

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all painting Work.
 - a. CONTRACTOR is responsible for all surface preparation and painting Work for all new and existing interior and exterior items and surfaces throughout the Project areas included under this and other Sections.
2. Painting Work shown in the Painting Schedule in this Specification does not provide CONTRACTOR with complete indication of all painting Work. CONTRACTOR is directed to Section 2.4 herein where all surfaces of the generic types specified in Section 2.4 shall be prepared and painted according to their status, intended function and location in the Work, using the painting system for that surface, function and location as specified, whether or not indicated on any schedule or Drawing.
3. Types of painting Work required include, but are not necessarily limited to, the following:
 - a. Surface preparation and painting of all new and specifically identified existing items, both interior and exterior, and other surfaces, including items furnished by OWNER, are included in the Work, except as otherwise shown or specified.
 - b. Removal of all substances, top coats, primers and all intermediate coats of paint and other protective or decorative toppings on those items and surfaces to remain which are identified to receive a painting system under this Section, in order to provide surfaces acceptable for application of painting system specified.
 - c. Approved stepped-down job mock-ups for all painting systems showing all components of the surface preparation and paint system application before the start of any Work. Check all dry film thicknesses, demonstrate methods of surface preparation and methods of application in addition to obtaining approval from ENGINEER of colors and textures to be used in the finished Work.
4. The term "paint" in this Section includes pretreatment and all painting system materials, such as primer, emulsion, enamel, organic/inorganic polymer

coating, stain sealer and filler, and other applied materials whether used as prime, filler, intermediate or finish coats.

5. Paint all new and specifically identified existing surfaces and items except where the natural finish of the material is specified as a corrosion-resistant material not requiring paint; or is specifically shown as indicated by written note, or specified as a surface not to be painted. The term "exposed" in this Section means all items not covered with cement plaster, concrete or fireproofing. Items covered with these materials shall be provided with specified primer only, except where specified as a surface not to be painted. The requirements for "exposed-to-view" surfaces are specified in Section 3.4.A.4.a. Where items or surfaces are not specifically mentioned, paint them the same as adjacent similar materials or areas.
6. Electrical items to be painted include, but are not limited to, the following:
 - a. Exposed conduit and fittings.
 - b. Switchgear, panels, junction boxes, motor control centers, motors and accessories.

B. Coordination:

1. Review installation, removal and demolition procedures under other Sections and coordinate them with the Work specified herein.
2. Coordinate the painting of areas that will become inaccessible once equipment and similar fixed items have been installed.
3. Coordinate primers with finish paint materials in order to provide primers which are compatible with finish paint materials used. Review other Sections and other Contracts in which primed surfaces are to be provided in order to ensure compatibility of the total painting system for the various surfaces. CONTRACTOR shall be responsible for coordinating the compatibility of all shop-primed and field-painted items in other Sections.
4. Furnish information to ENGINEER on the characteristics of the finish materials proposed for use, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and repaint as required. Notify ENGINEER in writing of anticipated problems using the specified painting systems with surfaces primed by others. Reprime all factory-primed equipment and other factory-primed items that are damaged or scratched.

C. Related Sections:

1. Section 09905, General Coating Specification.

D. Work Not Included: The following categories of Work are not included as part of the painting Work, or are included in other Sections:

1. Shop-Priming: Shop-priming of structural metal, miscellaneous metal fabrications, other metal items and fabricated components such as shop-

fabricated or factory-built heating and ventilating and electrical equipment or accessories shall conform to applicable requirements of this Section but are included under other Sections.

2. Pre-finished Items:
 - a. Items furnished with such finishes as baked-on enamel, porcelain and polyvinylidene fluoride shall only be touched up in the field by CONTRACTOR using Supplier's recommended compatible field-applied touch up paint.
 - b. Items furnished with such finishes as chrome plating, anodizing, or where the natural oxide of the item forms a barrier to corrosion, whether factory or Site formed, such as copper, bronze or muntz metal.
3. Concealed Surfaces: Nonmetallic wall or ceiling surfaces in areas concealed from view and generally inaccessible areas such as furred spaces, pipe chases and duct and elevator shafts.
4. Concrete surfaces, unless otherwise shown or specified.
5. Concrete floors.
6. Exterior face of architectural precast concrete unless otherwise noted.
7. Corrosion-Resistant Metal Surfaces: Surfaces of zinc, terne metal and stainless steel.
8. Operating Parts and Labels:
 - a. Do not paint moving parts of operating units, mechanical and electrical parts such as valve and damper operators, linkages, sensing devices, interior of motors and fan shafts.
 - b. Do not paint over labels required by building code or other governing authority, such as Factory Mutual, Underwriters' Laboratory, or any equipment identification, performance rating, name or nomenclature plates.
 - c. Cover moving parts and labels during the painting Work with protective masking. Remove all protective masking upon completion of Work. Remove all paint, coatings or splatter which comes in contact with such labels.
9. Structural and miscellaneous metals covered with concrete, shall not receive intermediate or finish coats of paint.

1.2 QUALITY ASSURANCE

- A. Applicator Qualifications:
 1. CONTRACTOR shall submit to the ENGINEER the name and experience record of the painting subcontractor. Include a list of utility or industrial installations painted, responsible officials, architects, or engineers concerned with the project and the approximate contract price.

2. Painting subcontractors whose submissions indicate that they have not had the experience required to perform the Work shall not be approved. Qualifying experience shall include at least three (3) previous projects of similar magnitude and complexity to this project that have been completed not less than eighteen (18) months prior to submission of qualifications to ENGINEER.
 3. CONTRACTOR shall submit to the ENGINEER written approval from the Manufacturer verifying that the painting subcontractor is approved to install the Manufacturer's coatings.
- B. All materials specified by name, brand or manufacturer shall be delivered unopened to the job in their original containers. The paint shall be applied in strict accordance with the recommendations of the manufacturer using equipment approved for the duty.
- C. Source Quality Control:
1. Provide the services of a qualified Manufacturer's representative at the Project site for a minimum of one (1) trip and one (1) 8 hour work days at the commencement of Work to advise on materials, surface preparation, installation and finishing techniques.
 2. Certify long term compatibility of all coatings with all substrates.
 3. Certify that products supplied comply with local regulations controlling use of Volatile Organic Compounds (VOCs).
 4. Provide the services of a qualified manufacturer's representative at the Project site for a minimum of one (1) trip and one (1) 8 hour work days prior to application of paint to inspect, advise on, and approve surface preparation.
 5. Provide the services of a qualified Manufacturer's representative at the Project site for a minimum of one (1) trip and one (1) 8 hour work days during application; and a minimum of one (1) trip and one (1) 8 hour work days at completion of the work to inspect the work.
 6. Within seven (7) calendar days after each site visit by the manufacturer, the CONTRACTOR shall provide a written report from the manufacturer certifying the surface preparation, installation, and the coatings have been applied properly and in accordance with the manufacturer's recommendations and requirements. Deficiencies in the coatings system, if any, noted by the manufacturer during any of the inspections shall be defined in the manufacturer's report including corrective measures to be implemented by the CONTRACTOR at the CONTRACTOR'S expense. Following corrective measures by the CONTRACTOR, the manufacturer shall re-inspect the work, at the CONTRACTOR'S expense and the CONTRACTOR shall, within seven (7) days after re-inspection, provide a written report from the manufacturer certifying the surface preparation and the coatings have been applied properly and in accordance with the manufacturer's recommendations and requirements.

- D. Reference Regulations: Surface preparation and application of coatings shall be performed by the CONTRACTOR in compliance with all applicable federal, state and local occupational safety, health and air pollution control regulations. The CONTRACTOR shall obtain and comply with all safety precautions recommended by the paint manufacturer in printed instructions or special bulletins, and as required by applicable regulations. The CONTRACTOR shall provide forced ventilation in all areas where inadequate ventilation exists.

1.3 SUBMITTALS

- A. Submittals shall be provided as described in Section 01330, Submittals, and as specified below. The CONTRACTOR shall be required to submit his proposed protective coating systems prior to any other equipment, piping, or hardware submittals that require protective coatings. After review of the protective coating submittals by the ENGINEER to indicate no further submittals are required, the CONTRACTOR shall be required to furnish only the approved protective coatings throughout the project.
- B. Shop Drawings: Submit for approval the following:
1. Copies of manufacturer's technical information, including paint label analysis and application instructions for each material proposed for use.
 2. Copies of CONTRACTOR'S proposed protection procedures in each area of the Work.
 3. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.
 4. Copies of manufacturer's complete color charts for each coating system.
 5. Maintenance Manual: Upon completion of the Work, furnish copies of a detailed maintenance manual including the following information:
 - a. Product name and number.
 - b. Name, address and telephone number of manufacturer and local distributor.
 - c. Detailed procedures for routine maintenance and cleaning.
 - d. Detailed procedures for light repairs such as dents, scratches and staining.
 6. Copies of Material Safety Data Sheets.
- C. Certificates: Submit for approval the following:
1. Certificate stating that materials meet or exceed Specification requirements.
 2. CONTRACTOR shall provide notarized statement verifying that all painting systems are compatible with surfaces specified. All painting systems' components shall have been reviewed by an authorized technical representative

of the paint Supplier for use as a compatible system. Verify that all painting systems are acceptable for the exposures specified and that the Supplier is in agreement that the selected systems are proper, compatible and are not in conflict with the paint Supplier's recommended specifications. Show by copy of transmittal form that a copy of the letter has been transmitted to the paint applicator.

- D. Statement of Application: Upon completion of the painting Work, submit a notarized statement to ENGINEER signed by CONTRACTOR and painting applicator stating that the Work complies with the requirements of these Specifications and that application methods, equipment and temperatures were proper and adequate for the conditions of installation and use.
- E. Test Reports: Submit for approval certified laboratory test reports for required performance and analysis testing.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials: Deliver all materials to the Site in original, new and unopened packages and containers bearing Supplier's name and label, and the following information:
 - 1. Name and title of material.
 - 2. Supplier's stock number and date of manufacture.
 - 3. Supplier's name.
 - 4. Contents by volume, for major pigment and vehicle constituents.
 - 5. Thinning instructions where recommended.
 - 6. Application instructions.
 - 7. Color name and number.
- B. Storage of Materials:
 - 1. Store only acceptable painting system components at the Site.
 - 2. Store in an environmentally controlled location as recommended by paint Supplier's written product information guidelines. Keep area clean and accessible.
 - 3. Store materials not in actual use in tightly covered containers.
 - 4. Comply with governing health and fire regulations.
- C. Handling of Materials:
 - 1. Handle materials in a manner which precludes the possibility of contamination, or incorrect product catalyzation.

2. Do not open containers or mix components until necessary preparatory Work has been completed and approved by ENGINEER and painting Work will start immediately.
3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.

1.5 JOB CONDITIONS

A. Site Facilities:

1. Supplemental heat sources, as may be required to maintain both ambient and surface temperatures within the range recommended by the Supplier for paint system applications, are not available at the Site.
2. The provision of all supplemental heat energy sources and equipment is the responsibility of CONTRACTOR.
3. Do not use heat sources which emit carbon dioxide or carbon monoxide into areas being painted. Properly locate and vent all such heat sources to the exterior such that paint systems are unaffected by exhaust products.

B. Existing Conditions:

1. Existing materials specified to be painted as part of the Work shall have their surfaces prepared to meet the requirements of the painting systems specified. Abrasive blasting, scraping or other abrading or surface film removal techniques as approved by ENGINEER shall be provided as part of the Work.
2. Before painting is started in any area, all surfaces to be painted and floors shall be cleaned of all dust using commercial vacuum cleaning equipment equipped with high-efficiency particulate air filters (HEPA filters) and dust containment systems.
3. After painting operations begin in a given area cleaning shall be done only with commercial vacuum cleaning equipment.

C. Environmental Requirements:

1. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 55°F and 90°F, unless otherwise permitted or restricted by the paint Supplier's printed instructions.
2. Surfaces to be painted shall be at least 5°F above the dew point temperature and shall be dry to the touch. Apply paints only when the temperature of surfaces to be painted, paint material, and the surrounding air temperatures are between 65°F and 95°F, unless otherwise permitted or restricted by the paint Supplier's printed instructions.
3. Apply paint system within the shortest possible time consistent with Supplier's recommended curing instructions for each coat. If chemical, salt, or other contamination contacts paint film between coats, it shall be removed in

accordance with SSPC-SP 1 Solvent Cleaning, and the surface restored before applying remainder of painting system.

4. Tanks containing water shall not be painted without specific permission of ENGINEER, and only under conditions where "sweating" of the tank outside surface is not likely to occur within 24 hours of application.
5. Epoxy paints shall not be applied if ambient temperature is expected to go below 50°F within 12 hours of application. Where Supplier's printed recommendations require a higher minimum ambient temperature, this shall be followed.
6. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; to damp or wet surfaces or when surfaces will reach dew point due to falling or rising temperatures and humidity conditions during the course of the paint application, unless otherwise permitted by the paint Supplier's printed instructions.
7. Do not paint pipelines and other unacceptably hot or cold surfaces until such surfaces can be maintained within temperature and dew point ranges acceptable to Supplier. CONTRACTOR shall arrange for such surfaces to be brought within acceptable temperature and dew point ranges as part of the painting Work.
8. Moisture content of surfaces shall be verified to ENGINEER as acceptable to permit the commencement of the painting Work using methods recommended by the specified Supplier.
9. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint Supplier during application and drying periods.
10. Provide adequate illumination and ventilation in all areas where painting operations are in progress.
11. Comply with applicable governing code requirements for air quality and material disposal regulations.

D. Pre-Painting Conference: (NOT USED)

E. Protection:

1. Cover or otherwise protect finished Work of other trades and surfaces not being painted concurrently or not to be painted.
2. During the surface preparation and painting Work, the facility shall remain in operation. Employ procedures which prevent contamination of the process or cause facility shutdown due to the Work of this Section.
3. Coordinate and schedule surface preparation and painting Work to avoid exposing employees of CONTRACTOR, OWNER, ENGINEER, and others who are not involved with the surface preparation and painting Work to the

Work of this Section. Provide required personnel safety equipment in compliance with governing authorities.

4. Submit protection procedures to be employed by CONTRACTOR to ENGINEER. Do not begin surface preparation and painting Work in any area until ENGINEER approves protection techniques proposed by CONTRACTOR.
5. Provide fire extinguishers and post caution signs warning against smoking and open flame when working with flammable materials.

PART 2 - PRODUCTS

2.1 MATERIAL QUALITY

- A. Product and Manufacturer: Provide one of the following:
 1. Tnemec Company, Incorporated.
 2. Sherwin Williams Company.
 3. Or equal
- B. The use of catalog numbers and the specific requirements set forth in the Specifications are not intended to preclude the use of any other acceptable Supplier's products which may be equivalent, but are given for the purpose of establishing a standard of design and quality of materials, application and workmanship.
- C. Where catalog numbers are out of date at time of bidding, provide products equal in quality to those specified.

2.2 SUBSTITUTIONS

- A. Refer to Section 01630, Product Options.

2.3 COLORS AND FINISHES

- A. Color Selection:
 1. A maximum of 15 different colors shall be selected for the painting Work, in addition to color coding of all pipelines, valves, equipment, ducts and electrical conduit.
 2. ENGINEER reserves the right to select all non-standard colors for all paint systems specified within the ability of the Supplier to produce such non-standard colors. CONTRACTOR shall supply such colors at no additional expense to OWNER.

- B. Color Coding of Pipelines, Valves, Equipment and Ducts:
 - 1. In general, all color coding of pipelines, valves, equipment and ducts shall comply with applicable standards of ANSI A13.1, ANSI Z535.1 and OSHA 1910.144. Provide color coding for pipelines included in Section 2.3.B.3.b, Pipeline Color Table, for specified pipelines.
 - 2. For equipment located on roofs or where exposed to public view such as on exterior building facades, or in offices or lobbies, the color shall be selected by ENGINEER.
 - 3. Color Coding of Pipelines and Equipment:
 - a. Finish coats of paint for pipelines and equipment shall be coded in basic colors. Colors shall be brilliant, distinctive shades matching the following safety colors in accordance with ANSI Z535.1 color specifications for safety colors and other basic colors:
 - b. Piping and Sign Color Code: Refer to Schedule A at the end of Section.
 - 4. The color of the final coats shall match as closely as possible, without custom blending, the color tabulated under the specific pipeline service.
- C. After approval by ENGINEER of colors and Shop Drawing submittals and prior to beginning painting Work, ENGINEER will furnish color schedules for surfaces to be painted listed in paragraph 2.4, Painting Systems below.
- D. Color Pigments: Provide pure, nonfading, applicable types to suit the surfaces and services indicated. Comply with the following:
 - 1. Lead and Chromate: Lead and chromate content shall not exceed amount permitted by Laws and Regulations.
 - 2. Areas subject to hydrogen sulfide fume exposure shall be identified by ENGINEER. Supplier shall notify ENGINEER of colors which are not suitable for long-term color retention in such areas.
 - 3. Supplier shall identify colors which meet the requirements of governing standards for use in locations subject to contact with potable water or water being prepared for use as potable water.
 - 4. Comply with Suppliers' recommendations on preventing coating contact with levels of carbon dioxide and carbon monoxide which could cause yellowing during application and initial stages of curing of paint coatings.

2.4 PAINTING SYSTEMS

- A. Ferrous metals, interior and exterior, non-submerged including piping, structural steel and miscellaneous steel.
 - 1. Surface Preparation: SSPC-SP6 Commercial Blast.
 - 2. Shop Primer:
 - a. Generic Description: Polyamide Epoxy.

- b. Product and Manufacturer:
 - 1) Tnemec: 66-1211 H.B. Epoxoline, 3.0-5.0 dry mils.
 - 2) Sherwin Williams: Copoxy Shop Primer, 3.0-5.0 dry mils.
 - c. Or equal.
 3. Field Preparation: SSPC-SP11 Power Tool Cleaning.
 4. Field Spot Intermediate:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 66-Color H.B. Epoxoline 4.0-6.0 dry mils.
 - 2) Sherwin Williams: Epolon II multi mill epoxy 4.0-6.0 dry mils.
 - 3) Or equal.
 5. Finish Coat Interior:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 66-Color H.B. Epoxoline 4.0-6.0 dry mils.
 - 2) Sherwin Williams: Tile-Clad High Solids 8.0-12.0 dry mils.
 - 3) Or equal.
 6. Finish Coat Exterior:
 - a. Generic Description: Aliphatic Acrylic Polyurethane.
 - b. Product and Manufacturer:
 - 1) Tnemec:
 - a) Gloss- Endura-Shield II 1074, 2.0-3.0 dry mils.
 - b) Semi Gloss- Endura-Shield II 1075, 2.0-3.0 dry mils.
 - 2) Sherwin Williams:
 - a) Gloss-Hi Solids Polyurethane, 2.0-3.0 dry mils.
 - b) Semi Gloss-Corothanell, 2.0-3.0 dry mils.
 - 3) Or equal.
- B. New ferrous metals, interior or exterior, submerged or intermittently submerged (must be NSF 61 approved):
1. Surface Preparation: SSPC-SP1, SSPC-SP2, SSPC-SP3, as recommended by manufacturer. If existing paint system is found not compatible with the specified system, it shall be removed per SSPC-SP10.
 1. Primer:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 20 Pota-Pox, 3.0-5.0 dry mils.
 - 2) Sherwin Williams: Hi Solids Catalyzed Epoxy B62, 3.0-5.0 dry mils.
 2. Field Spot Intermediate:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:

- 1) Tnemec: 20 Pota-Pox, 3.0-5.0 dry mils.
 - 2) Sherwin Williams: Hi Solids Catalyzed Epoxy B62, 3.0-5.0 dry mils.
 - 3) Or equal.
4. Finish Coat:
- a. Generic Description: Amine-catalyzed epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 20 Pota-Pox, 1 coat, 4.0 to 6.0 dry mils.
 - 2) Sherwin Williams: Macropoxy B58 Series, 1 coat 4.0 to 6.0 dry mils.
- C. Galvanized, Aluminum and Non-Ferrous Metals, submerged or non-submerged (must be NSF 61 approved)
1. Surface Preparation: SSPC-SP3 Power Tool Clean.
 2. Shop Primer:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 66 H.B. Epoxoline, 2.0-3.0 dry mils.
 - 2) Sherwin Williams: Macropoxy 646, 2.0-3.0 dry mils.
 - 3) Or equal.
 3. Field Preparation: SSPC-SP-3 Power Tool Clean.
 4. Finish Coat Interior:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 66 H.B. Epoxoline, 2.0-4.0 dry mils.
 - 2) Sherwin Williams: Tile Clad High Solids Epoxy, 2.0-4.0 dry mils.
 - 3) Or equal.
 5. Finish Coat Exterior:
 - a. Generic Description: Aliphatic Acrylic Polyurethane.
 - b. Product and Manufacturer:
 - 1) Tnemec: Semi Gloss-1074 Endura-Shield II, 2.0-4.0 dry mils.
 - 2) Sherwin Williams: Semi Gloss-Corothan II, 2.0-4.0 dry mils.
 - 3) Or equal.
- D. Aluminum in Contact with Dissimilar Materials:
1. Surface Preparation: Solvent clean.
 2. Shop Prime:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 66 Hi-Build Epoxoline, 2.0-3.0 dry mils.
 - 2) Sherwin Williams: Macropoxy 646, 2.0-3.0 dry mils.
 - 3) Or equal.
 3. Finish Coat:
 - a. Generic Description: Polyamide Epoxy.

- b. Product and Manufacturer:
 - 1) Tnemec: 66 Hi-Build Epoxoline, 2.0-3.0 dry mils.
 - 2) Sherwin Williams: Macropoxy 646, 2.0-3.0 dry mils.
 - 3) Or equal.

- E. New Interior Concrete Masonry and Concrete Non-submerged:
 - 1. Surface Preparation: Allow 28 days to cure, remove all spatter and nibs.
 - 2. Primer:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 54-660 Masonry Filler, 10 dry mils.
 - 2) Sherwin Williams: Kem Cati-Coat Epoxy Filler, 10 dry mils.
 - 3) Or equal.
 - 3. Finish Coat:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 66 H.B. Epoxoline, 4.0-6.0 dry mils.
 - 2) Sherwin Williams: Tile Clad High Solids Epoxy, 6.0-10.0 dry mils.
 - 3) Or equal.

- F. New exterior concrete:
 - 1. Surface Preparation: Allow 14 days to cure Paragraph 3.02 F.3.
 - 2. Primer:
 - a. Generic Description: Polyamide Epoxy.
 - b. Product and Manufacturer:
 - 1) Tnemec: 54-660 Masonry Filler, 10 dry mils.
 - 2) Sherwin Williams: Kem Cati-Coat HS Epoxy Filler, 10 dry mils.
 - 3) Or equal.
 - 3. Finish Coat:
 - a. Generic Description: Aliphatic Acrylic Urethane.
 - b. Product and Manufacturer:
 - 1) Tnemec: 175 Endura Shield, 4.0-6.0 dry mils.
 - 2) Sherwin Williams: Corothane II, 4.0-6.0 dry mils.
 - 3) Or equal.

- G. PVC Piping, CPVC Piping, Fiberglass, Fiberglass Insulation Covering: Exterior:
 - 1. Surface Preparation: Sand as specified in 3.2.G.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Tnemec:
 - 1) Finish: 69 H.B. Epoxoline II- 2 coats, 2.0-3.0 dry mils per coat, 240-360 square feet per gallon per coat.
 - b. Sherwin Williams:

- 1) Finish: Macropoxy 646 - 2 coats, 2.0-3.0 dry mils per coat, 400-600 square feet per gallon per coat.
- c. Or equal.
3. Exterior applies to areas that are not housed within a building and/or within an enclosed structure.

PART 3 - EXECUTION

3.1 INSPECTION

- A. CONTRACTOR and his applicator shall examine the areas and conditions under which painting Work is to be performed and notify ENGINEER in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film capable of performing in accordance with claims made in Supplier's product literature for the surfaces and conditions encountered.
- C. Do not paint over existing paint where there is no assurance that existing paint will provide an acceptable surface for the long-term adherence and durability of painting systems specified or where the Supplier requires removal of all existing paint in order to recommend the use of the specified painting system.

3.2 SURFACE PREPARATION

- A. General:
 1. Test for moisture content of surfaces before commencement of painting Work. Test for moisture in concrete in compliance with ASTM D 4263. Report results to ENGINEER before commencing Work.
 2. Prepare existing surfaces required to be painted as specified for new surfaces. Where CONTRACTOR proposes other methods of preparing existing surfaces they shall be submitted to ENGINEER for approval at time of Shop Drawing submittal. ENGINEER's approval of alternative surface preparation methods shall not relieve CONTRACTOR of performance required under this Section.
 3. Perform all preparation and cleaning procedures as specified herein and in strict accordance with paint Supplier's instructions for each particular surface and atmospheric condition.

4. CONTRACTOR shall remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items already in-place and that do not require field-painting, or provide effective surface-applied protection prior to surface preparation and painting operations.
5. CONTRACTOR shall remove, as necessary, items which must be field-painted where adjacent surfaces cannot be completely protected from splatter or overspray. Following completion of painting of each space or area, the removed items shall be reinstalled by workers skilled in the trades involved.
6. Clean surfaces to be painted before applying any painting system components. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning.
7. Prepare all surfaces which were improperly shop-painted, and all abraided or rusted shop-painted surfaces, as specified.

B. Ferrous Metals:

1. Comply with Supplier's recommendations for type and size of abrasive in order to provide a surface profile meeting Supplier's painting system requirements for type, function and location of surface. Verify that Supplier recommended profiles have been achieved on prepared surfaces. Report profiles to ENGINEER using Test Method C in compliance with ASTM D 4417.
2. Clean non-submerged ferrous surfaces including structural steel and miscellaneous metal to be shop-primed, of all oil, grease, dirt, mill scale and all other contamination by commercial blast cleaning complying with SSPC-SP6, at the time of paint system application, using SSPC VIS 1 as a standard of comparison.
3. Clean submerged ferrous surfaces including structural steel and miscellaneous metal to be shop-primed, of all oil, grease, dirt, mill scale and all other contamination by near-white blasting complying with SSPC-SP10, at the time of painting system application, using SSPC VIS 1 as a standard of comparison.
4. Clean non-submerged, ferrous surfaces that have not been shop-coated of all oil, grease, dirt, loose mill scale and all other contamination by commercial blasting complying with SSPC-SP6, at the time of painting system application, using SSPC VIS 1 as a standard of comparison.
5. Clean submerged ferrous surfaces that have not been shop-coated or that have been improperly shop-coated, of all oil, grease, dirt, mill scale and all other contamination by near-white blasting complying with SSPC-SP10, at the time of painting system application, using SSPC VIS 1 as a standard of comparison.
6. Touch-up shop-applied prime coats which have damaged or have bare areas, with primer recommended by Supplier after commercial blasting complying with SSPC-SP6, at the time of painting system application, using SSPC VIS 1 as a standard of comparison, to provide a surface profile of not less than 1 mil.

7. Power tool clean, complying with SSPC-SP3, in order to remove welding splatter and slag.
 8. Remove all rust and contamination on existing ferrous metals to sound surfaces by power tool cleaning complying with SSPC SP11 to provide a surface profile of not less than 1 mil.
- C. Non-Ferrous Metal Surfaces: Prepare all non-ferrous metal surfaces for painting by light whip-blasting or by lightly sanding with 60-80 mesh sandpaper.
- D. Galvanized (Zinc-Coated) Surfaces: Prepare all galvanized surfaces for painting by lightly sanding with 60-80 mesh sandpaper or by light whipblasting.
- E. Cast-In-Place Concrete and Masonry Surfaces:
1. Prepare surfaces of concrete unit masonry to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils, and other contamination, with soap and water. All surfaces shall be clean and dry at the time of paint system application.
 2. Concrete unit masonry that cannot be adequately cleaned by soap and water shall be acid etched with a commercial solution of 15 percent muriatic acid.
 3. Prepare and clean all surfaces of cast-in-place concrete and precast concrete in compliance with ASTM D4259 to obtain a uniform and continuous anchor profile of approximately 1 mil. Provide mechanical abrading procedures and abrasive blasting procedures as specified in ASTM D4259. Use 40 to 80 mesh abrasive and clean, dry, compressed air. Compressed air cleanliness shall be in compliance with ASTM D4285. Pressure at blasting nozzle shall not exceed 80 psi. Do not concentrate blast on surface but move at a fairly rapid rate to provide a surface free of laitants and contaminants. Provide post-surface preparation cleaning in accordance with ASTM D4258 to remove loose material. Surface preparation shall open all surface air holes by removing all laitance shoulders surrounding the air holes. Vacuum all surfaces to remove all dust and sand and wash with potable water.
 4. Where paint system is used to provide chemical containment barrier protection, repair cracks and expansion joints in concrete and provide 2-inch radiused cove base fillets at all equipment pads and containment walls as part of the complete chemical containment paint system Work. Use materials and techniques recommended by the specified Manufacturer.
 5. Remove all cast-in-place concrete fins, projections and other surface irregularities which would protrude above the level of finished intermediate fillers and surfacers by chipping and scarification by mechanical abrasion.
 6. Using specified filler and surfacer, patch all cast-in-place concrete and precast concrete surfaces as required to completely fill surface air holes and honeycombing. Level all protrusions and grind filler and surfacing compounds

smooth and level with adjacent surfaces.

7. Perform tests in compliance with ASTM D4262 and ASTM D4263 in order to verify the alkalinity and moisture content of the surfaces to be painted and report findings to ENGINEER. If, in the opinion of ENGINEER, the surfaces are sufficiently alkaline to cause blistering and burning of the paint, correct this condition before application of paint. Provide suitable testing materials in order to carry out alkalinity and moisture tests. Do not paint over surfaces where the moisture content exceeds 8 percent.
8. Where a concrete unit masonry block filler is specified, spot patch holes and cracks with a putty knife using specified block filler. Apply to large surfaces by airless spray and backroll uniformly using a roller with a synthetic nap cover. Follow with a rubber squeegee in order to provide a smooth finish.

3.3 MATERIALS PREPARATION

A. General:

1. Mix and prepare painting materials in strict accordance with Supplier's product literature.
2. Do not mix painting materials produced by different Suppliers unless otherwise permitted by Supplier's instructions.
3. Where thinners are required in the Work, they shall be produced by the paint system Supplier, unless otherwise permitted by the Supplier's product literature, submitted to ENGINEER at the time of Shop Drawing approval.

B. Tinting:

1. Tint each undercoat a lighter shade to facilitate identification of each coat of paint where multiple coats of the same material are to be applied.
2. Tint undercoats to match the color of the finish coat of paint, but provide sufficient difference in shade of undercoats to distinguish each separate coat. Provide a code number to identify material tinted by the Supplier.

C. Mixing:

1. For those products requiring constant agitation use methods in compliance with Supplier's product literature, to prevent settling during paint application.
2. Mix only in containers placed in suitably sized non-ferrous or oxide resistant metal pans to protect concrete floors from slashes or spills which could stain exposed concrete or react with subsequent finish floor material.
3. Mix and apply paint only in containers bearing accurate product name of material being mixed, or applied.
4. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film

which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.

5. Strain products requiring such mixing procedures. After adjusting mixer speed to break up lumps and after components are thoroughly blended, strain through 35 to 50 mesh screen before application.

3.4 APPLICATION

A. General:

1. Apply paint systems by brush, roller, or airless spray in accordance with Supplier's recommendations and in compliance with Paint Application Specifications No. 1 in SSPC Vol. 2, where applicable. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheeps wool as recommended by Supplier for material and texture required. Use air spray and airless spray equipment recommended by Supplier for specific painting systems specified. Submit a list of application methods proposed, listing paint systems and location.
2. Paint dry film thicknesses required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried.
3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. This is of particular importance regarding intense chroma primary colors. Insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
4. Surfaces of items not normally exposed-to-view do not require the same color as other components of the system of which they are a part, but require the same painting system specified for exposed surfaces of the system.
 - a. "Exposed-to-view surfaces" is defined as those areas visible when permanent or built-in fixtures, convector covers, ceiling tile, covers for finned tube radiation, grilles, etc. are in-place in areas scheduled to be painted.
5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint before final installation of registers or grilles.
6. Paint the backs of access panels, and removable or hinged covers, to match the exposed surfaces.
7. Paint aluminum parts in contact with dissimilar materials with specified paint system.
8. Omit field-primer on metal surfaces which have been shop-primed. Touch-up paint shop-primed coats and pre-finished items only when approved by

ENGINEER using compatible primers and Supplier's recommended compatible field-applied finishes.

9. Welds shall be stripe-coated with intermediate or finish coat of paint after application of prime coat.

B. Minimum/Maximum Paint Film Thickness:

1. Apply each material at not less than, nor more than, Supplier's recommended spreading rate, and provide total dry film thickness as specified.
2. Apply additional coats of paint if required to obtain specified total dry film thickness.
3. Maximum dry film thickness shall not exceed twice the minimum dry film thickness, except where more stringent limitations are recommended by the paint Supplier for a specific product.

C. Scheduling Surface Preparation and Painting:

1. Apply the first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration in consideration of the atmospheric conditions existing at the time of surface preparation and painting. Surfaces that have started to rust before first-coat application is complete shall be brought back to required standard by abrasive blasting.
2. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
3. Scarify primers and other painting system components by brush-blasting if paint has been exposed for lengths of time or under conditions beyond Supplier's written recommendations for the painting systems involved, the intended use, or the method of application proposed for subsequent coats of paint.
4. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

D. Prime Coats: Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects caused by insufficient sealing.

E. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage.

F. Brush Application:

1. Brush-out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Neatly draw all glass and color break lines.
2. Brush apply all primer or first coats, unless otherwise permitted to use mechanical applicators.

G. Mechanical Applicators:

1. Use mechanical methods for paint application when permitted by governing ordinances, Supplier, and approved by ENGINEER.
2. Limit roller applications, if approved by ENGINEER, to interior wall finishes for second and third coats. Apply each roller coat to provide the equivalent hiding as brush-applied coats.
3. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of two coats in one pass.

- H. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish, or repaint Work not in compliance with specified requirements as required by ENGINEER.

3.5 FIELD QUALITY CONTROL

- A. The right is reserved by ENGINEER to invoke the following material testing procedure at any time, and any number of times, during the period of field painting:
1. Engage the service of an independent testing laboratory to sample any of the paints being used. Samples of materials delivered to the Site will be taken, identified and sealed, and certified as to being the material actually applied to the surfaces in each area, in the presence of CONTRACTOR.
 2. A testing laboratory, selected by OWNER, will perform appropriate tests for any or all of the following characteristics:
 - a. Abrasion resistance.
 - b. Apparent reflectivity.
 - c. Flexibility.
 - d. Washability.
 - e. Absorption.
 - f. Accelerated weathering.
 - g. Dry opacity.
 - h. Accelerated yellowness.
 - i. Recoating.
 - j. Skinning.
 - k. Color retention.

- D. At the completion of Work of other trades, touch-up and restore all damaged or defaced painted surfaces as determined by ENGINEER.

SCHEDULE A - PIPING AND SIGN COLOR CODE

**NOTE: FINAL COLOR SELECTION MUST BE REVIEWED AND APPROVED BY OWNER.*

<u>PIPING</u>	<u>PIPING COLOR</u>	<u>LETTERING COLOR</u>
Drinking Water	L. Blue	White
Seal Water	Blue	Black
Bollards	Yellow or Match Existing as required	NA
Vault Vent Pipe	White	NA

++ END OF SECTION ++

SECTION 09905

GENERAL COATING SPECIFICATION (GCS)

PART 1 - GENERAL

1.1 SCOPE OF WORK.

- A. The project will be defined as cleaning and applying protective coating systems as specified.
- B. Furnish all labor, insurance, equipment, and materials necessary to clean and supply protective coating systems to the facilities as required by the General and Project Specific Coating Specifications, and to complete other work as described.

1.2 RELATED REQUIREMENTS.

- A. Related work as called for on plans, or in this or other Specification Sections.

PART 2 - QUALITY ASSURANCE, REFERENCE SPECIFICATIONS, STANDARDS, AND OTHER INFORMATION

2.1 DEFINITION OF TERMS:

- A. Owner is the Trinity River Authority of Texas (Authority).
- B. Owner's Representative is the Construction Services Manager for TRA and/or his designated representative.
- C. Engineer is the firm who designed the Project.
- D. Contractor is an independent contractor and is the supplier of labor (competent superintendent, skilled craftpersons, and others), material and other items necessary to perform the work in accordance with the coating specifications in the contract.
- E. Quality Assurance includes all those planned and systematic actions necessary to provide adequate confidence that a protective coating system will perform satisfactorily in service. Quality assurance includes quality control inspections.

- F. Quality Control Inspection is the verification of the conformance (compliance) of materials and methods of application to the governing documents (Coating Specifications) in order to achieve a desired result. A quality control (QC) supervisor designated by the contractor shall be responsible for on-job-site quality control. A field inspector shall be designated by the Owner. The field inspector is not responsible or liable for the project coatings operations and or verifications (inspections).
- G. Mandatory Quality Control Verifications are mandatory inspections which shall be conducted jointly by the Owner's Representative and the QC Supervisor to verify quality control of detailed parts of the work or materials to be used in the work. No work shall be initiated by the Contractor that will limit complete (100%) inspection of the Owner's Representative and QC Supervisor of items included within mandatory quality control verifications.
- H. Inspection Program is written procedures used to determine if the requirements of the specifications are met. The Inspection Program shall designate mandatory quality control verifications. The Inspection Program details the information needed, controls, limiting factors, instruments, and other items necessary to confirm that the requirements of the Coating Specifications are maintained. The QC Supervisor shall maintain a daily log to verify compliance with the coating specifications. Mandatory quality control verifications included in the Inspection Program shall be designated by the Owner's Representative. It is solely the Contractors QC Supervisor responsibility for verification of surface prep, mixing, application and testing of coatings for the project. The Owner assumes no responsibility or liability for requirements outlined in the specifications.
- I. Inspection Schedules are times and dates determined by the Contractor to coordinate work progress with the inspection requirements. These shall be written (nbc).
- J. Off-Site Coating Operations is any where other than the project site.
- K. Specialty Specifications and Standards refer to recognized industry references, such as, those published by NACE International, Steel Structures Painting Council, American Society of Testing and Materials, or other organizations and are used as a part of the Technical Specifications.
- L. Where the terms "exposed" surfaces are used to define painting locations and requirements it shall include all interior or exterior surfaces, top of walls, ceilings, and surfaces to 1'-0" below grade or the weir level or to floor level, whichever applies.

2.2 PERSONNEL AND PLANNING SHALL BE AS FOLLOWS:

- A. An inspector shall be assigned by the Owner and shall protect the Owner's interest as Owner's field representative.
- B. Quality Control is the responsibility of the Contractor (competent superintendent). The Contractor shall designate in writing a quality control supervisor (QC Supervisor) who shall be responsible for on-job-site quality control. The QC Supervisor can be the Contractor himself or herself or can be a person designated by the Contractor.
- C. No work that effects the quality of applied protective coating system shall proceed when the QC Supervisor is not on the job site.
- D. The QC Supervisor shall be qualified. Minimum qualifications shall include:
 - 1. Experience (minimum 5 years) performing and/or supervising abrasive blast cleaning operations;
 - 2. Knowledge of abrasives, equipment required, and applicable safety requirements and safety appliances;
 - 3. Knowledge of other methods of surface preparations, equipment required, and applicable safety requirements and safety appliances;
 - 4. Experience (minimum of 5 years) performing and/or supervising coating applications;
 - 5. Knowledge of coating materials, the equipment required for their proper application, and applicable safety requirements and safety appliances;
 - 6. Knowledge of calibration and proper use of test instruments and test appliances;
 - 7. Knowledge of all work related safety requirements and applicable safety appliances;
 - 8. Complete understanding of the intent and application of the Specifications, Specialty Specifications and Standards.
- E. The QC Supervisor shall coordinate the work progress with the required inspections and verifications provided by the written Inspection Program. The QC Supervisor (the Contractor or the Contractor's competent superintendent) shall have the on-job-site authority to alter the work schedule, if necessary, to meet the intent and quality requirements of the Coating Specifications.
- F. Coordination of activities and communication with the Contractor by the Owner's Representative with respect to inspection of work or materials, or both, and verification of compliance with the Coating Specifications shall be with the QC Supervisor designated by the Contractor. Hold points shall be determined by the owner's representative for the inspection of all phases of the work. No extra cost to owner for delays due to hold point inspections.

- G. Chemical and instrumental tests required by the Coating Specifications for quality control shall be performed with commercially available test reagents and instruments. Procedures followed and calibration standards used shall be in accordance with the manufacturer's or supplier's published data and follow the written procedures in the references and standards listed. The results of any and all tests required by federal, state, or local agencies shall be confirmed by an approved, independent, analytical laboratory.

2.3 THE CONTRACTOR SHALL HAVE PREPARED PRIOR TO THE PRE-CONSTRUCTION CONFERENCE THE WRITTEN SCHEDULES, PROCEDURES, PROGRAMS, AND DOCUMENTATION, INCLUDING THE RESUME(S), WITH REFERENCES, FOR THE QC SUPERVISOR. REGULATIONS ARE INCLUDED BY REFERENCE AS A PART OF THE COATING SPECIFICATIONS. THIS MATERIAL SHALL BE SUBMITTED TO THE OWNER AT THE PRE-CONSTRUCTION CONFERENCE.

- A. No work shall proceed until the requirements of 2.03 have been completed.

2.4 THE CONTRACTOR SHALL HAVE PREPARED, TO BE REVIEWED AT THE PRE-CONSTRUCTION CONFERENCE, A WORK SCHEDULE, WORK PROCEDURES, THE TRAINING PLANNED TO BE GIVEN FOR THE JOB, AND A LIST OF THE MATERIALS TO BE USED.

- A. DFT(s) in excess of those stated by the manufacturers data sheets shall be removed by power sanding, and the sanded areas shall be repaired at no additional expense to the Owner.
- B. Any test necessary to verify the quality of the applied coating system shall be conducted by a third party competent person, NACE certified, not otherwise involved in this project, and acceptable to the Owner's representative. A written report of the test shall be submitted and approved before the applied coating system is accepted. Testing and repair, if necessary, shall be completed within the time constraints of the contract and at no additional expense of the Owner.

2.5 THE CONTRACTOR SHALL HAVE AVAILABLE AND IN THE POSSESSION OF THE QC SUPERVISOR ON THE JOB SITE THE FOLLOWING INFORMATION:

- A. A copy of these Coating Specifications including the Inspection Program and all referenced standards and specifications.
- B. A copy of the coating manufacturer's product data sheets, technical bulletins, application guides, and any other information relevant to storage, mixing, thinning,

and applying the protective coatings selected. Copies shall be provided for the Owner's Representative.

- C. A copy of Material Safety Data Sheets (MSDS) for all materials furnished or to be used by the Contractor. Copies shall be provided for the Owner's Representative.

2.6 CURRENT EDITIONS OF THE FOLLOWING SPECIALTY SPECIFICATIONS, STANDARDS, AND INFORMATION SHALL BE USED BY THE OWNER'S REPRESENTATIVE. WHEN APPLICABLE, TO DETERMINE CONFORMANCE WITH THE COATING SPECIFICATIONS. CONTRACTOR SHALL ADHERE TO ALL REQUIREMENTS LISTED IN THE FOLLOWING SPECIFICATIONS AND STANDARDS. IF REQUESTED, ELECTRONIC COPIES OF ALL LISTED SPECIFICATIONS AND OR STANDARDS SHALL BE PROVIDED FOR THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.

- A. Joint Surface Preparation Standards by NACE/SSPC:
1. Joint Surface Preparation Standard, NACE No. 1/SSPC-SP5, "White Metal Blast Cleaning;"
 2. Joint Surface Preparation Standard, NACE No. 2/SSPC-SP10, "Near-White Metal Blast Cleaning;"
 3. Joint Surface Preparation Standard, NACE No. 3/SSPC-SP6, "Commercial Blast Cleaning;"
 4. Joint Surface Preparation Standard, NACE No. 4/SSPC-SP7, "Brush-Off Blast Cleaning;"
 5. Joint Surface Preparation Standard, NACE No. 5/SSPC-SP12, "Surface Preparation of Steel and Other Hard Materials by High and Ultra-High Pressure Water Jetting;"
 6. Joint Surface Preparation Standard, NACE No. 6/SSPC-SP13, "Surface Preparation of Concrete;"
 7. Joint Surface Preparation Standard, NACE No. 7/SSPC VIS 4, "Visual Reference for Steel Cleaned by Water Jetting;"
 8. Joint Surface Preparation Standard, NACE No. 8/SSPC 14, "Industrial Blast Cleaning;"
- B. NACE International – National Association Of Corrosion Engineers (NACE):
1. NACE International (NACE) Standard Recommended Practice, RP0287-95, "Field Measurements of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using Replica Tape;"
 2. NACE Standard RP0188-99, "Discontinuity (Holiday) Testing of Protective Coatings;"
 3. NACE Standard TM-01-70, "Visual Comparator for Surfaces of New Steel Airblast Cleaned with Sand Abrasive," or NACE Standard TM-01-70, "Visual

- Comparator for Surfaces of New Steel Airblast Cleaned with Slag Abrasive," or SSPC-Vis 1 89, "Visual Standard for Abrasive Blast Cleaned Steel;"
4. NACE Standard RP0178-95, "Fabrication Details, Surface Finish Requirements, and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service;"
 5. NACE RPO 892-92, "Linings Over Concrete for Immersion Service;"
 6. NACE RPO 591-96, "Coatings for Concrete Surfaces in Non-Immersion;"
 7. NACE 6G186, "Surface Preparation of Contaminated Steel Surfaces;"
 8. NACE 6G191, "Surface Preparation of Contaminated Concrete."
 9. NACE RPO 178, "Weld Preparation Visual Comparator."
- C. Steel Structures Painting Council – Society For Protective Coatings (SSPC):
1. SSPC Good Painting Practice, Vol. 1, Chapters 2.3, "Non-Metallic Abrasives," 2.4, "Abrasive Air Blast Cleaning," 2.5, "Water Blast Cleaning," and .1, Paint Application (PA);"
 2. SSPC-PA 1, "Paint Application Specification No. 1;"
 3. SSPC-SP 1, "Solvent Cleaning;"
 4. On surfaces that will be in immersion service the visible inspection shall be supplemented, by the Owner's Representative using an ultraviolet light source to check for oil contamination. Contractor shall provide an ultraviolet light source.
 5. SSPC-SP 2, "Hand Tool Cleaning;"
 6. SSPC-SP 3, "Power Tool Cleaning;"
 7. SSPC-AB 1, "Abrasive Specification No. 1" and SSPC-AB-2;
 8. SSPC-PA 2, "Measurement of Dry Paint Thickness with Magnetic Gages." (note: exception taken to averaging of DFT readings);"
 9. SSPC-TU4, "Field Methods for Retrieval and Analysis of Soluble Salts;"
 10. SSPC-T66, "Detecting, Removing, and Over coating Soluble Salts."
 11. SSPC- SP11 "Power Tool Cleaning To Bare Metal"
- D. Environmental protection is regulated by both the United States Environmental Protection Agency (EPA) and the TNRCC. The relevant EPA regulations are published in the code of Federal Regulations (CFR) in Title 40 Parts 60, and 260 to 290, Solid Waste. The relevant Texas Natural Resource Conservation Commission (TNRCC) regulations are published in the Texas Administrative Code (TAC) in Title 30 Chapter 335 (30 TAC 335), Industrial Solid Waste and Municipal Hazardous Waste and 30 TAC 111, Air Pollution.
- E. American National Standards Institute (ANSI):
1. A224.1, Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames;
 2. Z535.1, Safety Color Code.

- F. American Society for Testing and Materials (ASTM):
1. A780, Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings;
 2. D4258, Practice for Surface Cleaning Concrete for Coating;
 3. D4259, Practice for Abrading Concrete;
 4. D4261, Practice for Surface Cleaning Concrete Unit Masonry for Coating;
 5. D4262, Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces;
 6. D4263, Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method;
 7. ASTM-D4940-89, "Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blasting Adhesives;"
 8. ASTM-D4285-88, "Standard Test Method for Indicating Oil or Water in Compressed Air;"
 9. ASTM-D1125, "Test Method for Electrical Conductivity and Resistivity of Water;"
 10. ASTM-E377, "R.H. by Wet and Dry Bulb Psychrometer;"
 11. ASTM-D4414, "Measurement of W.F.T. by Notch Gauges;"
 12. ASTM-D4138, "Measurement of D.F.T. by Destructive Means;"
 13. ASTM-D4541, "Pull Off Strength of Coatings."
 14. ASTM-D4260, "Practice for Acid Etching Concrete."
 15. ASTM-D714, "Evaluating Degree of Blisters."
 16. ASTM-D5064, "Conducting a Patch Test to Assess Coating Compatibility."
 17. ASTM-D3359, "Measuring Adhesion by Tape Test."
 18. ASTM-D4787, "Continuity Verification of Liquid or Sheet Linings to Concrete Substrates."
 19. ASTM-A123, "Zinc Coatings on Iron and Steel Products."
 20. ASTM-A143, "Safeguarding Against Embrittlement."
 21. ASTM-A153, "Zinc Coatings on Hardware."
 22. ASTM-A384, "Safeguarding Against Warpage and Distortion."
 23. ASTM-A385, "Providing High-Quality Zinc Coatings."
 24. ASTM-767, "Zinc Coated Steel Bars For Concrete Reinforcement."
 25. ASTM-780, "Repair of Damaged Hot dip Galvanized Repair."
- G. National Bureau of Standards (NBS):
1. Certified Coating Thickness Calibration Standards.
- H. National Fire Protection Association (NFPA):
1. 101, Life Safety Code.
- I. Occupational Health and Safety Administration (OSHA):
1. OSHA 29CFR 1910.144, 1995 Safety Color Codes for Marking Physical Hazards;

2. Applicable regulations relating to labor; Occupational Safety and Health Administration, Department of Labor, (OSHA) published in the Code of Federal Regulations (CFR), Title 29, parts 1910 & 1926 (29 CFR 1910 & 29 CFR 1926).
- J. American Water Works Association (AWWA):
 1. ANS/AWWA C652-92 "Disinfection of Water Storage Facilities;"
 2. ANSI/AWWA D102-97 "Coating Steel Water-Storage Tanks."
- K. American Concrete Institute (ACI):
 1. ACI 503-30, "Use of Epoxy Compounds with Concrete."
 2. ACI 515.1r-79 " A Guide to the use of Waterproofing, Dampproofing concrete."
- L. Federal Specifications:
 1. DOD-P21035 , " Paint, High Zinc Dust Content, Galvanizing Repair."
 2. MIL-P26915 , " Primer Coating Zinc Dust Pigmented."

2.7 QUALITY ASSURANCE

- A. Manufacturer: All paints, sealers, and coatings to be manufactured by those firms listed. Products of equal quality by other manufacturers will be considered, subject to approval of written submittal that includes product data and a detailed paint and coating schedule. Deviation from specified mil thickness or product type is not allowed without written authorization from the Engineer.
- B. Workmanship
 1. Furnish workers who perform quality work and who are experienced and knowledgeable in the surface preparation and application of high-performance industrial coatings. Submit list of five similar projects which have been prepared and coated by the personnel which the Contractor proposes to employ for this project.
 2. Submit manufacturer's written instructions on cleaning and coating prior to any surface preparation or coating.
- C. Whenever, possible, all coatings should be from single manufacturer.
- D. All coatings provided for use on this project in the field or from equipment suppliers will be in compliance with local, state and federal government laws, regulations and ordinances related to items such as lead, chromate, carcinogens and volatile organic compounds. All coatings in potable water service to be National Sanitation Foundation (NSF) approved potable water service. NSF approved coatings is required even if not listed in the painting schedule, provide at no cost to the owner. Coating contractor is responsible for coordination.

- E. Perform surface preparation and disposal of preparation debris in accordance with applicable local, state and federal regulations and standards at no additional cost to Owner.
- F. Contractor shall coordinate materials to be painted, shop primers, field primers, and finish coating systems to ensure compatibility for all materials and coatings in this project.
- G. All coatings in contact with potable water shall conform to ANSI/NSF Standard 61 and shall be certified by an organization accredited by ANSI. All process, service water, potable, and chemical piping, fittings, tanks, valves, equipment, and structures in contact with the water being treated are included in this requirement, provide at no extra cost to the owner.
- H. All aspects of the coating operations including off-site coating operations will be inspected by the owners rep. All costs associated with the off-site inspection including travel, airfare, meals, rental car, lodging and parking, shall be paid for by the general contractor and or coating contractor and or manufacturer. No cost to the owner.
- I. Manufacturers, suppliers and others that will supply equipment for the project shall provide the project specified coatings on their products. Final color selection shall be by the owner. Coordination is required by the general contractor and manufacturer/supplier.

2.8 DEVIATION FROM SPECIFICATIONS, STANDARDS, OR OTHER INFORMATION MUST BE APPROVED IN WRITING FROM THE ENGINEER. IF THERE IS A CONFLICT OR DISCREPANCY BETWEEN REFERENCE SPECIFICATIONS, STANDARDS, OR A MISPRINT OR ERRONEOUS LISTING OF REFERENCE SPECIFICATIONS, STANDARDS, OR OTHER INFORMATION AND THE GENERAL OR PROJECT SPECIFIC COATING SPECIFICATIONS, CONTRACTOR SHALL BID THE STRICTER REQUIREMENTS.

- A. Resolution of conflicts between any of the specifications, standards, or other information shall be the responsibility of the ENGINEER. The final decision shall be written and become a part of the General or Project Specific Coating Specifications. No extra payment due for resolutions.

2.9 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR QUALITY CONTROL. A WRITTEN INSPECTION PROGRAM THAT DETAILS INSPECTION PROCEDURES, TEST REQUIREMENTS, AND THE INSTRUMENTS NECESSARY FOR QUALITY CONTROL SHALL BE INCLUDED AS A PART OF THESE COATING SPECIFICATIONS. COPIES OF THE

INSPECTION PROGRAM SHALL BE AVAILABLE TO THE OWNER'S REPRESENTATIVE.

- A. The purpose of the Inspection Program is twofold: first, to facilitate coordination of necessary interactions between the Contractor and the Owner's representative for verification of compliance with the Coating Specifications, and second, to facilitate communication between the QC Supervisor and the Owner's representative.

2.10 THE CONTRACTOR SHALL HAVE AVAILABLE ALL THE INSTRUMENTS IN GOOD WORKING CONDITION, AND CALIBRATIONS STANDARDS NECESSARY TO CONDUCT THE TESTS REQUIRED BY THE INSPECTION PROGRAM AND/OR THE OWNER'S REPRESENTATIVE.

2.11 THE CONTRACTOR SHALL PROVIDE ALL SCAFFOLDING AND PERSONNEL TO RIG AND MOVE THE SCAFFOLDING NECESSARY FOR QUALITY CONTROL INSPECTIONS. ALL SAFETY APPLIANCES USED SHALL BE FURNISHED BY THE CONTRACTOR.

- A. Refer to "Safety Requirements for Scaffolding," 29CFR 1926.451 and 29CFR 1910.28, OSHA.

2.12 THE CONTRACTOR SHALL PROVIDE ALL PERSONNEL, DEEMED NECESSARY BY THE OWNER'S REPRESENTATIVE, TO CONDUCT THE FINAL QUALITY CONTROL INSPECTION ON ALL SURFACES COATED. SPECIFICALLY, THE FINAL QUALITY CONTROL INSPECTION SHALL INCLUDE RECORDING THE FINISHED COATING SYSTEM DFT IN ACCORDANCE WITH SSPC-PA 2(SPECIFIED DFT IS REQUIRED) NO AREA SHALL BE LESS THAN SPECIFIED DFT BEFORE AVERAGING OF TESTS AND TESTING FOR DISCONTINUITIES (HOLIDAYS) IN ACCORDANCE WITH NACE STANDARD RP0188-99. THE FINISHED COATING SYSTEM ON ALL SURFACES SHALL BE COMPLETELY (100%) FREE OF DISCONTINUITIES, PINHOLES, AND SURFACE DEFECTS. A COMPATIBLE CONDUCTIVE PRIMER IS REQUIRED FOR ALL CONCRETE/CEMENTITIOUS SURFACES.

2.13 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR QUALITY CONTROL AND SAFETY. THE FINISHED COATING SYSTEMS SHALL HAVE A UNIFORM APPEARANCE OF BOTH GLOSS AND COLOR. THE APPEARANCE OF THE FINISHED COATING SYSTEMS REGARDING RUNS, SAGS, OVERSPRAY, OR ORANGE-PEEL TEXTURE SHALL BE CORRECTED TO A FINISH ACCEPTABLE TO THE OWNER'S REPRESENTATIVE.

2.14 ALL WORK SHALL BE DONE BY QUALIFIED, RESPONSIBLE PERSONS. ALL SURFACES AND PROPERTY SHALL BE PROTECTED FROM DAMAGE AS A RESULT OF WORK PERFORMED ON THIS PROJECT. REPAIRS AND RESTORATION OF SURFACES OR PROPERTY DAMAGE BY THE CONTRACTOR OR BY SUB CONTRACTORS OR BY SUPPORT ACTIVITIES SHALL BE PAID FOR BY THE CONTRACTOR OR SUB CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

2.15 OVER SPRAY SHALL BE REMOVED BY A COMPETENT THIRD PARTY COMPANY SPECIALIZING IN OVER SPRAY REMOVAL. ALL REPAIRS MUST BE ACCEPTABLE TO THE ENGINEER AND OWNERS REP. AT NO ADDITIONAL COST TO THE OWNER. ANY SURFACE NOT ACCEPTABLE SHALL BE REPLACED AT NO ADDITIONAL COST TO OWNER.

PART 3 - SUBMITTALS

3.1 SUBMIT THE FOLLOWING IN ACCORDANCE WITH SPECIFICATION SECTION, "SUBMITTALS."

- A. Painting Schedule: Submit detailed list indicating individual items to be painted, preparation, paint manufacturer, product designation, color charts, and dry mil thickness, adhesion P.S.I., and anchor profile for each item to be painted.
- B. Panels:
 - 1. Submit panels containing samples of proposed paints and coatings. Include three displays of each kind of paint used. Panel to be representative of material to be coated.
 - 2. Mark panels to indicate respective types of surfaces to which several kinds and colors of paint, stain, and coating are applied.
- C. Samples: If requested by Owner, submit one pint of each kind of paint or stain proposed for use. Do not deliver materials to site until representative samples (if requested) have been approved.
- D. For all materials, furnish ENGINEER with sets of manufacturer's printed instructions describing surface preparation procedures and application procedures including environmental limits (temperature, humidity, and dew point). Include surface preparation, anchor pattern, mixing and thinning requirements, pot life, adhesion pull off P.S.I., and other special requirements listed by manufacturer.
- E. List of five similar projects.
- F. Material Safety Data Sheets (MSDS) for all coatings, solvents, sealers, and paints to be utilized.

- G. Submit documentation to Owner, including disposal manifest, that shows that surface preparation debris has been disposed of as required by local state and federal regulations based on lead content. At no additional cost to the Owner.
- H. Provide owner with a copy of all references listed.
- I. Manufacturer's statement regarding applicator instruction on product use.
- J. Applicator experience qualifications.
 - 1. The coating manufacturer technical representative shall qualify / certify the applicator (on site) for surface prep, mixing, application and testing for their product. A written qualification / certification from the coating manufacturer technical service manager is required. Provide qualification / certification at no cost to the owner.
- K. Manufacturer's recommendation for universal barrier coat.
- L. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's application instructions.
 - c. Manufacturer's surface preparation instructions.
 - d. If products being submitted are manufactured by company other than listed in 4.01, provide complete individual data sheet comparison of proposed products with specified products including application procedure, coverage rates, cost analyst and verification that product is designed for intended use.

PART 4 - PRODUCTS

4.1 ACCEPTABLE MANUFACTURERS

- A. See other related coating specifications.

4.2 MATERIALS

- A. All materials used must contain not more than 3.5 LBS/GAL VOC as applied (in thinned state) unless noted otherwise.
- B. For unspecified materials such as thinner, provide manufacturer's recommended products.

- C. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- D. Contractor shall have complete responsibility for ensuring that each coating applied is compatible with its substrate and/or its intended finish coat, and that the completed coating system is suitable for its intended service. A conductive primer is required for concrete surfaces.
- E. Accessory Materials: Thinning of paint and all accessory type materials used shall be strictly in accordance with the manufacturer's recommendations covering material types, solvents, mix ratios, and methods.
- F. Colors:
 - 1. Owner reserves the right to select colors.
 - 2. Formulate with colorants free of lead or lead compounds.
- G. Extra Stock:
 - 1. Provide unopened five one-gallon containers of each color and surface texture to Owner.
 - 2. Label each container with color, texture, and room locations, in addition to the manufacturer's label.
- H. The manufacturer's recommended procedures are intended to define optimum conditions for use and performance of their products. All materials shall be used in accordance with the manufacturer's recommended procedures unless otherwise specified.
 - 1. Information required for using a coating material that is not specifically stated in the Product Data Sheet or other coating manufacturer information shall be obtained in writing from the coating manufacturer's Technical Service Manager and submitted to the Owner's representative.
- I. All coating materials shall be delivered to the job site in the manufacturer's original containers, unopened, and with labels identifying the manufacturer, the product, the batch number, and the date of manufacture. Multi-component materials shall be matched with the correct number and quantity of components for each mixed unit.
- J. No damaged or leaking containers of material shall be used or stored with the acceptable material. Damaged containers shall be removed from the job-site. Damaged means that the container is deformed in a manner that the material cannot be removed without loss.

1. If a container of one of the components of a multi-component material is damaged or leaking, all components which make one mixed unit of that material shall be removed from the job-site.
- K. Coating materials shall be checked for the expiration date of shelf life. Coating materials shall not be used after the expiration date and shall be removed from the job site on or before the shelf life expires.
- L. All coating materials shall be stored in a manner to provide protection from temperature extremes. The minimum storage temperature shall be 55°F and the maximum storage temperature shall be 120°F, or as by written approval by the manufacturer's technical services manager.
- M. Immediately after mixing, the temperature of the coating material shall be checked with a paint thermometer. The maximum temperature shall be 100°F, or as by written approval by the manufacturer's technical services manager.
- N. Immediately prior to application of any coating materials, the surface temperature of the surfaces to be coated shall be checked with surface thermometer. The minimum surface temperatures shall be 55°F and the maximum surface temperature shall be 120°F, or as by written approval by the manufacturer's technical services manager.
1. Regardless of the surface or coating material temperature, if the coating material develops blisters or exhibits any other unusual or unexpected characteristic immediately after application, application shall be discontinued until the source of the problem is identified.
 2. A small test area is always recommended when initially applying an unfamiliar material.

PART 5 - PROTECTION OF THE ENVIRONMENT, HEALTH AND SAFETY:
GENERAL

- A. The contractor shall assure by policy, rules, and inspection that all of the work related activities are in compliance with the requirements of federal, state and local agency regulations enacted to protect the environment and workpersons, at no expense to the Owner.
1. At no additional cost to the Owner, the Owner's representatives shall be included with the Contractor's employees for exposure assessment and other required tests, such as, blood lead level, ZPP, and respiratory exams.
- B. The Contractor shall keep the job site, storage facilities, and storage area free from accumulation of waste materials. Solid waste shall be stored in a manner to prevent a nuisance and contamination. Debris shall be covered in a manner that it

shall be completely contained until it is removed from the job site. Liquid waste shall be stored in metal containers that can be sealed. The Contractor, at no additional expense to the Owner, shall transport and dispose of all waste materials generated by workpersons and work activities on this project.

- C. At the completion of the project, all areas used by the Contractor shall be restored to original condition at no cost to the Owner.
- D. Contractor is solely and completely responsible for conditions of the job site including safety of all persons (including employees) and property during performance of the work. This requirement applies continuously and is not limited to normal working hours. Conform with safety provisions of the U.S. Department of Labor, Occupational Safety and Health Act, any equivalent state law, and all other applicable federal, state and local laws, ordinances, and codes.
- E. Contractor is cautioned of the potential risk of damage and/or nuisance to the adjoining property and/or structures. Contractor is responsible for continually monitoring risk of damage and providing necessary equipment and/or controls to minimize the carryover of dust, paint, and abrasives. If excessive dust, paint, or abrasives are determined to be affecting adjoining property and/or structures, Contractor to utilize shrouds, drop tubes, or other means to confine the abrasive, paint, and other materials to the associated work area.

PART 6 - MISCELLANEOUS REQUIREMENTS

- A. Abrasives used for cleaning the interior and exterior surfaces shall be used one-time without recycling.
 - 1. The abrasive shall be hard, angular, and graded to produce the specified surface profile. This determination shall be made in accordance with SSPC-AB 1 and SSPC-AB 2.
 - 2. The abrasive shall be free of oil and visible water-soluble contaminants. This determination shall be made in accordance with SSPC-AB 1.
 - 3. Each shipment of abrasive shall be identified with respect to type and grade (mesh size) by the processor or shipper.
 - 4. The abrasive shall have a conductivity of less than or equal to 1000 (+/- 100) microsiemens when tested in accordance with ASTM D4940-89. Also, the supernatant liquid shall have a pH of 6.5 to 8.0 (+/- 0.5) when tested with pH paper. Contractor shall test and submit to Engineer test results. An abrasive that is not within these limits shall not be used. The Contractor, at no additional expense to the Owner, shall have these determinations made by an independent analytical laboratory, if requested by Owner's representative.

- B. All cleaning materials shall be delivered to the job site in the manufacturer's original containers, unopened, and with labels identifying the manufacturer, the product, the batch number, and the date of manufacture. A MSDS shall be furnished for each different product.
- C. Equipment that is malfunctioning or is apparently malfunctioning shall be repaired or replaced.
- D. The air compressor(s) used for blow-off cleaning or air spray application shall supply clean oil and moisture free air at the nozzle or air cap. This shall be determined in accordance with ASTM D 4285-88. Moisture separators shall be provided. The air supply for respirators must meet all applicable requirements and regulations. **Note:** Refer to 29 CFR 1910.134(d), "Air Quality."
- E. Spray equipment and fluid hoses shall be cleaned using the thinner recommended by the coating manufacturer immediately prior to coating application. Wash solvent shall be flushed from the fluid hoses. Paintbrushes shall be new and approved for use in the coating material.
- F. Instruments required for quality control (furnished by the Contractor) shall be in good working condition. Also, where applicable, calibration standards shall be provided for verifying accuracy of the instruments.
- G. The solvent used for "solvent cleaning" shall be either water reducible or hydrocarbon reducible.
 - 1. If the solvent used for solvent cleaning is water reducible, it shall be water reducible, biodegradable, and require no containment or regulated disposal. Solvents selected should be manufactured specifically for cleaning organic substances from surfaces for application of protective coatings.
 - 2. If the solvent used for solvent cleaning is hydrocarbon reducible, it shall be contained and stored on-site. On-site storage shall be in accordance with the requirements of 40 CFR 262 and 40 CFR 265. If the solvent is classified as hazardous in accordance with 30 TAC 335.504, it shall be disposed of by a firm permitted to dispose of this type of hazardous waste.
- H. Water used for cleaning, pressure water cleaning, and water jetting shall be clean. Contractor shall pay for any testing/verification of water quality.
 - 1. Water shall be considered clean when it is obtained from a potable water source, has no visible turbidity when sampled (sample size not less than one liter), has a conductivity of less than or equal to 1000 (+/- 100) microsiemens when tested in accordance with ASTM D4940-89, and has a pH of 6.5 to 8.0 (+/- 0.5) when tested with pH paper.
 - 2. Water shall be considered clean when it is obtained from a non-potable water source and has been filtered through a 10-micron (or finer) filter, has no

visible turbidity when sampled, has a conductivity of less than or equal to 1000 (+/- 100) microsiemens when tested in accordance with ASTM D4910-89, and has a pH of 6.5 to 8.0 (+/- 0.5) when tested with pH paper.

- I. Contractor shall provide, at no cost to Owner, all power and water required for the coating operations.
- J. Masonry shall be cleaned accordingly to ASTM D - 4261 and manufacturers requirements.

PART 7 - ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45°F (7°C) for 24 hours before, during and 48 hours after application of finishes, unless written approval from the manufacturer's technical manager.
- B. No exterior coatings shall be applied during rain or snow, when the air temperature is below 50°F (10°C) or above 120°F (49°C) or when the temperature of the surface to be coated is below 50°F (10°C). No coating shall be applied if a predicted temperature of 35°F (1.67°C) or lower is forecast within 24 hours of application unless the coating is enclosed and heated. No painting is to be done when the relative humidity meets or exceeds 50 percent or when surface temperature is less than 10 degrees F above dew point temperature, unless written approval from the manufacturer's technical manager.
- C. Minimum Application Temperatures for Latex Paints: 45°F (7°C) for interiors; 50°F (10°C) for exterior; unless written approval from the manufacturer's technical manager.
- D. Minimum Application Temperature for Varnish and Finishes: 65°F (18°C) for interior or exterior, unless written approval from manufacturer's technical manager.
- E. Provide lighting level of 80-foot candles measured mid-height at substrate surface.
- F. Dehumidification equipment may be required to maintain specified requirements, provide at no additional cost to the Owner.
- G. Environmental conditions to be monitored continuously with chart recorders to verify environmental requirements and compliance, provide at no additional cost to the Owner.

PART 8 - PREPARATION

- A. Prepare surfaces to be coated in accordance with manufacturer's instructions and this/other related specifications or referenced standards.
- B. All welds to be coated shall be ground smooth according to NACE "Surface Finishing of Welds Prior to Coating" Comparator (RPO.178 Designation D).
- C. All edges shall be grinded to 1/4-inch radius according to NACE RPO 178.
- D. Profile depth of blasted surfaces shall be not less than 1 mil or greater than 2 mil unless required otherwise by coating manufacturer.
- E. Prepare existing internal and external surfaces requiring coatings and make sound, clean and free from all scale, dirt, oil, grease, loose paint, moisture and all other foreign matter.
- F. Prior to coating concrete surfaces, fill all air voids or bug holes with material recommended by coating manufacturer. Allow material to cure out before coating is applied. Material shall be compatible with specified coating. Allow concrete to cure for 28 days prior to coating. Contractors responsibility to inspect existing conditions of concrete surfaces to be coated, for determination of surface prep requirements (prior to bidding project). Repair all surface defects including cracks, air voids, spalling, eroded concrete, and surface irregularities, to coating manufacturers recommendation. Coat concrete when surface temperature is cooling down or when manufacturer's technical service manager recommends. Apply conductive primer, compatible with coating system, to all concrete / cement substrates for holiday testing. This conductive primer is required, even if not specified in other specifications. Coordination of this primer is the responsibility of the applicator. The costs shall be figured in the coating bid price, provide at no additional cost to owner.
- G. Prior to coating wood surfaces, fill all nail holes, cracks, open joints and other defects with putty. Tint putty to match finish color. Sand smooth after putty dries.
- H. Prior to coating gypsum wallboard, fill all cracks, holes, and other defects with compound. Sand smooth after compound dries.
- I. All surfaces to be coated on same day as prepared, and before rust bloom occurs or surface contamination is present. Prepared surfaces that show signs of contamination or rust shall be prepared again prior to coating at no cost to Owner.
- J. Prepare surfaces and hot dip galvanize items listed in contract documents according to ASTM Standards, TPC-9 Publication and American Galvanizes

Association. Bid the more stricter requirements if there is a conflict or discrepancies.

PART 9 - APPLICATION

- A. Thin, mix and apply coatings in accordance with manufacturer's instructions and this/other related specifications or referenced standards.
- B. Allow preceding coats to dry before recoating.
 - 1. If recoat time limits have expired, reprepare surface in accordance with written requirements by the coating manufacturer's technical manager.
 - 2. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
- C. Coat all aluminum in contact with dissimilar materials or concrete.
- D. Backroll concrete and masonry surfaces with a roller if coatings are spray applied.
- E. Stripe coat all corners, welds, sharp edges, bolt heads with specified primer coat.
 - 1. Slightly vary the color of strip coat from primer coat.
- F. No partial batches permitted.
 - 1. Provide small quantity kits for touch up and for coating small areas.
 - 2. If 5-gallon kits are used, provide working pot large enough to accommodate multipart components.
- G. Prime coat referred to, is prime coat as noted in the specifications. Structural and miscellaneous steel, steel joist and pipe that have shop-applied primer is not acceptable as a replacement for specified primer coating. The specified primer shall be used. The primer coat on concrete surfaces shall be conductive for holiday testing. Conductive primer is required for all concrete / cementitious surfaces, even if not listed in the painting schedule, provide at no cost to the owner. Coordination is required by the coating applicator.
- H. Apply each coat to a uniform finish acceptable to the Owner's representative.
- I. Prime back surfaces of interior and exterior woodwork.
- J. Surfaces shall be coated and tested before installation of equipment, piping, lighting, conduit and supports and other related items.
- K. All aspects of the coating operations including (off-site) coating operations shall be witnessed by the Owner's representative. Off-site witnessing cost (food, travel

and lodging) by the Owners Rep. shall be paid for by the General Contractor and/or Coating Contractor and/or Equipment Supplier, at no cost to the Owner.

L. Brush Application:

1. Brushes: Use first-quality hog hair or suitable synthetic bristle brushes. Use of horsehair brushes not permitted. Keep brushes clean and free from accumulation of dried plant or dirt, and when brushes for oil or varnish base paints are not in use, keep them suspended in raw linseed oil bath. Clean brushes with proper solvent before reuse. Replace brushes if requested by the Owner's representative.
2. Application: Apply in uniform thickness consistent with specified coverage and with sufficient cross-brushing to ensure filling of surface irregularities. Exercise particular care in painting around bolt heads and nuts and in corners and other restricted spaces.
3. Brush Application Use: Must be acceptable/approved by the Owner's representative prior to starting coating operations.

M. Conventional Spray Application: Apply with adjustable air gun equipped with suitable water trap to remove moisture from compressed air, with paint pot having air driven or mechanical agitator. Compressed air supply to be equipped with an oil separator. Pressure pot to have double regulators.

N. Airless Spray Application: Equipment used for airless spray to be designed for and capable of handling, the volume and pressures necessary to ensure smooth and proper application. Hoses to be specifically designed for a viscosity of the material being sprayed and be of the non-static, self-grounding type. Tips to be properly sized to ensure complete atomization and the spray pattern to be continuous and free of all fingering effects.

O. Roller Application: Proper length nap rollers to be used to ensure a smooth application free of runs, sags, roller marks, or air bubbles. Use longer nap for rougher surfaces. Phenolic core lambs wool type rollers to be used when polyurethanes, epoxies, or other types activated coatings are applied by roller. Standard type rollers to be used on water based and enamel coatings. Rollers to be of sufficient quality to leave finished surfaces free of lint, roller nap, runs, sags and other imperfections. Roller is not to exceed 24 inches in length. Roller application use must be acceptable/approved by the Owner's representative prior to starting coating operations.

PART 10 - PROTECTION

A. Protect floors and all other areas where work is done, with suitable drop cloths.

- B. Remove, mask, or otherwise protect all hardware, hardware accessories, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, labels, nameplates, etc. and other surfaces not intended to be painted prior to surface preparation and painting. Reinstall the removed items by workmen skilled in the trades involved.
- C. Protect working parts of mechanical and electrical equipment from damage. Mask openings in motors to prevent paint and other materials from entering motor.
- D. Remove any and all overspray. If removal is not acceptable to Owner's representative, Contractor is responsible for replacing item at no cost to Owner.

PART 11 - REPAIR/RESTORATION

- A. Removal masking products used to protect hardware, equipment, etc.
- B. Final Cleaning and Touch Up:
 - 1. Touch up and restore finish where damaged.
 - 2. Do not mar surface finish of item being cleaned.
- C. Refinish whole wall or item where portion of finish has been damaged or is not acceptable to Owner/Engineer.
- D. Damaged Coatings, Pinholes, Holidays, and Defects:
 - 1. Feather edges and repair in accordance with recommendations of coating manufacturer.
 - 2. Repair fusion bonded coatings as recommended by original applicator. Applicator to furnish liquid repair kits for this purpose as recommended by the coating manufacturer.
 - 3. Apply finish coats, including touch up and damage-repair coats, in a manner which presents a uniform texture and color-matched appearance.
 - 4. Repairs and finish coats must be acceptable to Owner's representative.
- E. Unsatisfactory Application or Repairs:
 - 1. If coating has improper finish color or insufficient film thickness: clean and topcoat surface with specified material to obtain specified color and coverage. Obtain and follow specific surface preparation information for top coating from coating manufacturer. Improper topcoat shall be removed and specified coating shall be applied.
 - 2. Hand or power sand visible areas of chipped, peeled, or abraded paint, and featheredges. Follow with primer and finish coat in accordance with specifications. Depending on extent of repair and appearance, a finish sanding and topcoat may be required for an acceptable finish.

3. Evidence of runs, sags, bridges, shiners, laps, or other imperfections shall be cause for rejection.
 4. Leave all staging in place until Owner's representative has inspected surface or coating. Replace staging removed prior to inspection and approval by Owner's representative.
- F. Schedule field operations to avoid settling of dust or grit on freshly painted surfaces, and adequately protect machinery or other equipment in vicinity of abrasive blasting work. Contractor to take every precaution to avoid overspray.
- G. During the progress of the work, remove from the project site at the close of each day's work, all oily rags, discarded materials, rubbish, cans, and dispose of in accordance with national, state, and local regulations.
- H. On completion of operations, remove all spots, oil, and stain from all surfaces and leave entire project in clean condition as far as this work is concerned.

PART 12 - TESTING

- A. Contractor shall perform routine quality control testing and/or as directed by Owner's representative, at no additional cost to Owner.
1. Contractor shall provide all necessary testing equipment, calibration standards, tools and any related items required for testing or verifying compliance with specifications and related standards.
 2. Contractor shall record all results of testing on Owner furnished documentation. Forms to be filled out accurately and completely. Original copy shall be turned in daily to the Owner's representative.
- B. Contractor shall, at no cost to Owner, repair all coatings damaged by testing or related verifications.
- C. Contractor shall test for pH of surface to be coated. Results shall be submitted to the Engineer.
1. If surface pH is not within coating manufacturer's acceptable limits, Contractor to bring pH within acceptable limits, at no cost to Owner.
- D. Contractor shall test moisture content of surface to be coated. Results shall be submitted to the Engineer.
1. If moisture content is not within coating manufacturer's acceptable limits, Contractor to bring moisture content within acceptable limits, at no cost to Owner.
- E. All finished coating systems shall be tested for discontinuities (holidays/pin holes). Results shall be submitted to the Engineer.

- F. If requested by Owner's representative, Contractor shall perform adhesion testing on the coating system. Results shall be submitted to the Engineer.
- G. Contractor shall test for soluble salts (chlorides, sulfates and nitrates) on the surface to be coated. Results shall be submitted to the Engineer.
 - 1. If soluble salts are present and not within coating manufacturer's acceptable limits, Contractor to bring acceptable limits within coating manufacturer's requirements, at no cost to Owner.
- H. Contractor shall provide the following, new equipment for use by Owner's representative. All equipment will be returned to Contractor at end of project.
 - 1. Moisture Meters.
 - 2. D.F.T. Gauges non-destructive - magnetic pull off type, eddy current type and ultrasonic for non-metal substrates
 - 3. NIST Calibration Standards certified by U.S. Department of Commerce.
 - 4. Testex Tape (course and extra course) Press-O-Film.
 - 5. Dail Micrometer.
 - 6. Holiday Detectors (high & low voltage).
 - 7. Sling Psychrometer and Weather Tables.
 - 8. Surface Thermometer (magnetic & infrared).
 - 9. Ambient Thermometer.
 - 10. Dolly pull-off Adhesion Tester (Dollies and glue).
 - 11. Tooke Gauge.
- I. If requested by Owner's representative, contractor shall perform the following nondestructive testing, at no cost to the Owner:
 - 1. Radiography.
 - 2. Ultrasonic.
 - 3. Liquid Penetrant.
 - 4. Magnetic Practice.
 - 5. Eddy Current.
- J. No equipment or structures shall be placed in service until the protective coatings have been cured, tested and approved by Owner's representative.

PART 13 - GUARANTEE

- A. The Contractor guarantees that workmanship and materials shall be satisfactory and meet the intent of these General and Project Specific Coating Specifications for one (1) year (unless longer period is specified), following the final acceptance of the project. An inspection shall be conducted by Owner's representative and Contractors QC supervisor during the eleventh (11) month (or 30 days prior) after final acceptance date, and any defects occurring in the coating systems shall be

repaired by the Contractor, to the approval of the Owner; at no additional cost or expense to the Owner.

- B. If requested, the Contractor shall reimburse the Authority for the cost of quality control inspection of repair work if any is required.

PART 14 - MEASUREMENT AND PAYMENT

- A. No separate measurement and payment for work performed under this section. Include cost of same in Contract price bid for work of which this is a component part.

++ END OF SECTION ++