Item No. 531
Coatings for Water Storage Tanks

Notes to Specifier:

Delete these notes and parts that are not applicable.

Where options are given, make appropriate selection and delete the other option, fill in all blanks.

Engineer must send completed specification to coating manufacturers to review prior to bid and provide written notification that that the coating systems are properly specified and they can meet the required warranty specified.

This Section is intended to be used on most tank projects without Section 530 "High Performance Coatings", specifier will need to verify that all painting on the Project is covered.

Verify all references to paragraphs within this Section and to any applicable Sections, standards or other specified sources of information.

531.1 Description

Furnish labor, materials, equipment and incidentals necessary to apply protective coatings to material and equipment as specified herein, including the preparation of surfaces prior to application of coatings.

Note to Specifier: Update Paragraphs B & C as necessary for each project.

A. Protective coatings must be applied to the following surfaces:
   1 Tank interior and exterior surfaces.
   2 Above grade piping and valves on the tank and above grade piping on the exterior of the existing pump building (inlet and outlet piping, proposed and existing)
   3 Exterior electrical as determined by the Engineer during construction.
   4 Stainless steel piping, ladders, etc. on the interior of the tank.
   5 **[Specify/list as necessary for each project.]**

B. The following must not be coated and must be protected from drips, overspray, etc. unless indicated otherwise
   1. Stainless steel piping, materials and equipment, except those on the interior of the tank.
   2. Galvanized steel piping, materials and equipment
   3. Aluminum materials and equipment.
   4. Ladder safety devices
   5. Interior electrical items.
   6. Name and identification plates
   7. [Specify/list as necessary for each project.]

C. Special applications for painting include the following:

1. Buried pipe and valves must receive a shop applied protective coating as described in the appropriate Section of the Specifications.
2. **[Specify/list as necessary for each project.]**

D. Contain, treat, and dispose of any dust, spray, drainage, or spillage resulting from coating operations. It is the Contractor's responsibility to determine if the materials to be disposed of are classified as Hazardous Waste. Disposed of waste, hazardous or otherwise, must be in accordance with applicable regulations. Contractor must be aware of and understand the regulations concerning disposal of waste generated by coating operations.

531.2 Quality Assurance

A. Contractor's Qualifications: Contractors must be qualified in this line of work and have a minimum of 5 years of experience coating potable water storage tanks and in the application of the protective coatings of the types specified herein. Submit a list of recent projects and names of references for those projects.

B. Contractor's superintendent/foreman must have a minimum of 5 years of experience with coating storage tanks. Superintendent/foreman must be on-site while the Work indicated within this Section is underway. Submit a list of recent projects and names of references for those projects.

C. Contractor must provide workers who perform professional and quality work and who are experienced and knowledgeable in surface preparation, mixing and application of high-performance coating systems.

D. Contractor's painters that will be applying any 100 percent solids coatings for this Project must be trained and approved by the coatings manufacturer for the application of the high solids coatings. Training and approval must occur at the Project Site, at the location where the coatings will be used and in the presence of the Owner's representative. Applicators must be certified using a mock structure constructed on the Site by the Contractor. Any new applicators added to the crew will need to be certified separately per this procedure.

E. Product Quality:

1. Use only the coatings specified in this Section. Use only those thinners and solvents recommended by the manufacturer, only in the amounts necessary to produce the manufacturer's recommended spreading rate, and in amounts not exceeding the maximum quantities stated in the manufacturer's literature.
2. The coating material must not show excessive settling in a freshly opened full can and must be easily re-dispersed with a paddle to a smooth, homogeneous state. It must show no curdling, livering, caking, or color separation and must be free of lumps or skim surfaces.

F. Testing: Protective coatings must be applied under quality control procedures, which include inspection of surface preparation and for each coat applied. Do not proceed with the next step until the Owner's representative has approved the previous step. The Contractor shall be solely responsible for testing for this Section, at no further cost to the Owner. The Owner's representative shall also make such tests, if it is considered necessary. Cooperate with the Owner, providing equipment, scaffolds, and other equipment as requested by the Owner's representative.

G. Testing Equipment: Furnish the testing apparatus necessary for testing surface preparation, environmental conditions and coatings as specified.

H. Testing Equipment: Contractor must furnish and have the following testing apparatuses on-site during construction for the Owner's use:

1. One set of U.S. Department of Commerce thickness calibration plates, certified by the National Bureau of Standards, to test dry film thickness.
2. Wet-film thickness gauges. Give one to Owner's representative. Each painter must keep one to test paint as it is applied.
3. One electronic dry-film thickness gauge capable or measuring 0-200 mils with calibration standards approved by the Bureau of Standards.
4. One Elcometer 319 Dewpoint Meter or approved equal.
5. One Tinker and Rasor Model M 1 Holiday Detector and recommended wetting agent and/or High Voltage Holiday Detector if required for coating thickness specified.
6. One set of SSPC-VIS 1, 3 and 4 - Visual Standards as applicable.

I. Contractor must schedule a construction conference prior to any field Work being completed. The meeting will be on-site and will include the Owner, Contractor, painting superintendent, Engineer, Owner's representative and coating manufacturer's representative. At this meeting the coating plan and schedule will be reviewed in detail.

531.3 Submittals

The following Product Data for products, including manufacturer's data sheets, are due prior to ordering coating and surface preparation materials:

A. Coating manufacturer's color selection literature for coating materials and caulk.

B. Sample warranty document for products.

C. Provide certification from the manufacturer that all coatings will not contain more than 0.06 percent by weight of lead in the cured coating for each coat applied.

D. Coating manufacturer's Product Information and Safety Data Sheets (SDS) for each coating and caulk material. Product Information must include the following:

1. The manufacturer's published instructions for use in specifying and applying all proposed coatings.
2. Application instructions written and published by the coating manufacturer.

E. Provide documentation that interior coating system is compatible with the cathodic protection system per ASTM G8 (Method A).

The following mock panels and samples are required prior to ordering the materials:

A. Three samples of selected exterior and interior finish colors for approval on 6-inch by 6-inch swatches. Label each swatch with the manufacturer's name, coating name/type, color name and number.

B. Coatings mock panels must be prepared and approved prior to surface preparation and coating work initiates. Mock-up must remain on-site for the duration of the Project. Mock panel must be stored in the same environment as the represented coating system. Panels

are to be prepared with same methodologies, equipment and materials that will be applied to the tank. Two panels are required:

1. Exterior Panel: Provide 2-foot by 2-foot approved same of SSPC-SP 6 surface preparation on one side, protected with a clear spray varnish. On opposite side, provide same surface preparation with approved exterior coating system showing each coat with mil thickness as specified.
2. Interior Panel: Provide 2-foot by 2-foot approved same of SSPC-SP 10 surface preparation on one side, protected with a clear spray varnish. On opposite side, provide same surface preparation with approved exterior coating system showing each coat with mil thickness as specified.

C. Mock structure for 100 percent solids coating systems will be constructed out of wood and incorporate:

1. Flat vertical wall made of plywood to simulate the shell.
2. Roof made of plywood to simulate coating the underside of the roof and roof to shell connection.
3. Rafters made of wood (4 minimum) attached to underside of the roof to simulate coating roof and rafter connections.
4. Contractor must provide geotextile fabric and backer rod and will demonstrate application of these on structure gaps and corners

The following Product Data is required prior to coating Work:

A. Coating Plan:

1. Anticipated coating process schedule by date, including dates when hold-point inspections are anticipated. Schedule must indicate detailed activities on a daily basis.
2. Detailed procedures and schedule for all pre-cleaning, surface preparation and application of coating, including touch-up and repair procedures for all coating systems.
3. Recoat schedule on the submitted coating materials.
4. Data sheets must include curing characteristics and recommendations regarding complete coating curing.
5. Provide a written plan documenting how spent cleaning debris and/or paint over spray or droplets will be contained/confined to the jobsite and tank site during the surface preparation and coating application operations. Reasonable care must be exercised by the Contractor to prevent damage, nuisance, or hazardous conditions to adjacent or nearby property owners. Include all materials and method to be used for protection of exterior surfaces and allow for recovery and disposal of paint scraps and blast media.
6. Provide written plan documenting how paint and/or abrasive damage to automobiles and property will be addressed, including a process for quick removal of the paint or abrasive, and how the Work will be accomplished (this must not relieve the Contractor from the responsibility of setting claims for damage, but is intended to expedite and minimize said claims).

B. Provide documentation on proposed containment system methods for blasting and coating operations.

C. Provide documentation on heating or dehumidification system (as required):
   1. Calculations for dehumidification and ventilation requirements.
   2. Fans and their locations.
   3. Dimensions of equipment.
   4. Maximum capacities of equipment.
   5. Emission control devices.
   6. Method of filtration of exhausted tank air.
   7. EMD- continuous electronic monitoring device.

D. Provide documentation on ventilation and filtration system:
   1. Calculations for ventilation requirements.
   2. Fans and their locations.
   3. Dimensions of equipment.
   4. Maximum capacities of equipment.
   5. Emission control devices.
   6. Method of filtration of exhausted tank air.

E. Contractor must submit evidence of notification of the appropriate office of the TCEQ prior to abrasive blasting as required. Submit copies of any obtained permits.

F. Coating Manifest: Within 48 hours of coating delivery to the Site, the Contractor must record the batch number stamped on each coating container and submit a typed list to the Owner's representative. Minimum information required is listed below.
   1. Date of delivery to Site.
   2. Name and signature of Superintendent recording the data.
   3. List of batch number including corresponding coating identification, color, date of manufacture and volume of each container.

The following Certified Test Report(s) are required prior to coating Work:

A. SDS sheets for all abrasive to be used on the Project.

B. Certification and laboratory test results indicating recycled metallic abrasive (if proposed for use) per SSPC-AB 2 or 4 and atomic absorption test results.

Provide the following Product Data during the construction of the Project:

A. Letter from the coating manufacturer confirming the test surface preparation for both the interior and exterior surfaces prepared by the Contractor in the field are acceptable for the product(s) being applied.

B. On a weekly basis, submit:
   1. Contractor's Daily Reports.
   2. Output from automatic real-time monitoring equipment from the previous week.

531.4 Standards

The following standards dictate standards used in project:

A. NSF International (NSF) / American National Standards Institute (ANSI):

NSF/ANSI Standard 61	Drinking Water System Components – Health Effects
NSF/ANSI/CAN 600	Health Effects Evaluation and Criteria for Chemicals in Drinking Water

B. ASTM International (ASTM):

ASTM D523	Standard Test Method for Specular Gloss
ASTM D610	Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D2244	Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D3359	Standard Test Methods for Rating Adhesion by Tape Test
ASTM D4214	Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D4258	Standard Practice for Surface Cleaning Concrete for Coating
ASTM D4417	Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM D5162	Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
ASTM E337	Standard Practice Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)
ASTM E84-03	Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM G8	Standard Test Methods for Cathodic Disbonding of Pipeline Coatings

C. American Water Works Association (AWWA):

AWWA D100	Welded Steel Tanks for Water Storage
AWWA D102	Coating Steel Water Storage Tanks
AWWA C210	Liquid-Epoxy Coating and Linings for Steel Water Pipelines
AWWA C222	Polyurethane Coatings and Linings for Steel Water Pipe and Fittings

D. Consumer Product Safety Act, Part 1303.

E. National Association of Pipe Fabricators (NAPF):

NAPF 500-03	Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings

F. Occupational Safety & Health Administration (OHSA):

1915.35 Standards - 29 CFR	Painting

1926.62 Standards - 29 CFR	Lead

G. Association for Materials Protection and performance (AMPP):

NACE TPC2	Coating and Lining for Immersion Service: Chapter Safety, Chapter 2 Surface Preparation, Chapter 3 Curing, and Chapter 4 Inspection
NACE SP0178	Design Fabrication, and Surface Finish Practices for Tanks and Vessels to be Lined for Immersion Service
NACE SP0188	Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE SP0178	Surface Finishing of Welds Prior to Coating; Weld Replica Only to be used with NACE SP0178
NACE RP0287	Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using a Replica Tape
SSPC-VIS 1	Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
SSPC-VIS 3	Guide and Reference Photographs for Steel Surfaces Prepared by Power and Hand Tool Cleaning
SSPC-VIS 4	Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting
SSPC Vol. 1	Good Painting Practices
SSPC-AB 1	Mineral and Slag Abrasives
SSPC-AB 2	Cleanliness of Recycled Ferrous Metallic Abrasives
SSPC-AB 3	Ferrous Metallic Abrasives
SSPC-AB 4	Recyclable Encapsulated Abrasive Media in a Compressible Matrix
SSPC-SP 1	Solvent Cleaning
SSPC-SP 2	Hand Tool Cleaning
SSPC-SP 3	Power Tool Cleaning
SSPC-SP 11	Bare Metal Power Tool Cleaning
SSPC-SP 15	Commercial Grade Power Tool Cleaning
SSPC-SP WJ-1/NACE WJ-1	Waterjetting to Bare Substrate
SSPC-SP WJ-2/NACE WJ-2	Very Thorough Waterjetting
SSPC-SP WJ-3/NACE WJ-3	Thorough Waterjetting
SSPC-SP WJ-4/NACE WJ-4	Light Waterjetting
SSPC-PA 1	Shop, Field, and Maintenance Painting
SSPC-PA 2	Measurement of Dry Film Thickness with Magnetic Gages
SSPC-PA 10	Guide to Safety and Health Requirements for Industrial Painting Projects
SSPC-PA 17	Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements
SSPC Guide 6 (CON)	Containment of Debris
SSPC Guide 12	Illumination of Painting Projects

SSPC Guide 15	Retrieval and Analysis of Soluble Salts
SSPC-SP 5/NACE 1	White Metal Blast Cleaning
SSPC-SP 6/NACE 3	Commercial Blast Cleaning
SSPC-SP 7/NACE 4	Brush - Off Blast Cleaning
SSPC-SP 10/NACE 2	Near - White Metal Blast Cleaning
SSPC-SP 13/NACE 6	Surface Preparation of Concrete

H. Texas Commission on Environmental Quality (TCEQ):

30 TAC Chapter 111, Subchapter A, Division 3	Abrasive Blasting of Water Storage Tanks Performed by Portable Operations
30 TAC Chapter 290, Subchapter D	Rules and Regulations for Public Water Systems

In the event of a conflict between the published standards, codes, and this Section, the more stringent requirement shall govern.

531.5 Warranty

Coating Manufacturer's Warranty:

A. Manufacturer's written warranty must be submitted and accepted by the Engineer and NBU prior to approval of the coatings submittal. If the warranty does not substantially meet the requirements of this Section, Contractor must provide an alternate coating manufacturer that will meet the requirements at no additional cost to the Owner.

B. General Warranty Requirements

1. Coating products must prevent coating defects as defined as blistering, cracking, checking, cratering, delaminating, corrosion; etc., collectively "coating problems".
2. Coating products must not allow the substrate to corrode in excess of 1 percent of the surface being coated as measured in accordance with ASTM D610 "Standard Test Method for Evaluating Degree of Rusting on Painted Surfaces" for the duration of the warranty period.
3. In the event the System does not provide the protection indicated herein, as applicable to the systems, the Coating Manufacturer's sole obligation will be to provide coating materials for the area where the coating problems occurred to make corrections for the duration of the warranty. The Coating Manufacturer will not be obligated to provide replacement coating materials having an aggregate value in excess of 100 percent of the total sales price of the coating materials initially applied. At such time, if any, as Coating Manufacturer has supplied replacement coating material(s) with an aggregate value equal to 100 percent of the total sales price of the coating materials initially applied, the Coating Manufacturer's obligation under this warranty shall be deemed to have been completely fulfilled. Replacement coating materials must be the originally specified materials or as approved by the Engineer/Owner.
4. Repairs performed under this warranty shall neither extend the term of this warranty nor affect the allowable percentage specified herein.
5. The parties hereto agree that all disputes and differences arising under this warranty shall be resolved by binding arbitration at the location indicated by the Owner.

C. Tank Coating Warranty:

1. IW-02 Tank Interior Wet Coating System – 100 Percent Solids Polyurethane System

   Coating manufacturer must issue a 15-year warranty to the Owner for the coating applied on the interior of the tank.

2. EN-02 Tank Exterior System – Zinc Rich Primer/Polysiloxane System

   The System will not have a change in color more than 12 CIE Lab units (12 Delta E) at the end of the warranty period in accordance with ASTM D2244.

   The System will not have a loss of gloss of more than 30 units at the end of the warranty period. Gloss to be measure by gloss meter in accordance with ASTM D523 w/60-degree geometry.

   Coating manufacturer must issue a 10-year warranty to the Owner for the coating applied on the exterior of the tank.

D. Warranty of All Other Coatings Systems: Contractor and Coating Manufacturer must issue a 1-year warranty to the Owner for all coating materials, application and workmanship for all coatings installed on the Project unless specifically addressed by other Specifications. Contractor's maintenance bond may be used to assure this work but will require the Surety's acknowledgement in writing prior to commencement of coating application on the Project.

E. Warranty Work: Contractor and coating manufacturer must coordinate warranty work requested by the Owner at any time during warranty period. Owner is only required to contact Contractor to initiate warranty work.

531.6 Environmental Control Conditions

A. Do not apply coatings under conditions that are unsuitable for the production of good results. Remove trash and debris from enclosed buildings and thoroughly clean prior to application of coatings. Do not begin application of coatings in areas where other trades are working, or where construction activities result in airborne dust or other debris. Do not apply coatings in conditions which do not conform to the recommendations of the coatings manufacturer.

B. Coatings must only be applied when conditions fall within the parameters listed in the manufacturer's printed data.

C. Do not apply any coatings when weather conditions are unfavorable. In the event that climatic conditions are not conducive for best results, postpone application of coatings until conditions conform to the manufacturer's recommendations and the provisions of this Section.

D. Do not apply coatings to a wet or damp surface in wet or damp weather conditions, or when there is dust in the air. Surfaces exposed to direct sunlight must be shaded by awnings or other protective devices while coatings are being applied, if recommended by coating manufacturer. When necessary, provide temporary heating devices of a type that produces no fumes or water vapor which will discolor the paint system.

E. Heating and Dehumidification:

   1. Dehumidification equipment must be used to control the environment during surface preparation, rehabilitation, coating application and coating curing at no additional cost to the Owner, if acceptable environmental conditions cannot be met.

      a. If the Contractor cannot meet the required environmental conditions to apply the interior coating system per this Section and the coating manufacturer's written recommendations, Contractor will cease operations until approved

dehumidification equipment has been provided and acceptable environmental conditions are achieved.

b. If coating system is applied without dehumidification or in conditions not acceptable by this Section and by the coating manufacturer's written requirements, Contractor must fully remove coating system applied and replace per the Engineer's direction.

2. Automatic real-time monitoring equipment must be provided. This equipment must be used when no Contractor personnel are at the Site. Monitoring equipment may be removed during abrasive blasting and coating operations, but environmental conditions must be checked and logged manually.

3. Contractor must furnish all labor, materials, equipment, fabrication and quality control inspections, and all other incidentals required to control and maintain the environment of the reservoir within the parameters stated in this Section and must incorporate these and any other expenses into its bid.

4. Owner reserves the rights, in the event the dehumidification equipment is not performing to the minimum requirements stated in this Section, to require the Contractor to modify and or add additional equipment to satisfy the conditions of this Section, at the sole cost to the Contractor.

5. It is the Contractor's responsibility to provide adequate dehumidification equipment to meet this specification and the coating manufacturer's requirements of this Section and coating manufacturer's requirements. The coating manufacturer's limits of surface temperature, tank inside air temperature and relative humidity requirements will govern, if more stringent than the requirements stated within this Section.

6. During abrasive cleaning and coating operations inside of the tank, the relative humidity of the air inside of the tank must not exceed 55 percent. During curing of the coating on the interior of the tank, the relative humidity of the air inside of the tank must not exceed 75 percent.

F. Forced Ventilation:

1. Continuous forced fresh air ventilation must be provided from beginning of the reservoir interior wet area surface preparation through final coating operations and coating curing.

2. Forced ventilation must be supplied per the recoat time required by the coating manufacturer and at least 48 hours after the final coat has been applied.

3. Unless dehumidification equipment is used to provide ventilation of the reservoir interior, the roof vents and hatches must be kept open and clear.

4. All reservoir, pedestal, dry riser and dry well openings susceptible to emissions during blasting, cleaning, and coating operations must be properly fitted and secured with suitable dust collection devices to reduce the release of emissions

5. From the beginning of interior coating applications to until the coating system is cured, the Contractor must monitor the air for the lower explosion limit (LEL) as published in the coating manufacturer's product SDS.

6. During coating curing and when no coatings are being applied inside the reservoir, the equipment must be sized so that it is capable of changing the volume of air inside the entire reservoir a minimum of 1.5 to 2.0 times per hour. On smaller tanks, exchanges may be reduced as justified by the Contractor and approved by the Engineer.

7. Throughout the duration of ventilation, containment of blasting abrasives, removed coating, and applied coatings must be maintained by use of proper filtration.
8. The ventilation system must be in accordance with AWWA D102 and submitted to the Owner.
9. Contractor is responsible for supplying, installing and maintaining the forced ventilation system.
10. Ventilation during interior abrasive blasting can be reduced to one air exchange per hour.
11. The above ventilation requirements are minimum requirements. It is the responsibility of the Contractor to verify that the flow rate provided throughout the tank meets the curing requirements of the coating manufacturer for the coating applied. Should additional ventilation be required by the coating manufacturer, the Contractor must furnish additional ventilation at his expense.

G. Containment System:

1. Contractor must provide containment methods, either full or partial, which allows for the containment of the environmentally sensitive waste, dust and paint over spray that will be generated during the abrasive blasting and painting operation.
2. Minimum Containment for Field Surface Preparation:
   a. Provide a minimum SSPC Guide 6 (CON) Class 3A.D1.E3 containment system when dry abrasive blasting.
   b. Provide a minimum SSPC Guide 6 (CON) Class 2W containment system when wet abrasive blasting. All water must be contained and properly disposed of.
   c. Provide a minimum SSPC Guide 6 (CON) Class 2P.E3 containment system when power tool cleaning.
3. Private residences and public areas exist within 500 feet of the water storage tank site. Emissions from abrasive blasting operations must be controlled as required by TAC 30, Chapter 111, Subchapter A, Division 3.
4. The ground surrounding the project area must be protected from all debris, emissions, dust, and other materials generated in the cleaning operations with a minimum of two layers of polyethylene covered with plywood or the same material used for the perimeter containment system.
5. Containment is not required when blasting on the interior of a completely enclosed area (i.e. roof is in place) as long as no visible emissions are created.
6. Contractor must ensure that no spent cleaning/blasting debris, dust, overspray, coating droplets, or emissions of any kind, escape to the atmosphere, or to adjacent buildings, private property, work sites, parking lots, etc.
7. Owner reserves the right to stop Work or require containment, additional containment or different containment methods if the Contractor's operations create a nuisance beyond the tank site property line in the sole opinion of the Owner, the Engineer, the Owner's representative, any regulatory agency, or neighbor. All costs of providing an adequate containment system must be included by the Contractor in the Base Bid.
8. Contractor will be responsible for all materials that are used and for any apparatus used to contain dust emissions, debris, overspray, and coating droplets. The containment system attachments to existing or proposed structures must be designed by a professional

engineer, licensed in the state where the Project is located, not to impose excessive loading on the structure. Contractor must submit the designed and sealed details of the containment system on the tank.

a. If the containment system will place additional loads on the tank that the tank was not originally designed for, the Contractor must reinforce the tank as necessary to prevent permanent deformation and to ensure that no damage occurs to the tank.

b. Any damage to the tank as a direct or indirect result of the containment system must be repaired or sections replaced by the Contractor at no additional cost to the Owner. Neither the Owner nor the Engineer assumes any responsibility for the structural ability of the tank to support the containment system.

9. If complete containment of the tank is utilized to contain all cleaning dust, debris, emissions, paint droplets, and paint overspray, the complete containment must include a full bonnet.

10. If tarps are used as part of the containment system, the tarps must be an impervious, solid, flame-resistant material, reinforced with a fiber mesh and must allow as much light as possible to pass through the material.

11. If robotic or creeper-type cleaning devices are used, the robotic or creeper-type device must meet the same containment criteria as that of the types of containment (lack of emissions). All overspray and paint droplets must be contained on the tank site.

12. Review of the containment system for containing the spent cleaning dust, debris, emissions, overspray, and coating droplets must not warrant the structural integrity of the containment system and must not warrant the structural integrity of the tank to support the containment system. Nor shall review of the containment system warrant the ability of the system to contain spent cleaning dust, debris, emissions, and overspray.

13. Damage Contingency Plan: Prior to construction, the Contractor must present a written plan for review by the Owner and Engineer concerning how dust and debris damage to automobiles will be removed. Approval of this plan will not relieve the Contractor from responsibility of settling claims, but is intended as an avenue to expedite and minimize such claims.

H. Visible Emissions:

1. Contractor must control visible emissions and releases while dust producing activities are underway.

2. Visible emissions more than SSPC Guide 6, Level 1 (1 percent of the workday or 5 minutes in an 8-hour shift) are unacceptable. Sustained emissions of more than 1 minute, regardless of the total time of emissions for the day is unacceptable. If unacceptable emissions are observed, Contractor must shut down immediately and correct the situation and clean up any debris generated from the release to the satisfaction of the Engineer before continuing Work.

I. Dust Collection:

1. Contractor must provide dust collection as required to prevent any visible emissions from entering the atmosphere as a result of the abrasive blasting operation.

2. For interior tank abrasive blasting, high volume fans and dust socks at manholes and vents must be provided as a minimum requirement.

3. The dust collection must be operated on the interior of the tank during all abrasive blast cleaning and until the area is clean enough for coating application. Contractor shall be responsible for all sizing, design of ductwork, etc., based upon the Contractor's operations, number of blasters, duration of blasting, etc.
4. Contractor must take precautions to avoid a vacuum from developing inside of the tank.

531.7 Existing Conditions

A. Contractor must acquaint himself with the hazards of the Work including, but not limited to: corroded components, high wind velocity, fire potentials caused by sparks from Contractor's torches, spark damage to property, and the proximity to overhead electrical lines, to residences, businesses, streets, etc. Failure to do so will not relieve the Contractor from all obligations described in the Drawings or Specifications.

B. Contractor must evaluate the tank for loads that will be added to the tank during surface preparation and coating operations, including loads for hanging scaffolding, abrasive blasting equipment on shell and roof, containment supports, rigging and all other loads. Contractor is responsible for all damages to the tank for improperly loading or overloading the tank.

531.8 Working Conditions

A. Provide adequate lighting at any location that coatings are being applied or testing is performed. Illumination must be of sufficient intensity to achieve good results. Provide explosion-proof lighting when required.

B. Temporary ladders and scaffolds must conform to applicable safety requirements. Erect temporary scaffolds where needed to cover large areas. Provide ladders or scaffolding during testing procedures.

531.9 Materials

General

A. All coatings must be free of heavy metals such as arsenic, barium, chromium, selenium, silver, lead, mercury and cadmium.

B. All interior coatings, thinners and products used on interior wet surfaces (all surfaces within the tank bowl and interior piping and valves) must meet the applicable requirements of NSF/ANSI/CAN 600 according to the requirements of NSF/ANSI/CAN 61, including the most current health effects criteria for xylenes, toluene and ethylbenzene for the application and volume of tank on the Project.

C. No coating submitted or used on this Project must have a VOC (volatile organic content) in excess of 360 grams/liter or 3.0 lb./gal.

D. Primers factory-applied must be those specified. Notify manufacturers which shop prime coats will be required in order to be compatible with field-applied finish coats. Where equipment is purchased which has the manufacturer's standard primer or a factory finish which is other than as specified in this Section, remove the factory-applied paint system or apply passivators or other special coatings as required to make the surface compatible with the finish coat specified.

E. No inorganic zinc-rich primers shall be permitted on the tank interior surfaces.

Acceptable Manufacturers:

A. Products listed herein are specified to establish a standard of quality. Products which comply with the Contract Documents and are manufactured by the following companies will be acceptable. Products from other coating manufacturers shall not be submitted and will not be considered.

   1 Carboline.

   2 The Sherwin-Williams Company.

   3 PPG.

B. To ensure coating compatibility, Contractor must use products of a single coating manufacturer for all coatings applied to the reservoir and/or its components, unless prior approvals are obtained in writing from the Owner and the coating manufacturer.

Coating Repair

A. Coating repair materials will be as recommended by the coating manufacturer and as approved by the Engineer.

B. All repair materials in contact with potable water meet the applicable requirements of NSF/ANSI/CAN 600 according to the requirements of NSF/ANSI/CAN 61, including the most current health effects criteria for xylenes, toluene and ethylbenzene.

Slip-Resistant Additive

A. Slip resistant additive is to be added to finish coating within guardrail areas and as indicated on the Drawings. Additive must be compatible with the finish coating to provide a slip resistant surface without compromising the longevity of the coating. Engineer may require areas with a slip-resistant additive to be a contrasting color at no additional cost to the Owner.

B. Coating manufacturer must confirm the product(s) are compatible with coating systems.

C. Approved Manufacturers:

   1. H&C SharkGrip Slip-Resistant Additive.

   2. Approved Equal.

Geotextile Fabric

A. Fabric Material must be a non-woven, 100 percent polypropylene fabric, with a “heat-set” on one side. Material to weigh 8 to 10 oz./sq. yd. and be approved by the coating manufacturer.

Stainless Steel Cleaning and Passivation

A. Product must be designed for the cleaning and passivation of stainless steel products.

B. Approved Manufacturers/Products:

   1. CitriSurf 2210

   2. Approved Equal

Caulk Schedule

IC – 01 Tank Interior/Exterior System:

A. Sika Flex 1A or Approved Equal.

B. Product must meet the applicable requirements of NSF/ANSI/CAN 600 according to the requirements of NSF/ANSI/CAN 61, including the most current health effects criteria for xylenes, toluene and ethylbenzene.

C. Color:

   1. Caulking within the interior of the tank must be a contrasting color to the finish coat as approved by the Owner.

   2. Exterior and exposed caulking color must be approved by the Owner.

Note to Specifier: The "Chime Seal" paragraph is for ground storage tanks, delete for elevated storage tanks.

Chime Seal

A. Chime seal consists of a layered system consisting of a primer, closed cell polyethylene backer-rod, high mil epoxy coating, geotextile fabric and an epoxy top coat.

B. Approved Systems:

   1. Carboline Semstone Tank Ring System.

   2. Approved equal.

Salt and Chloride Removal

A. The following products may be used to remove salts from surfaces. Product must not interfere with the adhesion of the protective coatings and linings. Coating manufacturer must provide a letter indicating no adverse effects prior to use.

B. Approved Products:

   1. Chlor*Rid Salt Remover.

   2. Holdtight 102.

   3. Approved Equal.

Color Selection

A. Contractor must submit drawdowns for Owner's review and approval of final color selection for all exterior and interior coating systems.

B. Use a multi-color system coating for any surface receiving more than one coat. Each coat must be tinted differently from the preceding coat in a manner that will allow the various coats to be easily distinguished. Colors must generally be from light to dark shades, but the Contractor may have the option to select tint shades to ensure coats will receive adequate coverage without bleeding or otherwise showing through the preceding coat.

C. Piping and equipment must be color coded in accordance with the requirements of the TCEQ or as indicated in section 531.15.

Abrasive Materials

A. Abrasive materials used must be non-carcinogenic when properly used, properly graded, be sharp, have proper angularity, and be clean and free of contaminants that would interfere with adhesion of coating, including lead, chromium, cadmium, arsenic, chlorides, dirt, oil, etc., such as steel grit or approved equal.

B. All expendable abrasives must meet SSPC-AB 1 and all abrasives must meet the requirements of SSPC-AB 1, Class A for silica content with less than 1 percent silica by weight before blasting.

C. New ferrous recyclable abrasive must meet SSPC-AB 3 and SSPC-AB 2.

D. Ferrous and Non-Ferrous recycled abrasive must meet the requirements of SSPC-AB 2/4, for new and re-manufactured abrasives. Recycled abrasive used on this Project must be sampled before use by the Owner's representative and the Contractor. Contractor must take samples in the presence of the Owner's representative. Every barrel or container of recycled abrasive must be tested. Contractor must have the samples sent to a laboratory for testing per SSPC-AB 2/4 and for atomic absorption testing for total lead, cadmium, chromium, barium and arsenic. The recycled abrasive must not be used until the results of the atomic absorption testing, testing required by SSPC-AB 3/4 and chain of custody forms are submitted and accepted by the Engineer. Test results must indicate that the total lead levels are less than 1000 ppm (<0.1 percent) to be allowed to be used on this Project. Test must be used for abrasives used in both shop and field abrasive blasting.

E. The grade must be of such size as to achieve an acceptable anchor pattern or surface profile as required by the coating manufacturer.

F. Silica sand, coal slag, and/or copper slag must not be used as a blast abrasive.

531.10 Delivery and Storage

A. Deliver coating products to the jobsite in original unopened containers, with manufacturer's label and batch number attached. Do not apply products until the Owner's field representative has approved the product for use.

B. Use one location at each jobsite for the storage of coating products. Protect the floor from spills and other damage. Protect the products from extreme heat or cold. Keep containers covered. Keep the storage rooms clean of trash and debris. Dispose of oily or used rags daily. Under no circumstances will they be allowed to accumulate. Take precautions to prevent fires. The storage of flammable liquids must comply with the city, state, or other fire codes.

C. Storage of coatings and other products must be in accordance with the manufacturer's requirements. Coatings that have been damage or not stored properly must not be applied and must be removed from the jobsite.

D. All products and coatings that are not approved for the Project must be removed from the jobsite and must not be stored at the jobsite.

E. All materials must be delivered to the jobsite in original sealed containers with the date of manufacture and batch number stamped thereon by the coating manufacturer. Materials are subject to random observations by the Owner's representative at the jobsite.

531.11 Construction Methods

A. General

1. All materials must be handled and applied in accordance with the coating manufacturer's recommendations and this Section.
2. No coatings shall be applied while water is in the reservoir.
3. All coating material for the exterior topcoat must be mixed from one batch number. Batching should occur so that the shelf life extends beyond the end of the Project.
4. All blasting and coating equipment must be in first class condition and comply with all recommendations of the coating manufacturer and these specifications. Owner reserves the right to have the Contractor immediately repair, modify or remove equipment functioning poorly or creating a nuisance as determined by the Owner.
5. Do not apply any coating to machinery, piping, or other surfaces before testing has been completed and systems approved. Any damage to coatings resulting from subsequent corrective procedures must be stripped back to bare metal and repainted with the appropriate paint system as directed by the Engineer.
6. Surfaces which will be inaccessible after installation must be coated prior to installation, or must be coated and approved in stages as the Work is installed.
7. At least 7 days shall be allowed for drying of finished surfaces before any machinery can be placed into service.
8. Do not apply coating over nameplates or other identification plaques. Mask such plates and keep protected. Remove tape and polish nameplates after painting is complete.
9. Coating application procedures must conform to the standards of craftsmanship as discussed in the Steel Structures Painting Manual, Volume 1 "Good Painting Practice".
10. All thinning must be as per the coating manufacturer's recommendations. Use only those thinners expressly approved by the manufacturer for the coatings used on this Project. Do not allow thinners to be stored in unmarked containers at any time.
11. Illumination equipment must be provided by the Contractor in accordance with SSPC Guide 12. Explosion-proof lights and electrical equipment must be provided. The minimum illumination at the surface of the work during surface preparation and coatings is 215 lux (20 fc). The minimum illumination during inspection is 538 lux (50 fc). Whenever required by the Owner's representative, the Contractor must provide additional illumination and necessary supports to cover all areas to be inspected.

    Project lighting must not interfere with existing residences or schools. Complaints from adjacent residential neighbors shall require Contractor to modify lighting plan to address complaint. Project lighting is considered subsidiary work relating to various bid items of the Contract.
12. Contractor must provide covers and plugs for the intake, discharge and drain piping at the point where the pipe enters the water compartment to prevent debris, or any other foreign matter from entering the water mains. The covers and plugs must remain in place from beginning of the job until just prior to filling the reservoir for disinfection. Prior to

filling the tank, Contractor must allow and support the Owner in flushing inlet lines into tank.

13. Grating or grills must be securely attached to all openings not otherwise secured at the end of work each day until work commences again. Gratings or grills must be used on all openings until the reservoir is secured for service. Grates or grills must be of at least 1/4-inch wire mesh, with a minimum of two square inch mesh openings and a maximum of six square inch openings, to allow adequate free air passage and reservoir protection.
14. Engineer must approve surfaces for application of coatings at each stage. Any material that is coated prior to the Engineer's approval must be stripped back to bare metal and repainted.
15. Cleaning and coating must be scheduled such that dust and other materials from adjoining Work will not contaminate wet or newly coated surfaces.
16. Roof plates must be jacked off rafters as required to abrasive blast and coat between the rafters and roof plates. Contractor is responsible for any damages to the tank and structural members resulting from point loading or over jacking the roof. Contractor must use swivel or angle tips to allow abrasive blasting and coating between rafter and roof plates and other tight areas not accessible with straight tips.
17. Where inspection shows that the specified thickness is not developed, apply additional coats to produce the required dry film thickness. If the re-coat window has passed, Contractor must abrade and prepare the surface in accordance with the manufacturer's recommendations. Contractor must submit surface preparation to the Engineer for review prior to starting Work.
18. Stainless steel may be welded to the tank. Exterior coating system must be applied 6 inches onto any stainless steel materials welded to the tank. The stopping point on the stainless steel surfaces that are to be coated must be masked with painter's tape. The tape must be removed after the coating has dried to a soft consistency, but before it is cured. All exposed stainless steel must be cleaned and passivated to remove free iron from surfaces. Contractor to follow cleaning product manufacturer's instructions when cleaning and passivating stainless steel.
19. Contractor may install painter's nipples in the roof of the tank for supporting staging on the interior of the tank, only with the express written permission of the Engineer. The nipples must remain a part of the tank after construction is complete. Nipples are to be constructed of 316 stainless steel and coated with the specified coating system. Contractor must plug nipples with PVC plugs on the interior and exterior. Contractor must submit Shop Drawings for the nipples, the location of the nipples, and a narrative on how the nipples will be prepared for interior coatings. No other penetrations in the tank shell, roof, or floor will be permitted without the express written permission of the Engineer.
20. All applicable equipment must be electrically grounded as required and must have clean operating gauges, moisture traps, etc.
21. Effective oil and water separators combined with after coolers or desiccant dryers must be used in compressed air lines serving abrasive blasting operations to remove detrimental oil and moisture from the air. Compressors may be tested periodically by the Owner's representative for oil and water contamination of compressed air per ASTM D4285. All compressor units found to produce unacceptable amounts of oil and or water must be replaced with a compressor that is acceptable.

B. Surface Preparation

1. Shop Surface Preparation: Clean and degrease surfaces prior to abrasive blasting to SSPC-SP 1. Methods described in SSPC-SP 1 include solvents, detergent/water, emulsions, and steam. Proposed method must be documented in the coating plan. Contractor must contain and properly dispose of all runoff and debris from cleaning. Prepare surfaces by abrasive blasting as specified and apply shop prime coat. Shop primed steel plates must not have primer extended within 4 inches along all edges to be welded. All primer within 4 inches of an area to be welded must be removed prior to welding. Welding of painted surfaces will not be allowed.
2. Field Surface Solvent Cleaning: Clean and degrease surfaces prior to abrasive blasting to SSPC-SP 1. Methods described in SSPC SP-1 include solvents, detergent/water, emulsions, and steam. Proposed method must be documented in the coating plan. Contractor must contain and properly dispose of all runoff and debris from cleaning. Remove heavy deposits of grease or oil from the surface prior to any other surface preparation. Neutralize and flush chemical contamination prior to any surface preparation. Contractor must contain and properly dispose of all runoff and debris from cleaning.
3. All weld slag, spatter, rough welds and other sharp or rough areas must be removed to a profile conforming to NACE SP0178, Profile 'D'.
4. All rusted, abraded and unpainted areas must be abrasive blast cleaned as specified. Touch up prime coat with primer as specified.
5. If the following conditions exist or are prevalent, surface preparation and coating must be delayed or postponed until conditions are favorable. Each day's coating must be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions or changes. No surface preparation shall begin or coating applied:
    a. When the surface, air or material is below or above the manufacturer's printed instructions.
    b. When surfaces are wet or damp.
    c. During weather conditions of rain, snow, fog or mist.
    d. When the air and steel temperature is less-than or equal to 5 deg. F above the dew point temperature.
    e. If the relative humidity is above 85 percent.
    f. When it is expected that the air and/or surface temperature will be below or above the coating manufacturer's recommended temperatures within 4 hours after applications of coating, minimum. Coating manufacturer may require additional time between application and temperature and weather changes based on existing environmental conditions.
6. All pre-assembled shop primed items must be prepared in accordance with these specifications and inspected by the Owner's representative before and after priming.
7. For both immersion and non-immersion service, all sharp edges and welds must be ground smooth to a rounded contour and all weld splatter must be removed prior to abrasive blasting. Edges of metal to be coated must be rounded to a minimum of 1/16-inch radius of chamfered a minimum of 1/16 inch at an angle of 45 degrees.
8. Abrasive Blasting:

a. Prior to extensive abrasive blasting operations, the Contractor must perform a test blast on both the exterior and interior of the tank in the presence of the Engineer or Owner's representative. Test section must be a minimum of 5 feet by 5 feet. The Engineer or Owner's representative must verify that the surface cleanliness and profile meets the requirements of the Specifications and the coating manufacturer's requirements for the coating to be applied. If the test section does not meet the requirements, the Contractor must make changes to the abrasive materials and methods to provide suitable blast.

b. Adequate surface preparation must be verified throughout surface preparation per SSPC-PA 17. Minimum testing requirements:

   i. Test the surface profile within the first 15-minutes and one additional time during each work shift or 12-hour period, whichever is shorter for each gun or blasting apparatus used or at any time the process producing the acceptable profile indicated above is changed, as interpreted by the Engineer.

   ii. Select a minimum of three 6-inch square locations and take two readings. The average to the two readings is a "profile measurement." The group of three locations is the "location average." The location average must be within the specified profile range.

   iii. Contractor must report the location averages (lowest location average and highest location average) and the profile measurement for each surface preparation apparatus.

c. If the tank has been previously coated, an existing profile may exist. Contactor must adjust blast media size to ensure that the surface profile yield meets the profile required.

d. Abrasive blast only the amount of surface area which can be primed the same day or before any rust starts to form, whichever occurs first. Areas which are not painted the same day must be re-blasted on the day the prime coat is applied. Contractor must leave an unpainted stripe of abrasive blasted surface to clearly identify the previous day's work.

e. Blasting abrasive may be left on the tank floor while painting the interior roof and walls provided no paint is applied to the walls within 4 feet of the floor.

f. Shrouding or recovery of all blast material will be mandatory during all exterior blasting.

   i. The TCEQ has established, under Regulation I, Control of Air Pollution and Visible Emissions from Particulate Matter, Standard 30 TCEQ 111.131, 111.133, 111.135, 111.137, and 111.139 titled "Abrasive Blasting of Water Storage Tanks Performed by Portable Operations". All Work must be performed in accordance with these regulations and are hereby made part of this Section by reference.

g. Contractor must contain all waste and process discharge in accordance with the accepted methods for the process and materials that are in abatement.

h. Air filtration/dust collectors must be used in conjunction with the dehumidification and/or ventilation equipment during blasting operations.

i. Where abrasive blast cleaning will not remove or properly prepare metal surfaces, hand and/or power tool cleaning must be used to remove such conditions as weld splatter, laminations and radius-sharp edges. Hand tool or power tool must be used on areas less than 2 feet in diameter or smaller or on corners and edges of the

reservoir and its internal support members. The surface must be re-blasted after hand work is completed.

j. All abrasive blast equipment must be equipped with, including but not limited to the following:

i. Noise reducing devices.

ii. Hose coupling safety devices.

iii. Electrical grounding devices.

iv. Moisture traps and filters.

v. Fresh air hoods for all blasters.

vi. “Dead Man” switches on all blast hoses.

vii. Air Dryers.

k. Alternate Methods: Alternate removal methods must have prior written approval by the TCEQ Air Program prior to submittal to the Owner for consideration.

9. Surface profile must be in accordance with the manufacturer’s printed requirements and as specified herein. In the event of a discrepancy, the Engineer’s decision will be final.

10. The adequacy of the preparation of surfaces must be determined by comparing the surface with SSPC-VIS 1, SSPC-VIS 3, SSPC-VIS 4 and NACE RP0178.

11. The requirements for preparing carbon steel for painting apply to stainless steel, with the exception that the Contractor must not use metallic abrasives on stainless steel. Surface profile of stainless steel must be a minimum of 1.5 mils.

12. Contractor must protect existing gaskets during abrasive blasting. Any damaged gaskets will be replaced at the Contractor’s expense.

13. Contractor must tighten all bolts at bolted seams, as directed by the Engineer, prior to coating.

C. 100 Percent Solids Interior Lining Special Surface Preparation

1. Coatings must not be applied to flash rusted surfaces or to existing coatings.

2. All weld seams, gaps, edges, bolts and difficult areas difficult to coat must receive an initial spray applied stripe coat of the high solids coating just before application of the liner over the entire surface.

3. Geo-Textile Fabric:

a. Contractor must apply geo-textile fabric over sharp edges, areas of pitting as determined by the Engineer, over bolted and gasketed seams and other locations determined by the Engineer.

b. Contractor is to stripe coat the area to be treated. Place pre-cut length of fabric and press evenly into coating. “Heat-set” side of fabric is to be facing out, i.e. “fuzzy” side towards the steel. Fabric is to be embedded in the stripe coat and then encapsulated as the same time as the rest of the structure. Exposed fabric fibers, edges or other discontinuities are not acceptable.

4. Backer-Rod: In unsealed joints, corners and gaps, fill gaps with backer rod. Backer rod is to be packed into gaps after stripe coat of the area and then coated with final coat.

5. Contractor must provide primer over pitted or corroded areas per the coating manufacturer's recommendation and as approved by the Engineer. No separate pay.

D. Stripe Coat

1. Stripe coat must be applied by brush and thinned according to written coating manufacturer's recommendations and applied to all welds, weld seams, tack welds (new and old), edges, bolts, rivets, ladder rails and rungs, seamed corners, joints of any kind and locations where brackets, lugs and other difficult to coat surfaces exist. Stripe coat on all welds and weld seams must extend 2 inches minimum above, below and beyond all welded sections.
2. Stripe coat must occur in coating system layering as stated in Coating Schedule.
3. Stripe coat is accomplished by moving the brush back and forth in a scrubbing motion working primer into all crevices. Stripe coat must be performed with a high-quality bristle brush using primer that has been thinned according to manufacturer's instructions. Bristles left on the surface must be removed before the coating dries. If bristles are discovered after the coating has dried, the bristle must be removed, the coating removed, and the area correctly re-coated at no additional cost to the Owner.
4. Stripe coat must be tinted such that it can be easily distinguished from the other coats.

E. Finish

1. All primer, intermediate and finish coats must be inspected visually and must be free of all sags, runs, bubbles, cratering, drips, waves, laps, unnecessary brush marks, over spray, environmental contaminants or other physical defects, including shadows, and be uniform in color, texture and gloss. All coatings must be applied in a professional manner to achieve the specified dry film thickness (DFT) leaving a smooth and uniform coating.
2. Prior to application of the intermediate and finish coats, exterior surfaces must be thoroughly waterjet cleaned per SSPC-SP WJ-4 - Light Cleaning to remove any and all surface contamination, visible and non-visible in accordance with the coating manufacturer's recommendations.
3. Sand between coats to remove over spray and dry fall.
4. Finish coat must have a uniform color and texture. Any "bleed through" will not be accepted and Contractor must provide additional coatings as required to provide a uniform color at no additional cost to the Owner.

F. Slip-Resistant Additive

1. Provide slip-resistant additive to finish coating for areas indicated on the Drawings. If not indicated on the Drawings, provide additive for all areas within roof guardrails, 3 feet around the center vent and provide 3-foot paths connecting appurtenances on the roof.
2. Contractor must provide mock panels on cardboard or other material to demonstrate the pattern and roughness to be provided for Engineer review prior to application.
3. Coating is to be applied per the manufacturer's written directions.

Note to Specifier: Include for new composite elevated storage tanks

G. Interior Wet Galvanized Painter's Rails

1. After interior coatings are complete, the interior wet galvanized painter's rails must receive two coats of NSF 61/600 certified epoxy.

H. Coating Repairs

1. All coating repairs must be in accordance with the manufacturer's recommendations and must be included in the submitted coating plan. No coatings may be applied to a surface that has not been properly prepared.
2. Square off areas to be repaired with blue painter's tape.

I. Protection of Existing Structures

1. Contractor must take every precaution available while cleaning and coating the reservoir and pedestal to avoid dusting or spraying the reservoir property, nearby residences and vehicles with either blast debris or over-spray coating. Shrouding is mandatory for exterior abrasive blasting and for spray application of coatings. All shrouding, containment and disposal of waste will be in conformance with TCEQ requirements. Contractor will be responsible for properly loading, securing, transporting and disposing of all waste.
2. If, in the opinion of the Owner's representative, modifications or repairs are necessary to the shroud or ground cover apparatus to provide improved containment of blasting or coating operations, blasting and coating operations must stop until the Owner's representative indicates to the Contractor that adequate repairs are complete.
3. Prior to any surface preparation, the ground surrounding the reservoir and pedestal must be covered with tarps or a similar ground cover that will allow for recovery of paint scraps and blast media. Adequate protection of all areas surrounding the tank must be provided during coating application.
4. Contractor is responsible for complete cleanup of any and all areas contaminated by blast debris.
5. Contractor is responsible for any and all damages to on-site facilities, residences, vehicles and/or public health, including any fines or penalties resulting from improper containment during blasting or coating of the reservoir and pedestal.
6. If present at the Site, all security equipment (light poles, camera poles, microwave beam poles, etc.) must be protected by construction of temporary fences or barricades around above ground devices. Four feet must remain clear of construction materials and activities around all security equipment devices.
7. Protect adjacent materials from damage, including over spray or spillage. Provide drop cloths or other protective tarps to cover floors, equipment or other adjacent materials.

531.12 Application

A. After abrasive blast cleaning, dust and spent abrasive must be removed from the surfaces by air blasting and brush sweeping. The prime coat must be applied as soon as possible after the blasting and surface cleaning is completed, inspected and approved by the Inspector.
B. Blasted surfaces must be coated before rust forms on the surface. No prepared surface will be allowed to receive a coating if "rust bloom" or surface discoloration has occurred. All blasted surfaces must be coated to within 6 inches of the edge of a blasted area. No visible rust must be coated under any circumstances, including rust bloom or if discoloration has occurred, regardless of elapsed time between blasting and coating.
C. Provide mist coat if recommended by the coating manufacturer.

D. Contractor must apply each coat at the rate and in the manner specified by the coating manufacturer, except as may be modified herein. If material has thickened or must be diluted for application, coating must be built up to the same dry film thickness as specified for each coat of the complete system. Additional thinner may not be added after the initial thinning.
E. Contractor and painting technicians are responsible for the application of the coating system and must have current applicator approvals from the coating manufacturer, as required.
F. Manufacturer must certify that coating system is compatible with the tank's cathodic protection system.
G. No coating shall be used which has an expired shelf or pot life.
H. Coating must be applied by skilled workmen and must be brushed out or sprayed evenly, without runs, crazing, sags, or other blemishes. Use of rollers are not permitted on the interior surfaces of the tank.
I. Sand between coats to remove over spray and/or dry spray as necessary.
J. Apply the first coat to the surface, including cutting in around edges, before the second coat is applied. The second coat and any successive coats must not to be applied before notifying the Owner's field representative and obtaining approval. Each coat must be tested before the successive coat is applied.
K. The coating curing period must be adjusted to compensate for surface temperatures and humidity, as recommended by the coating manufacturer, for complete curing of the entire coating system. The full curing time recommended by the manufacturer shall be provided.
L. Coating must be continuous and must be accomplished in an orderly manner to facilitate proper inspection control.
M. Where a roller or brush is used to apply the coating, additional coats may be necessary to achieve the recommended dry film thickness and/or to achieve total coverage of the underlying surface. Coated surfaces must be totally free of all roller nap, roller marks, brush bristles and brush marks.
N. When using conventional coating spray equipment for coating operations, effective oil and water separators combined with after coolers or deliquescent dryers must be used in compressed air lines to remove detrimental oil and moisture from the air. Separators must be placed as far as practical from the compressor. Compressors may be tested periodically by the Owner's representative for oil and water contamination of compressed air. Testing must follow ASTM D4285. All compressor units found to produce unacceptable amounts of oil and or water, as determined by results of ASTM D4285 test data and interpretation of data by the Owner's representative must be replaced with a compressor that is acceptable.
O. To the extent possible, the interior and exterior of all piping entering through the walls of the reservoir tank must be blasted and recoated the same as their respective reservoir walls. The interior of piping entering through the reservoir floor must be blasted and recoated the same as the interior of the reservoir. Methods of recovering blast material from the inside of the pipes must be submitted and approved by the Owner.
P. Field applied material must overlap onto cleaned and prepared adjacent coating system by a minimum of 6 inches. Preparation must be per the manufacturer's recommendations and included in submitted coating plan. Coatings may not be applied to a surface that has not been properly prepared.
Q. Check for compatibility when applying coatings over existing coatings. Apply a test patch of the recommended coating system, covering at least 2 to 3 square feet or as directed by the Engineer. Allow to cure 1 week before testing adhesion per ASTM D3359 in the presence of the Engineer. If adhesion does not meet the manufacturer's published data, consult with the Engineer.

531.13 Field Quality Control

A. Surface Profile Testing:

1. Provide a minimum of 3 sets of profile readings for the first 1000 square feet.
2. Provide a minimum of 2 sets of profile readings for each additional 1000 square feet.
3. Contractor must provide test kits for the Project:
    a. Chlor*Rid Chlor*Test Kit.
    b. KTA SCAT Test Kit.
    c. Approved Equal prior to use.

B. Wet Film and Dry Film Thickness Testing:

1. Provide wet film tests during painting operations to ensure proper thicknesses of coating are being applied.
2. The dry-film thickness for each coat must be tested and be in conformance with SSPC-PA-2 with a Type 2 Electronic Gauge.

C. Holiday Testing:

1. Contractor must conduct holiday testing in the presence of the Owner's representative.
2. Holiday Testing must be conducted using a wet sponge low voltage holiday detector for interior coatings with total DFT of 20 mils or less and high voltage holiday detector for coatings with a total DFT greater than 20 mils in accordance with ASTM D5162 and/or NACE SP0188.
3. A holiday test must be performed on the entire interior wet area of the tank, including the roof and all appurtenances, following the application of the final coat and after all work is completed inside of the reservoir.
4. During the holiday testing, defective areas must be marked for repair and re-tested after repair work has been completed.
5. All touched up pinholes and re-coated areas must be completely cured prior to re-testing for holidays.
6. Holiday testing and re-testing must continue until the interior surfaces are found to be holiday free.

D. Contractor must monitor and record ambient climatic conditions and interior reservoir conditions during surface preparation and coating as follows:

1. Temperature of both the sunny side and shady side of the reservoir must be recorded periodically each day. The reservoir surface temperatures, relative humidity, dry bulb, wet bulb and dew point temperatures, both interior and exterior (as appropriate), are to be recorded at least every 3 hours.
2. The dew point must be measured by use of a sling psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables or with an electronic climate monitoring system approved by the Engineer.
3. Contractor must use a form approved by the Owner for recording this data. The completed forms must be kept on the Site at all times from the time coating is first applied until the

coating system is complete. Cloud based reporting systems may be utilized with the Engineer's approval.

E. All Work, including observations, must be recorded daily by the Contractor. A copy of each daily report/log must be placed in a file kept on the Site and submitted to the Owner at the end of each day. The reports must include the following:

1. Date.
2. Project manager's name.
3. Contractor and Subcontractor name (where applicable).
4. Contractor's and or Owner's representatives name (where applicable).
5. Project name.
6. Work identification including:
   a. Type of Work performed.
   b. Location of Work performed, indicated on generalized drawings of the reservoir, drawings must include estimated square foot area blasted and/or painted and approximate percentage of total square foot area of surface being prepared and painted. Generalized drawings must include:
      i. Plan view of reservoir.
      ii. Profile view of reservoir.
      iii. Plate location.
      iv. North arrow.
   c. Any other drawings that will help to indicate location of Work performed.
7. Time of day each portion of the Work was started and finished.
8. Weather conditions, including corresponding time of day, before during and after work begins including:
   a. Temperature (air and surface).
   b. Humidity/dew point.
   c. Wind velocity/direction.
   d. Remarks and results of work.
9. QC results for completed Work, including:
   a. Compressed air blotter test performed at the start of each day and every 4 hours per ASTM D4285.
   b. Surface preparation visual checks.
   c. Profile checks utilizing replica tape.
   d. Documentation of DFT's and areas tested per SSPC-PA 2, Type 2 Gauge.
   e. Locations of holidays, repairs and touchups required, including documentation of the repair completion.
10. Contractor signature.

Note to Specifier: Include the following if the Owner/Engineer is providing an inspector. Delete the following paragraphs if no inspection is being completed by the Owner or Engineer.

F. Owner's Representative Field Quality Assurance Coordination:

1. Contractor must provide a schedule for anticipated hold-points and must notify the Owner's representative at least 7 days prior to any required inspections and confirmed 24 hours prior to inspection via text message and/or email and acknowledged by the Owner's representative. Prior to scheduling an inspection, Contractor is responsible for reviewing Work and verifying it is ready for a threshold inspection. Once scheduled, if the Owner's representative finds the Work not ready for inspection or if the inspection reveals deficiencies requiring re-testing, any additional trips for re-inspection or inspection for retesting of failed tests shall be borne by the Contractor and deducted from the Contract Value by Change Order.

Note to Specifier: Verify cost per day of inspector, and any engineering effort.

2. Costs for additional inspection shall be billed at the following rates:

Position	Per Day
Coating Inspector	$###

3. Cost includes all travel and inspection expenses. Construction contract administration will be billed for actual effort.

Note to Specifier: Include the following paragraph if the Owner/Engineer is providing an inspector. Below may be modified if resident representative services are being provided.

G. Field Quality Assurance:

1. Observations must be conducted by the Owner's representative and/or a third-party inspection company retained by the Engineer. Final observations must be performed in the presence of the Owner or their Representative and the Contractor's superintendent. All materials and equipment used in the accomplishment of testing are subject to observation at any time by the Owner's representative. Periodic observation times will be agreed upon by the Owner's representative and Contractor, and approved by the Owner.
2. The Owner may conduct the tests and observations to verify the coating manufacturer's data. If the coating testing results fall below the test requirements or visual observation, the Owner reserves the right to have the Contractor change coating materials and/or coating manufacturers to a coating that will meet all the stated requirements in this Section.
3. All steps of the coating system will be subject to observation prior to progression to succeeding steps. Phases of observation must include, but not limited to:
   a. All welding and welding repairs completed prior to painting.
   b. Containment erection completed (as required).
   c. Pre-cleaning (before surface preparation) survey of facilities to be primed.
   d. Prior to and during surface preparation.
   e. Prime coating application.
   f. Stripe coating application.

g. During and immediately after each coating application.

h. Final coating observation.

i. Holiday detection on interior of tank.

j. Cure test of interior coating completed.

k. Substantial Completion / pre-disinfection.

4. Contractor must not move or remove scaffolding, ladders or other fixtures necessary to provide proper observation until such Work has been observed and approved by the Owner's representative.

5. Any Work found to be deficient, damaged, or otherwise unacceptable must be repaired in accordance with the coating manufacturer's latest written repair recommendations at no additional cost to the Owner.

6. Owner's representative will make every attempt to minimize damage to newly coated areas during observation activities, but any damage caused, regardless of by whom, must be repaired by the Contractor at no additional cost to the Owner.

7. Observation and/or acceptance of Contractor's Work by Owner's representative(s) in no way releases Contractor from any of the terms and conditions of the Contract Agreement.

8. The following test and observations will be performed during coating operations:

   a. Surfaces of all steel must first be cleaned and observed by the Contractor's Superintendent to ensure that all grease, oil, and other foreign materials have been removed before coating. Any area found to be improperly cleaned, must be redone to the Owner's representative's satisfaction. Final surface preparation must be as outlined in SSPC-SP 1 through SP 13 and WJ-1 through WJ-4, as specified. Prior to observation of all interior and exterior surfaces by Owner's representative, Contractor's superintendent must observe and confirm readiness for inspection.

   b. Surfaces of all ductile pipe and fittings must first be cleaned and observed by the Contractor's superintendent to ensure that all grease, oil, and other foreign materials have been removed before coating. Any area found to be improperly cleaned, must be redone to the Owner's representative's satisfaction. Final surface preparation must be as outlined in NAPF 500, as specified. Prior to observation of all interior and exterior surfaces by Owner's representative, Contractor's superintendent must observe and confirm readiness for inspection.

   c. The pattern depth of the abrasive blasted surface must be as specified by the coating manufacturer's written surface profile recommendations. The profile must be measured by a Testex Replica Tape, as indicated in Paragraph **[531.11 H].** SSPC-VIS 1 and/or SSPC-VIS 3 must serve as guides and in arbitration to determine the degree of surface preparation. All prepared areas of the reservoir surface, interior and exterior, must be prepared as per SSPC visual standards.

   d. Prior to undertaking full-scale abrasive blasting operations, the Contractor must perform a test blast on both the exterior and the interior of the tank in the presence of the Owner's representative and the coating manufacturer's representative. The test section must be a minimum of 5 feet high by 5 feet wide. The Engineer or Owner's representative and the manufacturer's representative must verify that the surface cleanliness and profile meet the requirements of this Section before the Work can proceed. In the event the test section fails to comply with the requirements of this Section, the Contractor shall be required to make suitable changes to the equipment

and/or abrasive material and perform an additional test sections until compliance with this Section is demonstrated.

e. Before and/or during blasting and coating operations, a field test of ventilation flow-rates must be performed by the Contractor to verify that the ventilation requirements are being provided as specified. Contractor must submit documentation of flow test results to the Engineer.

f. Measurement of the dry film thickness must be made in accordance with SSPC-PA 2 with a Type 2 Electronic Gauge. Measurements of the actual dry film thickness of the various coating layers applied must be made by the Owner's representative with assistance from the Contractor. Film thickness measurements must be made at such locations as designated by the Owner's representative.

   i. Maximum and minimum DFT must be per the supplied coating manufacturer's printed requirements and as required by this Section. DFT will be measured per SSPC-PA 2, Level 2 with an allowable measurement of spot DFT of:

      1. Minimum DFT as specified, no less than the minimum specified will be accepted.

      2. 120 percent of maximum DFT specified.

   ii. Areas that fail to meet this criterion must be corrected at no expense to the Owner. Use of an instrument such as a Tooke Gauge, precision groove grinder, etc., is permitted if a destructive test is deemed necessary by the Engineer and the total DFT is less than 50 mils.

g. Holiday testing must be conducted by the Contractor and observed by the Owner's representative.

9. On days when blasting and/or coating is being performed, the Owner's representative must monitor and record ambient climatic conditions, and interior reservoir conditions as follows:

   a. Air temperature, steel surface temperature, humidity and dew point must be measured and recorded by the Contractor prior to beginning of blasting and prior to application of coating, daily.

   b. Surface temperature must be measured using a surface thermometer.

   c. Temperature of both the sunny side and shady side of the reservoir must be recorded periodically each day. The reservoir surface temperatures, relative humidity, dry bulb, wet bulb and dew point temperatures, both interior and exterior (as appropriate), are to be recorded at least every 3 hours.

   d. The dew point must be measured by use of a sling psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables or by utilizing an electronic measuring device approved by the Engineer.

10. The completed forms must be kept on the Site at all times from the time surface preparation is initiated until the coating system is complete. The forms must be submitted as Product Data on a weekly basis until coating is complete.

531.14 Coating Inspection

Anniversary Inspection

A. Owner and Contractor shall observe all surfaces of the reservoir within 11 to 23 months after the reservoir work has been accepted for Substantial Completion and placed in service to establish if remedial work is required. If the water utility is not able to remove the tank from service for the inspection or for any repair work, due to adverse weather conditions, drought or system limitations, the inspection or repair work may be delayed by the Owner for up to 16 months at no additional cost. All repair work must be conducted within a schedule acceptable to and approved by the Owner.

B. If failures in any portion of the reservoir surface, exceeds 5 percent of that portion, as determined by the Owner, then for that portion, the entire coating system must be completely removed, re-coated and re-tested in accordance with the specifications herein. In the event any portion of the reservoir surface requires repair, partial or complete, a second anniversary observation must be made unless the Owner otherwise deems it not to be necessary. If subsequent anniversary observations are made, time stipulations, coating removal, repair; re-testing requirements must be the same as provided for in this Section. Each subsequent repair will have a warranty observation to occur within 24 months after the repair is completed.

C. Owner will isolate the reservoir from the distribution system and drain the reservoir. The Contractor must open, clean out, high-pressure water wash and rinse the tank prior to the anniversary observation. After observation of the tank is complete and repair work accepted by Owner, the Contractor must follow disinfection procedures specified.

D. Contractor must provide suitable and adequate equipment including, lighting, ventilation, rigging, cable climbers, mirrors, inspection equipment, and sufficient man-power to clean, disinfect and move equipment and tools around the reservoir, etc., as may be necessary to facilitate complete observation of all interior surfaces. The Contractor will bear all costs of the anniversary observation and must incorporate such costs into its bid.

E. Any location, including but not limited to locations where a coating has peeled off, bubbled, blistered, chipped, or cracked, etc., or where pinholes and/or holidays are present and locations where rusting or corrosion is evident, will be considered a failure or defect of the coating system and must be repaired as required. Repairs will be made at areas or locations where coating failures are found, even though metal surfaces may be protected by a cathodic protection system.

F. Methods of testing for coating failure which, may or may not be evident, must include, but not be limited to, adhesion tests, film thickness measurement, holiday testing, etc. Testing may be non-destructive or destructive. Contractor, at its own expense, must repair all areas where destructive tests are performed.

G. The anniversary repair work must be completed within an agreed time as determined by the Owner and Contractor. All repairs must be made as per the coating manufacturer's written repair work instructions or that which is approved and acceptable to the Owner and completed within 90 calendar days of the anniversary observation. Holiday testing must be conducted by the Contractor to check all reservoir interior coating repairs, including the interior roof.

Cleaning And Adjusting

A. Promptly remove trash and debris resulting from painting operation from the Site. Remove drop cloths, masking tapes and other protective coverings. Remove paint spills, splatters, overlap of paint from adjacent material and other defects. Spot paint nicks and other defects.

B. Remove paint containers and waste products. Thoroughly clean paint storage rooms, removing spilled paint from walls and floors.

531.15 Coating Schedules

IW-02 Tank Interior Wet Coating System – 100 Percent Solids Polyurethane System:

A. Interior wet surfaces, include the tank roof, shell, bottom, accessories, piping and appurtenances that are exposed to the stored water or its vapor. These include items constructed of stainless steel, such as ladders and piping.

B. Coating must be considered a “100 percent solids” (98 percent +/- 2 percent solids) and must cover all edges, bridge all gaps and be monolithic and holiday free. Material must be in accordance with ANSI/AWWA C222.

C. Requires dehumidification (DH).

D. Surface Preparation:

1. Solvent Cleaning: SSPC-SP 1.
2. Abrasive Cleaning: SSPC-SP 10 / NACE No. 2, with a surface profile of 2.0 to 3.5 mils, with no exceptions.

E. Application Method(s): Spray. All weld seams, gaps, edges, bolts and difficult areas to coat must receive an additional pass/stripe coat during spray application.

F. Full removal of preconstruction primer is required in accordance with SSPC-SP 10 / NACE No. 2.

G. Refer to Paragraph 531.2 Quality Assurance, for training and certification required for applicators.

H. Unsealed joints must be sealed with 100 percent solids lining system. Appropriately sized foam backer rod must be used as needed to fill spaces in unwelded joints. 30 mil thick high solids lining system must be sprayed behind backer rod and over backer rod once it is in place.

I. System (including all thinners and additives) to be one of the following and of the same manufacturer of all other coating products used on this Project:

1. Sherwin-Williams:

Coat	Product	DFT	Color
Spray Stripe Coat	Poly-Cote 115		Beige
Single Coat	Poly-Cote 115	30 mils min.	Beige

2. Carboline:

Coat	Product	DFT	Color
Spray Stripe Coat	Reactamine 760 HB		Light Tan
Single Coat	Reactamine 760 HB	30 mils min.	Light Tan

3. PPG:

Coat	Product	DFT	Color
Spray Stripe Coat	Amerthane 490 or Aquataflex 505/506		Off White / Relaxed Khaki
Single Coat	Amerthane 490/ or Aquataflex 505/506	30 mils min.	Off White / Relaxed Khaki

Note to Specifier: Include for new composite elevated storage tanks

J. Interior Wet Galvanized Painter's Rails

1. After interior coatings are complete, the interior wet galvanized painter's rails must receive two coats of NSF 61/600 certified epoxy.
2. Epoxy coating is to be as recommended by the coating manufacturer and approved by the Engineer. Minimum requirements are as follows:
   a. Surface Preparation – SSPC SP1 Solvent Clean followed by an SSPC-SP2/3 hand tool or power tool clean to abrade and roughen the surface or as recommended by the manufacturer for galvanized surfaces.
   b. Prime Coat – Epoxy – 4 - 6 mils DFT
   c. Finish Coat – Epoxy – 4 – 6 mils DFT

ID-01 Tank Interior Dry System - Zinc Rich Primer/Epoxy/Epoxy:

A. System applies to all interior dry surfaces of the finished structure that are not exposed to the elemental atmosphere, the stored water, or its vapor. These areas include, but are not limited to the interior of the access tube, interior of the steel pedestal, and the underside of a suspended bottom within the pedestal.

B. Finish coat shall be satin.

C. Surface Preparation:

1. Solvent Cleaning: SSPC-SP 1.
2. Abrasive Cleaning: SSPC-SP 6 / NACE No. 3.

D. Application Method(s): Spray or roller. Brush must only be used for touch up and stripe coating.

E. Organic zinc-rich primer must be minimum 80 percent zinc by weight.

F. Preconstruction Priming:

1. Preconstruction priming must be in accordance with AWWA D102. Full removal of construction primer is not required if the primer is fully compatible with the specified paint system primer. A letter from the paint manufacturer certifying compatibility must be submitted with coating submittal. The zinc primer indicated in the schedules below is not a preconstruction primer and must be field applied.
2. Weld seams and bare steel must be cleaned to SSPC-SP 6 / NACE No. 3.

3. Areas with inadherent preconstruction primer or rusting must be cleaned to SSPC-SP 7 / NACE No. 4.
4. A full field coat of the specified prime coat indicated below must be applied over the spot-cleaned bare steel and remaining preconstruction primer.

G. Three-coat system to be one of the following and of the same manufacturer of all other coating products used on this Project:

1. Sherwin-Williams:

Coat	Product	DFT	Color
Prime Coat	Corothane I Galvapac	3-4 mils	Gray
Stripe Coat	Macropoxy 646*	2-3 mils	Contrasting Color
Intermediate Coat	Macropoxy 646*	4-6 mils	Beige
Finish Coat	Macropoxy 646*	4-6 mils	TBD
Minimum and Maximum DFT for System		11-16 mils	

*Macropoxy 5500LT is an approved equal to the Macropoxy 646 PW. A single finish coat of 8-12 mils is acceptable in lieu of providing an Intermediate Coat.

2. Carboline:

Coat	Product	DFT	Color
Prime Coat	Carbozinc 859	3-5 mils	Gray
Stripe Coat	Carboguard 60	2-3 mils	Contrasting Color
Intermediate Coat	Carboguard 60	4-6 mils	Beige
Finish Coat	Carboguard 60	4-6 mils	TBD
Minimum and Maximum DFT for System		11-17 mils	

3. PPG:

Coat	Product	DFT	Color
Prime Coat	Amercoat 68HS	4-5 mils	Gray
Stripe Coat	Amerlock 2/400	2-3 mils	Contrasting Color
Intermediate Coat	Amerlock 2/400	4-6 mils	Beige
Finish Coat	Amerlock 2/400	4-6 mils	TBD
Minimum and Maximum DFT for System		16-17 mils	

EN - 02 Tank Exterior System – Zinc Rich Primer/Polysiloxane System:

A. System applies to all exterior surfaces of the tank roof, shell, steel pedestal, legs, accessories, piping connecting to the tank and appurtenances that are exposed to the elemental atmosphere.

B. Finish coat shall be high gloss.

C. Surface Preparation:

1. Solvent Cleaning: SSPC-SP 1.
2. Abrasive Cleaning: SSPC-SP 6 / NACE No. 3, with a surface profile of 1.5 to 3.5 mils, with no exceptions.

D. Application Method(s): Spray or roller as recommended by the paint manufacturer. Brush must only be used for touch up and stripe coating. The mils indicated may be difficult to achieve by roller in a single coat. Additional coats may be required to achieve the specified mils at no additional cost to the Owner.

E. Organic zinc-rich primer must be minimum 80 percent zinc by weight.

F. Shop Priming:

1. Shop priming must be in accordance with AWWA D102.
2. Shop-applied primer may be eliminated or applied at reduced thickness within 4-inches of any area to be welded.
3. Field work after the tank is erected consists of spot cleaning and spot priming exposed weld margins and primer abrasions. Weld seams and bare steel must be cleaned to SSPC-SP 6 / NACE No. 3, with a surface profile of 1.5 to 3.5 mils, with no exceptions. Spot priming must be in accordance with the manufacturer's recommendations. The zinc primer indicated in the schedules below is not a preconstruction primer and must be field applied.

G. Preconstruction Priming:

1. Preconstruction priming must be in accordance with AWWA D102. Full removal of construction primer is not required if the primer is fully compatible with the specified paint system primer. A letter from the paint manufacturer certifying compatibility must be submitted with coating submittal.
2. Weld seams and bare steel must be cleaned to SSPC-SP 6 / NACE No. 3.
3. Areas with adherent preconstruction primer or rusting must be cleaned to SSPC-SP 7 / NACE No. 4.
4. A full field coat of the specified prime coat must be applied over the spot-cleaned bare steel and remaining preconstruction primer.

H. Three-coat system to be one of the following and of the same manufacturer of all other coating products used on this Project:

1. Sherwin-Williams:

Coat	Product	DFT	Color
Prime Coat	Corothane I Galvapac	3-4 mils	Gray
Stripe Coat	Sher-Loxane 800	2-3 mils	Contrasting Color

Coat	Product	DFT	Color
Intermediate Coat	Sher-Loxane 800	3-4 mils	Beige
Finish Coat	Sher-Loxane 800	3-4 mils	Safety White
Minimum and Maximum DFT for System		9-12 mils	
Logo	FluoroKem HS 100	2-3 mils	T.B.D.

2. Carboline:

Coat	Product	DFT	Color
Prime Coat	Carbozinc 859	3-5 mils	Gray
Stripe Coat	Carboxane 2000 or 2100	2-3 mils	Contrasting Color
Intermediate Coat	Carboxane 2000 or 2100	3-4 mils	Beige
Finish Coat	Carboxane 2000 or 2100	3-4 mils	Safety White
Minimum and Maximum DFT for System		9-13 mils	
Logo	Carboxane 950 VOC	2-3 mils	T.B.D.

3. PPG:

Coat	Product	DFT	Color
Prime Coat	Amercoat 68HS	3-5 mils	Gray
Stripe Coat	PSX 700/805 Polysiloxane	2-3 mils	Contrasting Color
Intermediate Coat	PSX 700/805 Polysiloxane	3-4 mils	Beige
Finish Coat	PSX 700/805 Polysiloxane	3-4 mils	Safety White
Minimum and Maximum DFT for System		9-13 mils	
Logo	Coraflon ADS Intermix	1.5-2.2 mils	T.B.D.

SS - 01 Interior/Exterior Equipment, Pumps, Motors, Valves and Piping:

A. System applies to Interior/Exterior Equipment, Pumps, Motors, Valves and Piping that are bare or shop primed with epoxy, alkyd, acrylic, or unknown primer type. System is not to be used for submerged piping, piping in vaults or piping with insulation. Above grade exterior piping attached to tank is to be prepared and coated per the tank's specified exterior coating system.

B. Finish Coat Colors:

1. Potable Water Piping and Valves: Safety Blue.
2. Valve Hand Wheels: Red.

3. Overflow Drain Flap Valve: Gray.

C. Finish coat shall be satin.

D. Surface Preparation:

1. Steel Pipe and Fittings: Clean per SSPC-SP 1 and then clean per SSPC-SP 6 / NACE No. 3.
2. Ductile Iron Pipe and Fittings: Clean per NAPF 500-03-01, NAPF 500-03-04 and NAPF 500-03-05, with degree of cleanliness, Blast Clean No. 2.
3. Field preparation of Shop Primed Surfaces:
   a. Consult Engineer for surface preparation requirements for removal of asphaltic coatings.
   b. Slag and weld metal accumulations and splatters not removed by the fabricator must be removed in the field by chipping or grinding. Sharp edges must be peened, ground or otherwise blunted.
   c. Clean per SSPC-SP 1 for steel applications. Clean per NAPF 500-03-01, Solvent Cleaning, for ductile iron applications.
   d. Areas adjacent to welds or any area where shop primer has been damaged must be thoroughly cleaned in accordance with SSPC-SP 11, preparation and re-primed for steel applications. Clean in accordance with NAPF 500-03-02, Hand Tool Cleaning, and NAPF 500-03-04, Power Tool Cleaning, preparation and re-primed for ductile iron applications. All edges adjacent to damaged primer must be feathered.
   e. If damage is too extensive or uneconomical to touch up or if the existing primer shows signs of wear or weathering, the entire item must be re-cleaned and coated in accordance with SSPC-SP 7 / NACE No. 4 using fine (30 to 100 mesh) abrasive for steel applications. Re-clean per NAPF 500-03-04, Abrasive Blast Cleaning for Ductile Iron Pipe and NAPF 500-03-05, Abrasive Blast Cleaning for Cast Ductile Iron Fittings, Cleanliness Level No. 2 for ductile iron applications. Welds and irregular surfaces must receive a stripe coat of the specified primer prior to the application of the first field coat.
   f. Provide final solvent cleaning as specified prior to coating.
   g. 100 to 200 grit sandpaper must be used to roughen the surface and feather edges of the existing coating system.
   h. Motors, electrical, equipment name plates, labels, tags, site glasses, gauges, etc. must be protected from damage during abrasive blasting.

E. Application Method(s): Spray or brush. Brush must be used for touch up and stripe coating.

F. Three-coat system to be one of the following and of the same manufacturer of all other coating products used on this Project:

1. Sherwin-Williams:

Coat	Product	DFT	Color
Prime Coat	Epoxy Mastic II	4-6 mils	Aluminum
Stripe Coat	Macropoxy 646		Beige

Coat	Product	DFT	Color
Intermediate Coat	Macropoxy 646	5-10 mils	Beige
Finish Coat	Hi-Solids Polyurethane	3-5 mils	As Specified
Minimum and Maximum DFT for System		13-25 mils	

2. Carboline:

Coat	Product	DFT	Color
Prime Coat	Carbomastic 15	4-6 mils	Aluminum
Stripe Coat	Carboguard 60		Beige
Intermediate Coat	Carboguard 60	4-6 mils	Beige
Finish Coat	Carbothane 134HG	2-4 mils	As Specified
Minimum and Maximum DFT for System		10-16 mils	

3. PPG:

Coat	Product	DFT	Color
Prime Coat	Amerlock 2/400 AL	5-6 mils	Aluminum
Stripe Coat	Amerlock 2/400		Beige
Intermediate Coat	Amerlock 2/400	5-6 mils	Beige
Finish Coat	Amercoat 450HS	2-3 mils	As Specified
Minimum and Maximum DFT for System		12-15 mils	

SS - 02 Piping and Valves in Vaults and Under Insulation:

A. System applies to Equipment, Valves and Piping that are bare or shop primed with epoxy, alkyd, acrylic, or unknown primer type. System is to be used for submerged piping, piping in vaults or piping with insulation at ambient temperatures.

B. Finish Coat Colors:

1. Potable Water Piping and Valves: Safety Blue.
2. Valve Hand Wheels: Red.
3. Overflow Drain Flap Valve: Gray.

C. Finish coat shall be satin.

D. Surface Preparation:

1. Steel Pipe and Fittings: Clean per SSPC-SP 1 and then clean per SSPC-SP 6 / NACE No. 3.
2. Ductile Iron Pipe and Fittings: Clean per NAPF 500-03-01, NAPF 500-03-04 and NAPF-03-05, with degree of cleanliness, Blast Clean No. 2.
3. Field preparation of Shop Primed Surfaces:

a. Consult Engineer for surface preparation requirements for removal of asphaltic coatings.

b. Slag and weld metal accumulations and splatters not removed by the fabricator must be removed in the field by chipping or grinding. Sharp edges must be peened, ground or otherwise blunted.

c. Clean per SSPC-SP 1 for steel applications. Clean per NAPF 500-03-01, Solvent Cleaning, for ductile iron applications.

d. Areas adjacent to welds or any area where shop primer has been damaged must be thoroughly cleaned in accordance with SSPC-SP 2 and SSPC-SP 3, preparation and re-primed for steel applications. Clean in accordance with NAPF 500-03-02, Hand Tool Cleaning, and NAPF 500-03-04, Power Tool Cleaning, preparation and re-primed for ductile iron applications. All edges adjacent to damaged primer must be feathered.

e. If damage is too extensive or uneconomical to touch up or if the existing primer shows signs of wear or weathering, the entire item must be re-cleaned and coated in accordance with SSPC-SP 7 / NACE No. 4 using fine (30 to 100 mesh) abrasive for steel applications. Re-clean per NAPF 500-03-04, Abrasive Blast Cleaning for Ductile Iron Pipe and NAPF 500-03-05, Abrasive Blast Cleaning for Cast Ductile Iron Fittings, Cleanliness Level No. 2 for ductile iron applications. Welds and irregular surfaces must receive a stripe coat of the specified primer prior to the application of the first field coat.

f. Provide final solvent cleaning as specified prior to coating.

g. 100 to 200 grit sandpaper must be used to roughen the surface and feather edges of the existing coating system.

h. After application of the prime coat, apply caulking to fill flanged joints to be level.

E. Application Method(s): Spray or brush. Brush must be used for touch up and stripe coating.

F. Three-coat system to be one of the following and of the same manufacturer of all other coating products used on this Project:

1. Sherwin-Williams:

Coat	Product	DFT	Color
Prime Coat	Epoxy Mastic II	4-6 mils	Aluminum
Stripe Coat	Macropoxy 646		Beige
Intermediate Coat	Macropoxy 646	4-6 mils	Beige
Finish Coat	Macropoxy 646	4-6 mils	As Specified
Minimum and Maximum DFT for System		12-18 mils	

2. Carboline:

Coat	Product	DFT	Color
Prime Coat	Carbomastic 15	4-6 mils	Aluminum
Stripe Coat	Carboguard 60		Beige

Coat	Product	DFT	Color
Intermediate Coat	Carboguard 60	4-6 mils	Beige
Finish Coat	Carboguard 60	4-6 mils	As Specified
Minimum and Maximum DFT for System		12-18 mils	

3. PPG:

Coat	Product	DFT	Color
Prime Coat	Amerlock 2/400 AL	5-6 mils	Aluminum
Stripe Coat	Amerlock 2/400		Beige
Intermediate Coat	Amerlock 2/400	5-6 mils	Beige
Finish Coat	Amerlock 2/400	5-6 mils	As Specified
Minimum and Maximum DFT for System		15-18 mils	

531.16 Measurement and Payment

There is no separate payment for the supply and installation of coatings on any construction or installation by the Contractor. The Contractor shall consider all labor, equipment, materials, time, incidentals, and other items required for installation of coatings subsidiary to the item for which they are part..

End