solids by volume, modified polyamine epoxy.

Dry Film Thickness: 6.0 to 8.0 mils.

Intermediate Coat: Two component, not less than 90 percent solids by volume, polyamine novolac epoxy.

Dry Film Thickness: 10.0 to 15.0 mils.

Topcoat: Two component, not less than 97 percent solids by volume, polyamine novolac epoxy.

Dry Film Thickness: 6.0 to 10 mils.

Total Dry Film Thickness: 22.0 to 31.0 mils.

For non-skid surface, add or broadcast 50 to 70-mesh silica sand at 5 pounds per gallon to second coat.

* + - * 1. Concrete Masonry Units:

Exterior - Exposed:

Surface Preparation: Clean and Dry.

Prime Coat: Three component, not less than 68 percent solids by volume, waterborne cementitious acrylic.

Dry Film Thickness: 6.0 to 8.0 mils.

Intermediate Coat: Same as topcoat.

Topcoat: Single component, not less than 44 percent solids by volume, acrylic emulsion.

Dry Film Thickness: 6.0 to 8.0 mils per coat.

Total Dry Film Thickness: 18.0 to 24.0 mils.

Interior:

Surface Preparation: Clean and dry.

Prime Coat: Three component, not less than 68 percent solids by volume, waterborne cementitious acrylic.

Dry Film Thickness: 14.0 to 18.0 mils (60 to 80 sq ft/gal).

Intermediate Coat: Same as topcoat.

Topcoat: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 3.0 to 6.0 mils per coat.

Total Dry Film Thickness: 6.0 to 12.0 mils above black filler.

* + - * 1. Indoor Wall and Ceiling Surfaces:

Cement Plaster and Gypsum Wallboard:

Surface Preparation: Clean and dry.

Prime Coat: Two component, not less than 30 percent solids by volume, waterborne polyamide epoxy.

Dry Film Thickness: 1.0 to 1.5 mils.

Intermediate Coat: Same as topcoat.

Topcoat: Two component, not less than 44 percent solids by volume, waterborne acrylic epoxy.

Dry Film Thickness: 3.0 to 5.0 mils per coat.

Total Dry Film Thickness: 7.0 to 11.5 mils.

* + - * 1. Wood:

Indoor and Outdoor Areas:

Surface Preparation: Clean and dry.

Prime Coat: Single component, not less than 56 percent solids by volume, alkyd primer.

Dry Film Thickness: 2.0 to 3.5 mils.

Intermediate Coat: Single component, not less than 56 percent solids by volume, semi-gloss finish alkyd.

Dry Film Thickness: 1.5 to 3.5 mils.

Topcoat: Single component, not less than 49 percent solids by volume, gloss finish alkyd.

Total Dry Film Thickness: 7.0 to 11.5 mils.

* + - * 1. PVC Piping:

Indoor Areas:

Surface Preparation: Clean and dry; surface uniformly scarified.

Prime and Topcoats: Two component, not less than 56 percent solids by volume, polyamide epoxy.

Dry Film Thickness: 2.0 to 3.0 mils per coat.

Total Dry Film Thickness: 4.0 to 6.0 mils.

* + - 1. SYSTEM MATERIAL COLOR IDENTIFICATION

Colors given in the schedule below are in compliance with recommended standards for water works, published by Great Lakes-Upper Mississippi River of State Public Health and Environmental Managers.

|  |  |  |
| --- | --- | --- |
| Material contained(tanks and piping) |  | generic color |
| Water - |  |  |
| Raw Water |  | Olive Green |
| Settled or Clarified Water |  | Aqua |
| Finished or Potable Water |  | Dark Blue |
| Chemicals - |  |  |
| Alum or Primary Coagulant |  | Orange |
| Ammonia |  | White |
| Caustic |  | Yellow with Green Band |
| Chlorine (Gas and Solution) |  | Yellow |
| Fluoride |  | Light Blue with Red Band |
| Ozone |  | Yellow with Orange Band |
| Phosphate Compounds |  | Light Green with Red Band |
| Polymers or Coagulant Aids |  | Orange with Green Band |
| Potassium Permanganate |  | Violet |
| Soda Ash |  | Light Green with Orange Band |
| Sulfuric Acid |  | Yellow with Red Band |
| Compressed Air |  | Dark Green |
| Other Lines |  | Light Gray |
| Fire Protection |  | Red |

1. EXECUTION
	* + 1. GENERAL
				1. Surface preparation, coating and painting to conform to applicable standards of the Steel Structures Painting Council and the coating and paint manufacturer's printed instructions. Material applied prior to approval of the surface by the Director's Representative to be removed and reapplied at no expense to the State.
				2. Coating and painting equipment to be designed for application of the materials specified and will be maintained in first class working condition. Compressors to have suitable traps and filters to remove water and oil from the air. Equipment is subject to approval by the Director's Representative.
			2. EXAMINATION
				1. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
				2. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

Concrete: 12 percent.

Fiber-Cement Board: 12 percent.

Masonry (Clay and CMUs): 12 percent.

* + - * 1. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
				2. Proceed with coating application only after unsatisfactory conditions have been corrected.

Application of coating indicates acceptance of surfaces and conditions.

* + - 1. PREPARATION
				1. Comply with manufacturer's written instructions and recommendations applicable to substrates and coating systems indicated.
				2. Prepare surfaces in accordance with the latest revision of the following surface preparation specifications of the Steel Structures Painting Council.

All blasted surfaces shall conform to SSPC-Vis1-89 Visual Standard for Abrasive Blast Cleaned Steel.

* + - * 1. Particle size of abrasive used in blast cleaning shall be that which will produce a 1-1/2 - 2 mil (37.5 microns - 50.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.

Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of the coating or paint and shall not be reused unless specifically approved by the Director's Representative.

* + - * 1. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

* + - * 1. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

Coordination of shop-applied prime coats with high-performance coatings is critical.

Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

* + - * 1. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

If applicable, retain one of two subparagraphs below or, if necessary, insert acid etching of concrete surfaces.

Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.

Abrasive blast clean surfaces to comply with SSPC-SP 7/NACE No. 4.

* + - * 1. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.

Retain subparagraph below or, if necessary, insert acid etching of clay masonry substrates.

Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.

Retain "Steel Substrates" Paragraph below if steel is not shop primed or if shop primer is removed in the field.

* + - * 1. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, as per the coating schedules.

Retain "Shop-Primed Steel Substrates" Paragraph below if primers are shop applied and are not removed in the field.

* + - * 1. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

Galvanized-metal substrates should not be chromate passivated if primers are field applied. If galvanized metal is chromate passivated, consult manufacturers for appropriate surface preparation and primers.

* + - * 1. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

If necessary, insert requirements for acid etching aluminum.

* + - * 1. Aluminum Substrates: Remove loose surface oxidation.

Retain paragraph below for the painting of new steel tanks.

* + - * 1. Slag, welded metal accumulation and spatters not removed by the erector shall be removed by chipping or grinding. Sharp edges shall be peened, ground or otherwise blunted to the satisfaction of the Director's Representative.
			1. APPLICATION
				1. Mix and apply high-performance coatings according to manufacturer's written instructions and recommendations.

If Project requires restricted application method (e.g., using only spray or rollers), revise first subparagraph below accordingly.

Use applicators and techniques suited for coating and substrate indicated.

Coat surfaces behind movable equipment and furniture same as similar exposed surfaces.

Prior to assembly, all surfaces made inaccessible after assembly shall be prepared as specified herein and shall receive the full coating or paint system specified.

Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

* + - * 1. Coating and paint application shall conform to the requirements of the Steel Structures Painting Council's Paint Application Specification SSPC-PA1 (latest revision) and the manufacturer of the coating and paint materials.
				2. Application of the first coat shall follow immediately after surface preparation and cleaning and within the eight-hour working day. Cleaned areas not receiving the first coat within the eight-hour period shall be recleaned prior to application of the first coat.
				3. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
				4. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.
				5. Apply a preliminary stripe coat of primer to all welded seams, welded joints, rivets, corners, bolts, crevices, etc. by roller or brush only. Dry film thicknesses (DFT) to be as follows:

Interior coating with SSPC-10: 2-3 mils DFT.

Exterior coating with SSPC-6 or better: 1.5-2.5 mils DFT.

* + - * 1. Thinning shall be permitted only as recommended by the manufacturer in writing and approved by the Director's Representative.
				2. Apply each coat evenly, free of brush marks, sags, runs, and with no evidence of poor workmanship. Finished surfaces shall be free from defects or blemishes.
				3. Do not apply paints or coatings to non-ferrous or stainless steel machine parts.
			1. FIELD QUALITY CONTROL
				1. Dry Film Thickness Testing: The State may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

Contractor shall touch up and restore coated surfaces damaged by testing.

If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

* + - 1. CLEANING AND PROTECTION
				1. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
				2. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
				3. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Director’s Representative, and leave in an undamaged condition.
				4. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces to the satisfaction of the Director's Representative.
			2. COATING SCHEDULE
				1. Structural Concrete Surfaces – Immersed.

Surface Preparation: ASTM D4259.

Coating Systems: Type C-1.

Two Component; 2 coats applied at 16-24 mils DFT per coat.

One Component; 2 coats applied at 5-7 mils DFT per coat.

* + - * 1. Structural Concrete Surfaces – Wet Environment.

Surface Preparation: ASTM D4258.

Coating System: Type C-3.

Prime Coat: 10-20 mils DFT depending on surface roughness.

Intermediate and Topcoats: 3-6 mils DFT per coat.

* + - * 1. Structural Concrete Surfaces – Dry or Weathering Environment.

Surface Preparation: ASTM D4258.

Coating System: Type C-2.

Prime Coat: 10-18 mils DFT depending on surface roughness.

Intermediate and Topcoats: 2.4-4.0 mils DFT per coat.

* + - * 1. Structural Steel – Immersed.

Surface Preparation: SSPC-SP10, Near-White Blast Cleaning.

Coating Systems: Type C-1.

Two Component; 2 coats applied at 16-24 mils DFT per coat.

One Component; 2 coats applied at 5-7 mils DFT per coat.

* + - * 1. Structural Steel – Dry or Damp (wet) Environment.

Surface Preparation: SSPC-SP6, Commercial Blast Cleaning.

Coating System: Type C-4.

Prime Coat: 5-10 mils DFT.

Intermediate and Topcoats: 3-6 mils DFT per coat.

* + - * 1. Ferrous Surfaces of Comminutors, Bar Screens, Rakes, Distributor Arms, Rotary Arms, Sluice Gates, and Weirs.

Surface Preparation: SSPC-SP10, Near-White Blast Cleaning.

Coating System: Type C-6; 1 coat applied at 15-125 mils DFT per coat.

* + - * 1. Ferrous Surfaces of Machinery, Pumps, Valves and Piping – Immersed.

Surface Preparation: SSPC-SP10, Near-White Blast Cleaning.

Coating System: Type C-6; 1 coat applied at 15-125 mils DFT per coat.

* + - * 1. Ferrous Surfaces of Machinery, Pumps, Valves, Piping and Railings - Dry or Wet Environment.

Surface Preparation: SSPC-SP6, Commercial Blast Cleaning.

Coating System: Type C-4.

Prime Coat: 5-10 mils DFT.

Intermediate and Topcoats: 3-6 mils DFT.

* + - * 1. Steel Aeration and Settling Tanks.

Surface Preparation:

Interior surfaces: SSPC-SP10, Near-White Blast Cleaning.

Exterior Surfaces: SSPC-SP6, Commercial Blast Cleaning.

Interior Coating System: Type C-1.

Two Component; 2 coats applied at 16-24 mils DFT per coat.

One Component; 2 coats applied at 5-7 mils DFT per coat.

Exterior Coating System: Type C-4.

Prime Coat: 5-10 mils DFT.

Intermediate and Topcoats: 3-6 mils DFT.

* + - * 1. Equipment Rooms - Interior Surfaces.

Concrete Surface Preparation: ASTM D4258.

Concrete Coating System: Type C-3.

Prime Coat: 10-20 mils DFT depending on surface roughness.

Intermediate and Topcoats: 3-6 mils DFT.

Structural Steel Surface Preparation: SSPC-SP6, Commercial Blast Cleaning.

Structural Steel Coating System: Type C-4.

Prime Coat: 5-10 mils DFT.

Intermediate and Topcoats: 3-6 mils DFT.

Use paragraph below when an aluminum color and sheen are desired.

* + - * 1. Structural Steel Surface - Dry or Weathering Environment.

Surface Preparation: SSPC-SP6, Commercial Blast Cleaning.

Coating System: Type C-10; 2 coats applied at 1.0-1.5 mils DFT (critical) per coat.

* + - * 1. Galvanized Metal - Wet Environment.

Surface Preparation: SSPC-SP1, Solvent Cleaning or SSPC-SP7, Brush Blast Cleaning.

Coating System: Type C-8; 2 coats applied at 3-6 mils DFT per coat.

* + - * 1. Galvanized Metal - Dry or Weathering Environment.

Surface Preparation: SSPC-SP1, Solvent Cleaning or SSPC-SP7, Brush Blast Cleaning.

Coating system: Type C-9; 2 coats applied at 1.9-3.9 mils DFT per coat.

* + - * 1. High Heat Ferrous Surfaces.

Service Temperature 400 Degrees F and Under:

Surface Preparation: SSPC-SP6, Commercial Blast Cleaning.

Coating System: Type C-10; 2 coats applied at 1.0-1.5 mils DFT (critical) per coat.

Service Temperature Between 500 and 1000 Degrees F:

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning.

Coating System: Type C-11; 2 coats applied at 1.5-2.0 mil DFT (critical) per coat.

END OF SECTION 099623