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SPECIFICATIONS - DETAILED PROVISIONS
Section 09900 - Painting and Protective Coatings

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**SECTION 09900
PAINTING AND PROTECTIVE COATINGS**

PART 1 - GENERAL

1.01 SCOPE

Requirements of Conditions of Contract and Division 1 apply to this Section. Provide all labor, materials, apparatus, scaffolding, and all appurtenant work in connection with painting and protective coatings, complete as indicated, specified and required.

A. Work Included in This Section. Principal items include:

1. All exposed piping, conduits, ducts and other metal surfaces, interior and exterior, except as hereinafter specifically excluded.
2. All submerged and intermittently submerged metal surfaces, except stainless steel.
3. All structural and miscellaneous steel, including tanks.
4. The interior of wet wells, headworks, manholes, junction structures, transition stations and similar structures.
5. Exterior above-ground concrete and concrete block as specified and shown on the Drawings.
6. The interior and exterior of structures as specified in the Painting Schedule and shown on the Drawings.
7. Equipment furnished with and without factory finished surfaces.
8. Equipment on which factory applied finishes have been marred, abraded, scratched, nicked, or otherwise damaged.
9. Exterior and interior concrete, concrete unit masonry, cement plaster, doors, frames, sheet metal surfaces and other architectural work as specified and shown on the Drawings.
10. The Contractor shall furnish to the Owner, at no charge for use during this project, the necessary dry film thickness gages and electrical flaw or holiday detection equipment.
11. Protective coating of submerged and intermittently submerged concrete and masonry surfaces, except portion of such surfaces designated to receive waterproofing.

12. Recoating of existing interior and exterior painted surfaces from architectural break where damaged or altered in performance of Work of this General Contract.
- B. Related Work Not Included in This Section. The following surfaces, in general, shall not be painted:
1. Concrete surfaces subject to pedestrian or vehicular traffic except as herein specified.
 2. Plastic surfaces and fiberglass reinforced plastic (FRP) surfaces, except as specified for identification purposes.
 3. Nonferrous metals and stainless steel unless otherwise noted or indicated. Galvanized metal shall not be coated unless specified otherwise.
 4. Mechanical equipment with factory finish as specified herein.
 5. Electrical and instrumentation equipment with approved factory finish as indicated herein.
 6. Waterproofing, damp proofing and roof covering Work.
 7. Pavement stripping and marking as specified elsewhere in these Specifications.
 8. Existing painted surfaces which are not within areas of alterations performed under this General Contract unless such surfaces are damaged in performance of Work of this General Contract.
- C. In no case shall any concrete, wood, metal, or any other surface requiring protection be left unpainted or uncoated even though not specifically defined herein.

1.02 GUARANTEE

A two (2) year guarantee which commences on the date of acceptance against failure of all coatings shall be provided. Failure of any coating during the guarantee period shall be repaired by the Contractor who shall absorb all costs related to the repair of the coating.

As part of this two (2) year guarantee, the Contractor shall perform an inspection of all painted surfaces at 11 months from date of acceptance with an Owner's representative. All coating failures shall be repaired. The costs of this inspection and any repair services shall be the Contractor's responsibility.

1.03 REFERENCE SPECIFICATIONS AND STANDARDS

- A. Without limiting the generality of other requirements of these Specifications, all cleaning, surface preparation, and coating shall conform to the applicable requirements of the referenced portions of the standards specified herein to the extent that the requirements therein specified are not in conflict with the provisions of this Section.
- B. Unless otherwise specified, all work and materials for the preparation and coating of all metal surfaces shall conform to the applicable requirements specified in the Steel Structures Painting Manual, Volume 2, Systems and Specifications, latest edition, published by the Steel Structures Painting Council.
- C. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this Section.
 - 1. White Metal Blast Cleaning (SSPC-SP5-63I. Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning by wheel or nozzle (dry) using sand, grit, or shot. (For very corrosive atmosphere.)
 - 2. Near-White Blast Cleaning (SSPC-SPI0-63T). Blast cleaning nearly to White Metal Cleanliness, until at least 95 percent of each element of surface area is free of all visible residues. (For high humidity, chemical atmosphere, marine or other corrosive environment).
 - 3. Commercial Blast (SSPC-SP6-63I. Blast cleaning until at least 67 percent of each element of surface area is free of all visible residues.
 - 4. Brush-Off Blast Cleaning (SSPC-SP7-63). Blast cleaning of all except tightly adhering residues of mill scale, rust and coatings, exposing numerous evenly distributed flecks of underlying metal.
 - 5. Solvent Cleaning (SSPC-SP1-63). Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion or steam.
- D. Quality Assurance. Evaluation of surface preparation for ferrous metals will be based upon SSPC-Vis I ASTM Designation D220 and "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces", SSPC-Vis 2 ASTM Designation D 610.

1. To facilitate inspection, the Contractor shall, on the first day of sandblasting operations, sandblast metal panels to the degree called for in the Specification and as noted above. After mutually agreeing that a specific panel meets the requirements of the Specification, the panel shall be initialed by the Contractor and Inspector and then be coated with a clear, non-yellowing finish. Panels shall be prepared for each type sandblasting specified and shall be maintained and utilized by the Inspector throughout the duration of sandblasting operations.

1.04 COMPLIANCE WITH ENVIRONMENTAL REGULATORY REQUIREMENTS

- A. Contractor shall comply with all current federal, state, and local environmental laws and regulations, including, but not limited to the laws and regulations of the U.S. Environmental Protection Agency (USEPA), the California Air Resources Board (CARB), and the South Coast Air Quality Management District (SCAQMD).

1.05 SUBMITTALS

A. Samples

1. For compliance with these Specifications, the Contractor shall prepare and submit three (3) paint and protective coating samples of each finish, including all coats thereof, to the Owner for review, as specified in Section 01300, "Submittals". The samples shall be clearly marked with the manufacturer's name and product identification, and shall be submitted in sufficient time to allow for review, and, if necessary, resubmittal without causing any delay of the Project.
2. The Contractor, at the beginning of the Project, shall furnish one sq. ft. steel panels to be sandblasted in accordance with the sandblasting specifications and to be coated with a non-yellowing shellac, to be used as the standard for preparation of steel surfaces for the duration of this Project.

B. Coating Materials List

1. The Contractor shall provide eight (8) copies of a paint and coating materials list which indicates the manufacturer and paint number, keyed to the coating schedule herein, for approval of the Owner prior to, or at the time of, submittal of samples required herein.
2. The Contractor shall include with his submittal his protective coating schedule for shop and field coatings of items to receive protection. The schedule shall conform to the specified requirements for surface preparation, priming, and coating for items covered, and shall follow the same requirements for similar work where such work has not been specifically called-out. No bare ferrous non-working surfaces shall be omitted from the schedule. Particular care shall be taken to cover in sufficient detail the coating of mechanical joints and other mechanical devices, which shall conform to the recommended practice of the manufacturer of the joint or other mechanical devices.

3. Submittals shall be sufficiently early to permit Owner's review and then Contractor's coordination with affected material and equipment suppliers to assure their use of reviewed shop coats of same manufacture as field coats and compatibility with field applied coats for respective coating system.
 4. Coatings to be used on plastic and fiberglass materials shall be certified as acceptable by all plastic and fiberglass manufacturers whose products are to be coated. Certification copies shall be submitted to the Owner. The Contractor shall be certified in writing by the painting and coating material manufacturers as qualified applicators of their products, and copies of the certification submitted to the Owner.
- C. Product Data Sheets and Material Safety Data Sheets. Contractor shall submit paint and coatings material manufacturers' printed technical data sheets for products intended for use in each of various paint and coating systems. Data sheets shall fully describe material as to its intended use, make-up, recommended surface preparation and application conditions, primers, material mixing and application (including recommended dry mil thickness), precautions, safety and maintenance cleaning directions.

1.06 PROTECTION OF WORK

The Contractor shall be responsible for any and all damage to his Work or the work of others during the time his Work is in progress.

1.07 RIGHT OF REJECTION

The Owner shall have the right to reject all material or Work that is unsatisfactory, and require the replacement of either or both at the expense of the Contractor.

1.08 JOB CONFERENCE

Prior to commencing Work, a pre-job conference shall be held for the purpose of reviewing and clarifying the painting and coating requirements of the Project.

The Owner, Contractor, Applicator, Coatings and Paint Manufacturers, and the Inspector shall be present. A schedule of work to be accomplished will be established.

PART 2 -PRODUCTS

2.01 GENERAL

Surfaces to receive paint protective coating materials as herein specified in this Section shall be coated in conformance with the applicable coating systems specified herein. All materials specified by name and/or manufacturer or selected for use under these Specifications, shall be delivered unopened at the job site in their original containers and shall not be opened until inspected by the Owner. Whenever a manufacturer's brand name is specified, it is intended to define the general type and quality of paint or coating desired. Other coatings or paints of equal quality may be used.

Coating materials shall be as specified herein or approved equal. Architectural paint finishes are specified hereinafter. All paint and coatings shall be produced and applied as herein called for, or, if not specifically called for, it shall be applied in accordance with the manufacturer's printed recommendations as reviewed by Owner. So far as possible, all paint and coating materials shall be provided by a single source supplier.

2.02 PAINT AND COATING MATERIALS

- A. Definitions. The term "coating materials", as used herein, shall include enamels, paints, sealers, epoxy resins, stains, and all other paints and protective coatings, excepting galvanizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.
- B. General
 - 1. Paint and protective coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use. Pigmented paints shall be furnished in containers not larger than five (5) gallons. Materials shall conform to the specifications shown herein and to the requirements hereinafter specified.
 - 2. Products shall be standard for recognized manufacturer engaged in production of such materials for essentially identical or similar applications in the water and wastewater treatment industry and industrial plants.
- C. Compatibility. Only compatible materials shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to review of the Owner, a compatible barrier coat shall be applied between all existing prime coats and subsequent field coats to ensure compatibility.

- D. Colors. All colors and shades of colors of all coats of paints and protective coating material shall be as selected by the Owner. Each coat shall be of a slightly different shade, as directed by the Owner, to facilitate inspection of surface coverage of each coat.

2.03 SERVICE CONDITION A

Ferrous metals, other than stainless steel, submerged or intermittently submerged in water, sludge, sewage, chemical mixtures or similar corrosive liquid and all steel angles in contact with concrete shall be prepared and coated in accordance with the following requirements.

- A. Surface Preparation. All metal surfaces shall be field sandblasted in accordance with Steel Structures Painting Council Specification SSPC-SPIO (Near White Blast Cleaning). An anchor profile of not less than 2 mils, as determined by a profile comparator, shall be attained. Weld surface, edges, and sharp corners shall be ground to a curve and all weld splatter removed, and all welds neutralized with thinner.
- B. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.
- C. Coating System A. Except as otherwise noted, the prime coat shall have minimum dry film thickness of 10 mils; and the final coat, 10 mils. The total system shall have a minimum dry film thickness of 20 mils.

Carboline System:	Primer -Carboguard 891 Final -Carboguard 891
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Engard System:	Primer -480 H.S. Epoxy Final-480 H.S. Epoxy
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Tnemec System:	Primer -69 Hi-Build Epoxoline II Final -69 Hi-Build Epoxoline II
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2.04 SERVICE CONDITION B

Ferrous metals, other than stainless steel, not subject to chemical attack, normal indoor or outdoor exposure, shall be prepared and coated in accordance with the following requirements.

- A. Surface Preparation. All surfaces shall be free of dirt, dust, grease, or other foreign matter before coating. Surfaces, except galvanized, shall be cleaned in accordance with the Steel Structures Painting Council Specification SSPC-SP7 (Brush-Off Blast Cleaning). Weld surfaces, edges, and sharp corners shall be ground to a curve and all weld flux and splatter removed, and all welds neutralized with thinners prior to coating application.

- B. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.
- C. Coating System B. Except as specified below, the prime coat shall have a minimum thickness of 1.5 mils and two or more finish coats minimum total dry film thickness of 4.5 mils. The total system shall have a minimum of 6.0 mils.

Carboline System:	Primer -Carbocoat 150 2 Finish Coats -Carbocoat 139
Engard System:	Primer -126 2 Finish Coats -222
Tnemec System:	Primer -4-55 2Finish Coats -Tnemec -Series 2H, HiBuild

2.05 SERVICE CONDITION C

Ferrous metals, other than stainless steel, subject to a corrosive atmosphere and condensation shall be prepared and coated in accordance with the following requirements.

- A. Surface Preparation. All metal surfaces shall be sandblasted in accordance with Steel Structures Painting Council Specification SSPC-SP10 (Near White Metal Blast Cleaning). An anchor profile of not less than 2 mils as determined by a profile comparator shall be attained. Weld surface, edges and sharp corners shall be ground to a curve and all weld splatter removed.
- B. Application. Application shall be in strict conformance with the manufacturer's recommendations. A minimum of 12 hours time is required before additional coats may be applied to the prime coat, two hours for the intermediate coat, and two hours for the finish coat.
- C. Coating Systems C. Except as hereinafter specified, the prime coat shall have a minimum dry film thickness of 3.0 mils; the intermediate coat, 4 mils; and the final coat, 2 mils. The total system shall have a minimum dry film thickness of 9.0 mils.

Carboline System:	Primer -Carbozinc 11 HS Intermediate -Carboguard 891 Finish -Carbothane 133HB Satin
Engard System:	Primer -519 Inorganic Zinc Intermediate -460 H.S. Epoxy Finish - 428 Urethane Semi Gloss
Tnemec System:	Primer -69-1211 Intermediate -69 Hi-Build Expoxoline II Finish -75 Polyurethane, Semi-Gloss

2.06 SERVICE CONDITION D

Concrete which is subject to submerged and intermittent submergence in water, sludge or chemical mixtures, or which is exposed to corrosive atmospheres, shall be prepared and coated in accordance with the following requirements:

- A. Surface Preparation. All concrete surfaces shall be aged for 30 days prior to application. All surfaces shall be cleaned of all dirt, dust, form oil, curing compounds, and other deleterious compounds. In general, the concrete shall have a slight texture, be free of pockets and cavities, and be tightly adherent, not powdery. All hollow areas, bug holes, honeycombs, and voids shall be blasted clean and filled in accordance with Section 03300. All fins, form marks, protrusion and rough edges shall be ground off to provide a smooth, continuous surface of suitable texture for proper adhesion of coating. Horizontal surfaces shall be etched with a 15 to 20 percent solution of muriatic acid and thoroughly rinsed with clean water. Vertical walls shall be cleaned by brush blasting (NACE #4 or SSPC-SP7-63). Prior to coating, all surfaces shall be tested per ASTM D 4263. All surfaces shall be completely dry before application of the coating. After concrete repair, fill all voids with coating manufacturer's approved epoxy putty or filler.
- B. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All coats shall be applied within 24 hours of the previous coat.
- C. Coating System D. The prime coat shall have a minimum dry film thickness of 6 mils and two finish coats shall have a minimum total dry film thickness of 16 mils. The total system shall have a minimum dry film thickness of 22 mils.

Carboline System:

Primer-Two parts Bitumastic 300-M -thinned to manufacturer's written recommendations.

Two Finish Coats -Bitumastic 300-M

Engard System:

Primer -463 Coal Tar Epoxy coating -thinned to manufacturer's written recommendations.

Two Finish Coats -463 Coal Tar Epoxy Coating

Tnemec System:

Primer-Tnemec 69 Hi-Build Expoxoline II Two Finish Coats -46H-413

B. Application. Application shall be in strict conformance with manufacturer's printed recommendation.

C. Coating System F. Two (2) coats having a total dry film thickness of 8.0 mils.

Carboline System: Two coats -Carbothane 133HB Satin

Engard System: 460 Chemical Resistant Primer 428
HS Chemical Resistant Urethane

Tnemec System: 135 Chembuild

2.09 SERVICE CONDITION G

Submerged moving parts including cables, chains, gears, pulleys, etc. shall be prepared and coated in accordance with the following requirements.

A. Surface Preparation. All rust, scale, dust, and foreign matter removed by power or hand tool cleaning.

B. Application. Application shall be in strict accordance with manufacturer's recommendation.

C. Coating System G. The system shall have a total thickness of 25 mils and shall consist of the following:

Chevron -E.P. Roller Grease
Texaco -Rust Inhibitive Grease
Engard -880 Grease Coating

2.10 SERVICE CONDITION H

Ferrous metals requiring a heat resistant coating. To ensure proper coating selection, accurately measure surface temperatures. Surface preparation shall be performed in strict conformance with manufacturer's printed directions and treated surfaces shall be coated as soon as possible to avoid surface contamination. In conformance with printed directions of manufacturer: mix and apply coats of each system; and cure coats before recoating or before run-in to surface operating temperature. Contingent upon expected temperature range, apply one of the following or equal systems, and avoid excessive film buildup.

A. Rust-Oleum Systems:

150-450^o F (66-177°C) Temp. Range -4100 System

300-800^o F (149-427°C) Temp. Range -4200 System

400-1200^o F (260-649°C) Temp. Range -4300 System

B. Engard Systems:

Ambient to 250°F -222 HS Finish

460 Chemical Resistant Primer

519 MIL-P-23236 Class 3

Inorganic Zinc Coating

250° to 750°F -519 MIL-P-23236 Class 3 Inorganic Zinc Coating

750° to 10000F -240 TI-P-28 High Temperature Coating

1000° to 2000⁰ F -540 Fire Shield II

C. Tnemec Systems:

To 150° F- Tneme Gloss System 2-9
 Endura-Shield System 70-1
 Tneme-Zinc System 90-2
 Hi-Build-Epoxyelene System 66-2

To 7500°F- Tneme-Zinc System 90-97

To 12000°F- Silicone-Aluminum Systems 39-2

2.11 SERVICE CONDITION I

Coating of concrete and metal surfaces within the extremely corrosive areas as indicated on the Schedule.

- A. Surface Preparation. All concrete surfaces shall be aged for 30 days prior to application. All surfaces shall be cleaned of all dirt, dust, form oil, curing compounds, and other deleterious compounds. In general, the concrete shall have a slight texture, be free of pockets and cavities, and be tightly adherent, not powdery. All hollow areas, bug holes, honeycombs, and voids shall be blasted clean and filled in accordance with Section 03300. All fins, form marks, protrusion and rough edges shall be ground off to provide a smooth, continuous surface of suitable texture for proper adhesion of coating. Horizontal surfaces shall be etched with a 15 to 20 percent solution of muriatic acid and thoroughly rinsed with clean water. Vertical walls shall be cleaned by brush blasting (NACE #4 or SSPC-SP7-63). Prior to coating, all surfaces shall be tested per ASTM D 4263. All surfaces shall be completely dry before application of the coating. After concrete repair, fill all voids with coating manufacturer's approved epoxy putty or filler.

All metal surfaces shall be cleaned in accordance with SSPC-SP.1. All weld surfaces, edges shall be ground to a curve and all spatter removed. Surface shall then be sandblasted in accordance with SSPC-SP10-63T.

- B. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. The applicator shall be a licensed applicator by the coating manufacturer. The finished coating shall be spark tested and all holidays repaired.
- C. Coating System I. Except as otherwise noted, the prime coat on metal surfaces shall have a minimum thickness of 2.0 mils and a maximum thickness of 3.0 mils. The finish coat on a non-abrasive metal surface shall be 30 mils and in an abrasive area shall be 40 mils. The prime coat on concrete surfaces shall have a minimum thickness of 3.0 mils and a maximum thickness of 5.0 mils. A minimum cure time of 12 hours is required. The finish coat on the concrete shall be applied within 36 hours of the application of the primer and should be performed as recommended by the manufacturer. The finish coat shall be 65 mils minimum thickness.

Crandals System

Primer	
Steel	-Crandals No. 620
Concrete	-Crandals No. 560
Finish	-Crandals SHB1000

Sancon System

Primer	
Concrete	-Sancon 100 Epoxy
Steel	-United Coatings No. 32
Finish	-Sancon 100 Polyurethane

Zebran System

Primer	
Concrete	-P-24
Steel	-Con Seal
Finish	-386

2.12 ARCHITECTURAL PAINT FINISHES

- A. Manufacturer. Unless otherwise noted, products listed below are the products of the Dunn-Edwards Corporation and Sinclair Paints. Reviewed equivalent products of Ameritone Co. will be acceptable.

1. System P-1 -Enamel On Structural Steel Members

Dunn Edward's System:

- First Coat -"Bloc-Rust", rust inhibitive red primer 43-4 (delete on factory primed materials)
- Second Coat -"Lockote" 42-33
- Third Coat -"Endurasheen" semigloss enamel 39 series
- Fourth Coat -"Endurasheen" semigloss enamel 39 series

Sinclair's System:

- First Coat -Red Oxide Primer No. 15
- Second Coat -CorroPrime No. 14
- Third Coat -Sash and Trim Enamel GX22
- Fourth Coat -Sash and Trim Enamel GX22

2. System P-2 -Concrete Masonry Paint on Concrete Unit Masonry

Dunn Edwards' System:

- First coat -"Hi Build Industrial Epoxy Primer Eft-Stop", W-709
- Second &Third Coats -"Ultrashield" IP-631.

Sinclair's System:

- First coat -CLAS-9 translucent acrylic emulsion primer
- Second & Third Coats -UR22-8 Clear Anti Graffiti Coating

3. System P-3 -Concrete Masonry Paint on Concrete

Dunn-Edwards' System:

- Two Coats -Primer "Evershield" W-701 (100% Acrylic).

Sinclair's System:

- First Coat -18 Epoprime or 36 Unipoxy
- Second Coat -1300 Stuc-O-Life

4. System P-4 -Enamel on Galvanized Metal

(On Doors, Frames, and Sheet Metal)

Dunn-Edwards System:

- Pretreatment -Vinyl wash pretreatment, 42-36
- First Coat -"Galvaprime", zinc dust primer 43-3
- Second Coat -"Loc Kote" synthetic body coat 42-23
- Third Coat -"Endurasheen" semi-gloss enamel 39 series

Sinclair's System:

- Pretreatment -Vinyl wash pretreatment, 7113
- First Coat -Corro Prime 14
- Second Coat -Sash &Trim Primer GX22
- Third Coat -Sash & Trim Enamel GX2

5. System P-5 -Enamel on Primed Metal

Dunn-Edwards System:

- First Coat -(over prime) -"Loc Kote" synthetic body coat 42-33
- Second Coat -"Endurasheen" semi-gloss enamel 39 Series

Sinclair's System:

- First Coat -Corro Prime 14
- Second Coat -Sash and Trim Enamel GX22
- Third Coat -Sash and Trim Enamel GX22

6. System P-6 -Semi Gloss Enamel Paint on Interior Concrete Unit Masonry

Dunn Edwards' System:

- First Coat -"Blocfill" Smooth W305
- Second Coat -Decoglo W450
- Third Coat -Decoglo W450

Sinclair's System:

- First Coat -Smooth Block Filler V423-11
- Second Coat -1400 Sinco Satin \l
- Third Coat -1400 Sinco Satin \l

1. System P-7 -Sealer for Unpainted Masonry Surfaces

A transparent waterproofing sealer shall be applied to exterior masonry surfaces both smooth face and split face block as shown on plans and in Coating Systems Schedule. The waterproofing shall be Rain Guard BlokLok, Chemstop heavy duty waterproofing or approved equal. Apply to dry, clean split faced surface with airless spray. Rate of application shall be a minimum of 40 square feet per gallon for first coat and a minimum of 80 square feet per gallon for second coat and manufacturer's recommendation. The products selected for waterproofing shall comply with AQMD requirements for voc in California.

2.13 MISCELLANEOUS COATINGS

- A. Hydrants, indicator post, traffic posts, guard rails and ladders shall be safety yellow, matching OSHA Safety Yellow Color and using specified Coating System "B".

- B. Handwheels and operating handles of all valves and equipment shall be safety red, matching OSHA Safety Red Color, using, contingent upon exposure, Coating System "B" in non-corrosive atmosphere and Coating System "c" in corrosive atmosphere and high humidity exposures.
- C. Interior pipe insulation shall be finished with solvent paint system equal to Rust-Oleum's primer No. 2764 and "New Color Horizon" finish coat in color selected by Owner. Metal-protected exterior pipe insulation shall be coated with System "B".

2.14 PATCH COAT FOR GALVANIZED SURFACES

All galvanized surfaces which are scratched, marred, or otherwise damaged shall be patched with Carboline's Carbo Zinc II, "Drygalv" by American Solder and Flux Co., Engard 515 Zinc Rich Primer, or approved equal.

2.15 PRIMER OVER BITUMINOUS COATING

Two (2) coats, Rust-Oleum 5781 Rust-O-Crylic.

PART 3 -EXECUTION

3.01 MANUFACTURER'S RECOMMENDATIONS

Unless otherwise specified herein, the paint and coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protection of his coating materials; for preparation of surfaces for coating; and for all other procedures relative to coating shall be strictly observed. No substitutions or other deviations shall be permitted without written permission of the Owner.

3.02 DELIVERY AND STORAGE

Materials shall be delivered in manufacturer's original, sealed containers, with labels and tags intact. Coating materials and equipment shall be stored in designated areas. Coating containers shall be opened only when required for use. Coatings shall be mixed only in designated rooms or spaces in the presence of the

Owner's Representative. Coating shall be thoroughly stirred or agitated to uniformly smooth consistency and prepared and handled in a manner to prevent deterioration and inclusion of foreign matter. Unless otherwise specified or reviewed, no materials shall be reduced, changed, or used except in accordance with the manufacturer's label or tag on container.

3.03 SAFETY REQUIREMENTS

In accordance with the requirements of the latest revision of the California Administrative Code title 8 Construction Safety orders enforced by the California Department of Occupational Safety and Health (CAL OSHA), and applicable OSHA Regulations for Construction, the Contractor shall provide and require the use of personal protective lifesaving equipment for all persons working in or about the Project site.

- A. Protective Equipment. Respirators shall be worn by all persons engaged in, and assisting in, spray painting. In addition, workers engaged in or near the Work during sandblasting shall wear eye and face protection devices meeting the requirements of ANSI ZB7.1 latest revision, and approved OSHA Regulations for sandblasting operations and approved air-purifying, half-mask or mouthpiece respirator with appropriate filter.
- B. Ventilation. Where ventilation is used to control potential exposure to workers as set forth in Section 1910.94 of the OSHA Regulations for Construction, ventilation shall be adequate to reduce the concentration of the air contaminant to the degree that a hazard to the worker does not exist. Methods of ventilation shall meet the requirements set forth in ANSI Z9.2, latest revision.
- C. Sound Levels. Whenever the occupational noise exposure exceeds the maximum allowable sound levels as set forth in Table 0-2, Permissible Noise Exposures, in Section 1926.52, of the OSHA Regulations for Construction, ear protective devices shall be furnished and used. Ear protective devices inserted in the ear shall be fitted or determined individually, by competent persons. Plain cotton is not an acceptable protective device.
- O. Storage and mixing of coating materials shall be performed only in those areas designated by the Owner.
- E. Cloths and cotton waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each work day.

3.04 STORAGE, MIXING, AND THINNING

Paint and coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Materials of different manufacturers shall not be mixed together. Packaged materials may be thinned immediately prior to application in accordance with the manufacturer's directions.

3.05 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on all Work.
- B. All paint and coatings shall be applied in a workmanlike manner so as to produce an even film of specified uniform thickness. Edges, corners, crevices, and joints shall receive special attention to ensure that they have been thoroughly cleaned and that they receive an adequate thickness of paint. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat of paint would not increase the hiding. All coats shall be applied so

as to produce a film of uniform thickness. Special attention shall be given to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures. Rough exterior cement plaster shall be spray painted.

3.06 PREPARATION FOR PAINTING AND PROTECTIVE COATING

All surfaces to receive paint and protective coatings shall be cleaned as specified herein prior to application of coating materials. The Contractor shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. Beginning the Work of this Section without reporting unsuitable conditions to the Owner constitutes acceptance of conditions by the Contractor. Any required removal, repair, or replacement of the Work caused by unsuitable conditions shall be done at no additional cost to the Owner. All marred or abraded spots on shop-primed and factory-finished surfaces shall receive touch-up restoration prior to any other coating application.

3.07 ITEMS NOT TO BE COATED

Hardware, hardware accessories, nameplate data tags, machined surfaces and similar items in contact with coated surfaces not to be coated shall be removed or masked prior to surface preparation and painting operations. Following completion of coating of each piece, removed items shall be reinstalled. Such removal and installation shall be done by workmen skilled in the trades involved.

3.08 SANDBLASTING

- A. All sandblasting shall be done in strict accordance with the referenced specifications of the Steel Structures Painting Council.
- B. When items are to be shop primed or shop primed and finish coated in the shop, surface preparation shall be as specified in this Section. The Owner shall have the right to witness, inspect, and reject any sandblasting done in the shop.
- C. When sandblasting is done in the field, care shall be taken to prevent damage to structures and equipment. Pumps, motors, and other equipment shall be shielded, covered, or otherwise protected to prevent the entrance of sand. No sandblasting may begin before the Owner inspects and reviews the protective measures.
- D. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning.

3.09 APPLICATION OF ARCHITECTURAL PAINT FINISHES

Perform surface preparation, material mixing and application (including dry-mil thicknesses) for each "Architectural Paint Finish System" in strict conformance with submitted and approved material manufacturers' printed recommendations.

A. Surface Preparation

1. General

- a) Before priming, correct all finish surfaces which are not properly prepared, sandpapered and cleaned or which are not in proper condition to receive finish specified. Do no priming until surfaces are approved.
 - b) Prior to surface preparation and painting operations, remove or protect all hardware, hardware accessories, plates, lighting fixtures and similar items in contact with painted surfaces and not to be painted.
 - c) Program cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
2. Clean concrete and masonry surfaces of all dirt, encrustations, efflorescence and other foreign matter. Roughen glazed surfaces on concrete.
 3. Clean ferrous metal not provided with a shop prime of rust, mill scale, oil, grease and foreign matter by wire brushing, scraping or sandblasting as necessary. Clean ferrous metal provided with shop prime of oil, grease and foreign matter. Prime scratched and abraded areas with No. 15 Chrome Oxide Primer.
 4. Clean galvanized metal with mineral spirits and pretreat with Sinclair's No. 7113 Vinyl Wash Primer. Prime cleaned and pretreated galvanized metal with Sinclair's No. 25 Zinc Dust Primer the same day that cleaning has been performed.
 5. Clean gypsum board (drywall) of all dust, dirt, encrustations and foreign matter.

B. Application

1. Apply material evenly, free from sags, runs, crawls, holidays or defects. Mix to proper consistency, brush out smooth leaving minimum of brush marks, enamel, and varnish uniformly flowed on.
 - a) Sand and dust between each coat to remove defects visible from a distance of five feet.
 - b) Finish coats shall be smooth, free of brush marks, streaks, laps or pile up of paints, and skipped or missed areas. Finished metal surfaces shall be free of skips, voids or pinholes in any coat when tested with a low voltage detector.
 - c) Do not apply initial coating until moisture content of surface is within limitations recommended by paint manufacturer.
 - d) Rate of application shall not exceed that as recommended by paint manufacturer for the surface involved less ten percent allowance for losses.

- e) Keep brushes and spraying equipment clean, dry, free from contaminants and suitable for the finish required.
- 2. Apply paint by brushes, roller or spray.
- 3. Tint all pigmented undercoats to approximately same shade as final coat. Perceptibly increase the depth of shade in successive coats.
- 4. Allow each coat to dry thoroughly before succeeding coat application. For oil paints, allow at least 48 hours between coats of exterior work, except where otherwise recommended by the manufacturer.
- 5. Finish all four edges of doors with the same number and kind of coatings as specified for their main surfaces. Where openings into rooms having different finishes, finish door edges as directed.
- 6. Do not paint factory finished items unless specifically directed.
- 7. Paint surfaces of metal ducts and vents.
- 8. Apply two finish coats of paint to shop primed metal surface of all mechanical and electrical equipment, to match adjoining wall or ceiling surfaces. In addition to above, prime coat all unprimed surfaces. Principal items of this Work include interior of hose cabinets, air grilles, ceiling diffusers, electric panels, telephone panels, access panels, conduit, outlet and pull boxes, ducts and pipes.
- 9. Miscellaneous Painting: Paint surfaces to be painted and not specifically described herein, with a product specifically manufactured or prepared for the material and surface; prime coat and two finish coats.
- 10. Upon completion, remove all rubbish caused by this trade. Remove spots from floors, glass and other surfaces. Leave in a clean and orderly condition.
- 11. At the completion of other trades, touch up damaged surfaces as required.

3.10 APPLICATION OF PROTECTIVE COATINGS

A. Shop Coating. Fabricated metalwork and equipment which requires coating may be shop primed before fabrication with specified primer. Any such work delivered to the job site with any other shop coat shall have this coating removed and the specified coating applied in the field. Manufactured equipment with approved corrosion resistant factory finishes and galvanized finishes shall be exempt from this requirement.

B. Application of Field Coatings

1. Except where in conflict with the manufacturer's printed instructions, or where otherwise specified herein, the Contractor may use brush, roller, air spray, or so-called airless spray application; however, any spray painting must first have the approval of the Owner. Rollers for applying enamel shall have a short nap. Areas inaccessible to spray coating or rolling shall be coated by brushing or other suitable means.
2. The Contractor shall give special attention to the Work to ensure that edges, corners, crevices, welds, bolts, and other areas, as determined by the Owner, receive a film thickness at least equivalent to that of adjacent coated surfaces.
3. All protective coating materials shall be applied in strict accordance with the manufacturer's printed instructions.
4. Prime coat shall be applied to all clean surfaces within a four hour period of the cleaning, and prior to deterioration or oxidation of the surface, and in accordance with the manufacturer's recommendations. Drift from sandblasting procedures shall not be allowed to settle on freshly painted surfaces.
5. All coatings shall be applied in dry and dust-free environment, and unless otherwise directed by the Owner, shall not be applied when the air temperature or the temperature of the surface to be painted is outside the range of 50 degrees F to 90 degrees F.
6. Each coat shall be applied evenly, at the proper consistency, and free of brush marks, sags, runs, and other evidence of poor workmanship. Care shall be exercised to avoid lapping paint on glass or hardware. Coatings shall be sharply cut to lines. Finished coated surfaces shall be free from defects or blemishes. Protective coverings shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent paint from being spattered onto surfaces from which such paint cannot be removed satisfactorily. Surfaces from which paint cannot be removed satisfactorily shall be painted or repainted as required to produce a finish satisfactory to the Owner. Whenever two (2) coats of a dark colored paint are specified, the first coat shall contain sufficient powdered aluminum to act as an indicator of proper coverage, or the two (2) coatings shall be of a Contrasting color.
7. Interior surfaces of roof plates, roof rafters, and supports, and all contact surfaces inaccessible after assembly, shall be coated before erection; however, no structural friction connections or high tensile bolts and nuts shall be painted before erection. Areas damaged during erection shall be hand or power-tool cleaned and recoated with prime coat.

8. Touch-up of all surfaces shall be performed after installation.
9. All surfaces to be coated shall be clean and dry at the time of application.

C. Time of Coating

1. Sufficient time shall be allowed to elapse between successive coats to permit satisfactory recoating, but, once commenced; the entire coating operation shall be completed without delay. No additional coating of any structure, equipment, or other item designated to be painted shall be undertaken without specific permission of the Owner until the previous coating has been completed for the entire structure, piece of equipment, or other item.
2. Piping shall not be finish coated until it has been pressure-tested and approved.

D. Thickness of Coating. The dry film mil-thickness specified shall be achieved and verified for each coat.

3.11 TESTING AND INSPECTION

- A. Inspection Devices. The Contractor shall furnish, until final acceptance of coating and ainting, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness of coatings and paints. The Contractor shall also furnish U.S. Department of Commerce; National Bureau of Standards certified thickness calibration plates to test the accuracy of dry-film thickness gauge and certified instrumentation to test accuracy. Dry-film thickness gauges shall be made available for the Inspector's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Inspector. Inspection devices shall be operated in accordance with the manufacturer's instructions at the direction of the Owner or the Owner's Representative.
- B. The Contractor shall conduct film thickness measurements and electrical inspection of the coated surfaces with equipment furnished by him and shall recoat and repair as necessary for compliance with the Specifications.
- C. After repaired and recoated ferrous metals areas have cured, final inspection tests will be conducted by the Owner or the Owner's Representative. Coating thicknesses specified in mils on ferrous substrates will be measured with a nondestructive magnetic type dry-film thickness gauge such as the Elcometer, manufactured by Gardner Laboratories, Inc. Discontinuities, voids and pinholes in the coatings will be determined with a nondestructive type electrical holiday detector. Epoxy coatings and other thin film coatings will be checked for discontinuities and voids with a low voltage detector of the wet-sponge type, such as Model MI as manufactured by Tinker and Razor. Use a non-sudsing type wetting agent, such as Kodak Photo-Flo, which shall be added to the water prior to wetting the sponge. A high voltage, low current, spark type detector such as Model EP, manufactured by Tinker and Razor, will be used for electrical inspection of only coat tar enamel.

Tape type coatings will be inspected for holidays using a device designed for use in detecting such flaws. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations and retested. No pinholes or other irregularities will be permitted. Wide film thickness discrepancies shall be measured and verified with a micrometer or other approved measuring instrument. Coatings not in compliance with the Specifications will not be acceptable and shall be replaced and re-inspected at Contractor's expense until the Specifications are met.

- D. On non-ferrous surfaces, dry film thickness readings shall be taken at random locations with a Tooke Gauge at the rate of approximately five readings per 100 square feet of surface. Groove cut into coating shall be repaired by application of all coats of paint or coating film being tested. The average of all readings for a given area or surface shall be within required dry film thickness range and no individual reading shall be more than 20 percent below the recommended dry film thickness. Any areas that are found to be below standard shall be marked and recoated to obtain proper film thickness.
- E. Warranty Inspection. Warranty inspection shall be conducted during the eleventh month following completion of all coating and painting Work. All personnel present at the Pre-Job Conference shall attend this inspection. All defective Work shall be repaired in accordance with this Specification and to the satisfaction of the Owner or his appointed representative.

3.12 CLEANUP

- A. Upon completion of the Work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint spots, oil, or stains upon adjacent surfaces shall be removed.
- B. The Contractor shall clean the site in accordance with the requirements for "Cleaning Up" in the General Conditions.

3.13 PAINT AND COATING SCHEDULE

- A. General. The following schedule shall indicate the coating system to be used. The list shall not be construed as a complete list of all surfaces to be coated but rather as a guide as to the application of the various coating systems. All surfaces shall be painted except those specifically deleted herein. The Owner shall select the colors. Where reference is made to ferrous metal in this schedule, it shall not include stainless steel.
- B. Color Identification. All exposed and/or unburied pipe, including steel, copper and brass tubing, galvanized pipe, polyvinyl chloride pipe, fiberglass reinforced pipe, and stainless steel pipe, shall be identified by color to show its use/function. Color bands of an approved tape type may be used on PVC, FRP, and stainless steel pipe and all other pipe not readily susceptible to painted finish. Bands shall be adhesive type with extra strength and suitable for continuous duty at 250 degrees F. All markers shall have a protective silicone film.

COLOR CODE SCHEDULE

Item	Color Code	Label
Aeration Air	Light Green	AA
Belt Press Return Water	Gray	BPRW
Building Drain	NA	BD
Compressed Air	Light Green w/Yellow	CA
Chlorinated Effluent	Blue	CE
Chlorine Gas	Yellow/Green Band	CG
Chlorine Solution	Yellow	CSI
Cold Digested Sludge	Brown	CSL
Diesel Fuel	Yellow	DF
Digested Sludge	Brown	DSL
Digested Sludge Transfer	Brown	XSL
Digester Gs	Red	DG
Drain	NA	D
Electrical Panel (witin bldg.)	ANSI 61-Gray	--
Electrical Conduit and Equipment	White (Sherwin Williams F65W1)	--
Engine Coolant Water	Blue	ECW
Froth Spray	Blue	FS
Flotation Thickener Overflow	NA	FTO
Fresh Water	Light Blue	FW
Gravity Thickener Overflow	Gray/Yellow Bands	GTO
Grit	Brown	GRIT
Grit Washer Overflow	Gray	GWO
Ground Water Drain	NA	GWD
Heated Digested Sludge	Brown/Yellow Bands	HSL
High Temperature Water	Blue/Yellow Bands	HTW
Irrigation Water	NA	IW
Low Temperature Water	Blue/Orange Bands	LTW
Natural Gas	Light Yellow	NG

COLOR CODE SCHEDULE

(continued)

Item	Color Code	Label
Oil Lines	Black	Oil
Polymer	Light Blue/Yellow Bands	POLY
Primary Tank Drain	Brown	PTD
Primary Sludge	Brown	PSL
Primary Scum	Brown	PSK
Raw Sewage	Brown	S
Return Digested Sludge	Brown	RDS
Return Water	Gray	RW
Secondary Scum	Brown	SSk
Sludge Bed Drain	NA	SBD
Sludge Heater Bypass	Brown	SLHB
Storm Water Drainage	NA	SWD
Thickened Sludge	Brown	TS
Thickener Dilution Water	Blue	TDW
Waste Activated Sludge	Brown	WAS
Waste Digested Sludge	Brown	WDS
Wash Water	Red	WW

Architectural System	Descriptive Color Code	Manufacturers' Paint Designation
PLANT BUILDINGS:		
General Studies	Tan	Rustoleum #865 (Dunes Tan)
Trim & Doors	Dark Tan	Rustoleum #977 (Chestnut Brown)
Walls (metal)	Yellow-White	Dunn-Edwards #CH-60B (Parchment)

Both the direction of fluid flow, and the name of the fluid in the pipe shall be stenciled on all pipe at least once every 25 feet and at every change of direction. Color bands shall be spaced at 15 foot intervals and every change in direction. The size of the letters and color bands shall be as specified in the table below:

Outside Diameter Pipe or Covering	Width of Color Band	Height of Legend Letters
¼ to 1-1/4	1	½
1-1/2 to 2	1	¾
2-1/2 to 6	6	2
8 to 10	6	2-1/2
Over 0	6	3-1/2
All dimensions are given in inches		

The stenciled labels shall be abbreviated and conform to the piping abbreviations shown on Color Code Schedule. The labels shall be safety yellow, matching OSHA Safety Yellow. Engines and herein listed electrical items shall be color coded as follows:

White: Sherwin Williams F65W1
Electrical (Excluding panels)

Gray: ANSI 61 Electrical panels

Light Yellow: (WMWD) Engines

- C. Process Valve Identification. After the painting of process piping is complete, the Contractor shall stencil the tag numbers, as supplied by the Owner, of all valves on the pipe adjacent to the valve for pipe 2-inches and over. Characters shall be one inch high minimum and shall be oriented to be visible from the valve operating position. When the valve has extended operator shaft or chain operator, the number shall be placed both at the operating position and at the valve if practicable. The latter requirement does not apply if the valve is buried or in a pit. Valves in pipes under 2-inches shall have characters as large as the pipe will permit or at the Owner's option, on an adjacent surface. Characters shall be preferably white; however, if this would not provide sufficient contrast to the pipe, the Owner may select another color. Paint used shall be of the same type and quality as used for painting the pipe.

END OF SECTION 09900