

## **STORAGE TANK COATING SPECIFICATION**

### **PART 1 - GENERAL**

#### **1.01 SCOPE**

- A. The work of this section includes the surface preparation and painting of all surfaces related to the storage tank(s).

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE (if applicable)**

- A. Coating and painting of all other surfaces is specified in Section 9.

#### **1.03 REFERENCE SPECIFICATIONS AND STANDARDS**

- A. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of surfaces shall conform to the applicable requirements of the Steel Structures Painting Council, AWWA, NACE, ICRI, CSP and the manufacturer's printed instructions.
- B. The Owner's decision shall be final as the interpretation and/or conflict between any of the referenced specifications and standards contained herein.

#### **1.04 CONTRACTOR**

- A. The Contractor shall have five years practical experience and successful history in the application of specified products in similar projects. He shall substantiate this requirement by furnishing a list of references and job completions.
- B. The Contractor shall possess the applicable license to perform the work as herein described and as specified by local, state and federal laws. The Contractor's South Carolina contractor's license number shall appear in the lower left-hand corner of the envelope containing the bids.
- C. The Contractor shall provide an onsite English-speaking supervisor.

#### **1.05 QUALITY ASSURANCE**

- A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application, and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Owner.
- B. All work shall be in compliance with the latest version of ANSI/AWWA D100-05 and D102-06, the latest version of the International Building Code and in accordance with OSHA Safety and Health Standards
- C. Surface Preparation: Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-Vis-1 and ASTM Designation D2200; "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces" SSPC-Vis-2 and ASTM Designation D610; "Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive" or "Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coating and and Polymer Overlays" and ICRI CSP Surface Profile Chips.

- D. Application: No coating or paint shall be applied: When the surrounding air temperature or the temperature of the surface to be coated is below the minimum required temperature for the specified product; to wet or damp surfaces or in fog or mist; when the temperature is less than 5 degrees F. above the dewpoint; when the air temperature is expected to drop below 40 degrees F. within six hours after application of coating. Dewpoint shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychrometric Tables. If above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.
- E. Thickness and Holiday Checking: Thickness of coatings and paint shall be checked with a non-destructive, magnetic type thickness gauge. The integrity of coated interior surfaces shall be tested with an approved inspection device. Non-destructive holiday detectors shall not exceed the voltage recommended by the manufacturer of the coating system. For thicknesses between 10 and 20 mils (250 microns and 500 microns), a non-sudsing type wetting agent, such as Kodak Photo-Flo, may be added to the water prior to wetting the detector sponge. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations, and retested. No pinholes or other irregularities will be permitted in the final coating.
- F. Inspection Devices: The Contractor shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness of coating and paint. The Contractor shall also furnish U.S. Department of Commerce; National Bureau of Standard certified thickness calibration plates to test accuracy of dry film thickness gauges and certified instrumentation to test accuracy of holiday detectors.
- G. All necessary testing equipment shall be made available for the Owner's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Owner.
- H. All parties, to include the owner or owners representative, engineer, general contractor, applicator, installer, any subs and the product manufacture, shall meet prior to any work is started to review the spec and discuss job specific expectations, need and requirements

## **1. 06 SAFETY AND HEALTH REQUIREMENTS**

- A. General: In accordance with requirements set forth by regulatory agencies applicable to the construction industry and manufacturer's printed instructions and appropriate technical bulletins and manuals, the Contractor shall provide and require use of personnel protective lifesaving equipment for persons working on or about the project site.
- B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets, which shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying halfmask or mouthpiece respirators with appropriate filters. Barrier creams shall be used on any exposed areas of skin.
- C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion-proof. Ventilation shall reduce the concentration of air contaminant to the degree a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.
- D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices.

- E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Owner, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The Owner shall determine the level of illumination for inspection purposes.
- F. Confined Space: When applicable it is mandatory that all work be performed in compliance with OSHA'S rules and regulations for working in confined space. Atmospheres within confined spaces as defined by the Occupational Safety and Health Administration are classified as being either a Class A, Class B or Class C environment.

## **PART 2 - PRODUCTS**

### **2.01 GENERAL**

- A. Materials specified are those that have been evaluated for the specific service. Products of the Tnemec Co. are listed to establish a standard of quality. Equivalent materials of other manufacturers may be substituted on written approval of the Owner.

Local Technical Support:

Tnemec Company, Incorporated and TSE

(803) 736-1553. Contact is Mr. Nick Vause (803) 422-3650 or [nickvause@tsecoatings.com](mailto:nickvause@tsecoatings.com).

Requests for substitution shall include manufacturer's literature for each product giving the name' product number, generic type, descriptive information, solids by volume, recommended dry film thickness and certified test reports showing results to equal the performance criteria of the products specified herein. No request for substitution shall be considered that will decrease film thickness or offer a change in the generic type of coatings specified. In addition, a list of five similar projects shall be submitted in which each product has been used and rendered satisfactory service.

Requests for product substitution shall be made at least thirty (10) business days prior to bid date.

Any material savings shall be shown in writing prior to the bid and passed to the owner in the form of a contract dollar reduction.

Manufacturer's color charts shall be submitted to the Owner at least 30 days prior to paint application. General contractor and painting contractor shall coordinate work so as to allow sufficient time (five to ten days) for paint to be delivered to the jobsite.

- B. All materials shall be brought to the jobsite in original, sealed containers. They shall not be used until the Owner has inspected contents and obtained data from information on containers or labels. Materials exceeding storage life recommended by the manufacturer shall be rejected.
- C. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings or paint must be stored to conform to City, County, State and Federal safety codes for flammable coating or paint materials. At all times, coating and paints shall be protected from freezing.
- D. An AMPP Senior Certified Coatings Inspector certified technical representative from the paint manufacturer shall visit the job site to climb the tank and to support the Contractor's personnel or the Owner as needed and/or requested. Visits shall be made on a weekly basis as a minimum or as needed to help review hold points for the Owner. Additional visit shall be made as needed and/or requested by Owner or Contractor. 48 hours' notice is required by the Contractor for each hold point observations.

- E. All parties, to include the owner or owners representative, engineer, general contractor, installer, any subs and the product manufacture, shall meet prior to any work is started to review the spec and discuss job specific expectations, need and requirements
- F. Coating Systems

***Interior Steel Tank Coating System – NSF Immersion***

Surface Preparation: SSPC-SP10/NACE2 Near-White Blast Cleaning with a minimum angular profile of 1.5 mils. The surface must be clean and dry before painting.

1<sup>st</sup> Coat: NSF Aromatic Urethane, Zinc-Rich applied at 2.5 – 3.5 dry mils.  
(performance equal to Tnemec Series 94H20 HydroZinc)

Stripe Coat: NSF Approved Polyamidoamine Epoxy applied at 4.0 – 6.0 dry mils.  
(performance equal to Tnemec Series N140 Pota-Pox Plus)

2<sup>nd</sup> Coat NSF Approved Phenalkamine Epoxy applied at 6.0 – 8.0 dry mils.  
(performance equal to Tnemec Series 21 Epoxoline)

3<sup>rd</sup> Coat NSF Approved Phenalkamine Epoxy applied at 6.0 – 8.0 dry mils.  
(performance equal to Tnemec Series 21 Epoxoline)

***Exterior Steel Tank and Associated Site Piping Coating System – Overcoat (Assuming Compatibility)***

Surface Preparation: Power wash the entire exterior surface using 3,500 PSI with a rotating turbo nozzle to remove all loose paint, rust, dirt, scale and foreign matter. Great Lakes Laboratories Extra Muscle Prepaint Cleaner, CHLOR\*WASH or similar shall be used prior to power washing to help remove all the existing contaminants. Ensure all solubles have been removed. Pole sand the existing coating to degloss the surface and create a mechanical profile. SSPC-SP3 Power Tool Cleaning to all rust, corrosion and film issues areas, feather the edges to a tight and smooth transition and spot prime all cleaned areas with a Modified Polyamidoamine Epoxy (performance equal to Tnemec Series 135 Chembuild) @ 4.0 – 6.0 dry mils. The surface shall be clean and dry before painting.

1<sup>st</sup> Coat: Modified Polyamidoamine Epoxy applied at 4.0 – 6.0 dry mils.  
(performance equal to Tnemec Series 135 Chembuild)

2<sup>nd</sup> Coat: Aliphatic Acrylic Polyurethane applied at 2.5 – 3.0 dry mils.  
(performance equal to Tnemec Series 73/1095 Endura Shield)

3<sup>rd</sup> Coat: Advanced Thermoset Solution Fluoropolymer applied at 2.5 – 3.0 dry mils.  
(performance equal to Tnemec Series 700 Hydro-Flon)

Lettering / Logo: Two coats of a Advanced Thermoset Solution Fluoropolymer(performance equal to Tnemec Series 700-color HydroFlon) shall be used for the lettering/ logo applied at a dry film thickness of 2.5 – 3.0 per coat.

Calking: Fill all gaps between the concrete foundation and the bottom plates of the steel tank with a Modified Polyurethane (performance equal to Tnemec Series 265 Elasto-Shield TG). Overlap 2 inch on both sides of the gap.

Concrete Foundations, Overflow Pad and Associated Site Concrete: The concrete shall be cleaned and shall receive two coats of Mastic Waterborne Acrylic(performance equal to Tnemec Series 154) at 10.0 – 14.0 dry mils.

***Interior Fill Piping, Steel Tank Underbelly, Dry Riser and Associated Sweating Areas Coating System or any piping “insulation” need – Condensation Control Insulation Coating***

Surface Preparation: SSPC-SP6/NACE 3 Commercial Blast Cleaning. The surface shall be clean and dry before painting.

Primer Coat: Inorganic Hybrid Water-Based Epoxy applied at 4.0 to 8.0 dry mils.  
(performance equal to Tnemec Series 1224 Epoxoline WB)

Aerolon Insulation Coat: Fluid-applied acrylic insulation applied at 100.0 dry mils. Two coats are required to achieve specified thickness.  
(performance equal to Tnemec Series 971 Aerolon)

Finish Coat: HDP Acrylic Polymer at 2.5 to 3.0 dry mils  
(performance equal to Tnemec Series 1028T Enduratone)

***Exterior Steel Tank and Associated Site Piping Coating System – Complete Rehab***

Surface Preparation: SSPC-SP6/NACE3 Commercial Blast Cleaning with a minimum angular profile of 1.5 mils. Fill all unwelded seams, lap plates, gaps and other surface irregularities that cannot be filled with the coating system. The surface must be clean and dry before painting.

1<sup>st</sup> Coat: NSF Aromatic Urethane, Zinc-Rich applied at 2.5 – 3.5 dry mils.  
(performance equal to Tnemec Series 94H20 HydroZinc)

Stripe Coat: NSF Approved Polyamidoamine Epoxy applied at 4.0 – 6.0 dry mils.  
(performance equal to Tnemec Series N140 Pota-Pox Plus)

2<sup>nd</sup> Coat: Aliphatic Acrylic Polyurethane applied at 2.5 – 3.0 dry mils.  
(performance equal to Tnemec Series 73/1095 Endura Shield)

3<sup>rd</sup> Coat: Advanced Thermoset Solution Fluoropolymer applied at 2.5 – 3.0 dry mils.  
(performance equal to Tnemec Series 700 Hydro-Flon)

Lettering / Logo: Two coats of a Advanced Thermoset Solution Fluoropolymer(performance equal to Tnemec Series 700-color HydroFlon) shall be used for the lettering/ logo applied at a dry film thickness of 2.5 – 3.0 per coat.

Calking: Fill all gaps between the concrete foundation and the bottom plates of the steel tank with a Modified Polyurethane (performance equal to Tnemec Series 265 Elasto-Shield TG). Overlap 2 inch on both sides of the gap.

Concrete Foundations, Overflow Pad and Associated Site Concrete: The concrete shall be cleaned and shall receive two coats of Mastic Waterborne Acrylic(performance equal to Tnemec Series 154) at 10.0 – 14.0 dry mils.

***Interior Fill Piping, Steel Tank Underbelly, Dry Riser and Associated Sweating Areas Coating System or any piping “insulation” need – Condensation Control Insulation Coating***

Surface Preparation: SSPC-SP6/NACE 3 Commercial Blast Cleaning. The surface shall be clean and dry before painting.

Primer Coat: Inorganic Hybrid Water-Based Epoxy applied at 4.0 to 8.0 dry mils.

(performance equal to Tnemec Series 1224 Epoxoline WB)

Aerolon Insulation Coat: Fluid-applied acrylic insulation applied at 100.0 dry mils. Two coats are required to achieve specified thickness.

(performance equal to Tnemec Series 971 Aerolon)

Finish Coat: HDP Acrylic Polymer at 2.5 to 3.0 dry mils

(performance equal to Tnemec Series 1028T Enduratone)

## **PART 4 – EXECUTION**

### **4.01 GENERAL**

- A. All surface preparation, coating, painting and other work shall conform to applicable standards of the Steel Structures Painting Council, AWWA, NACE ICRI, CSP, and any other appropriate standards as well as the manufacturer's printed instructions. Material applied prior to approval of the surface by the Owner shall be removed and reapplied to the satisfaction of the Owner at the expense of the Contractor.
- B. All work shall be performed by skilled craftsmen qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of personnel shall be maintained and transfers of key personnel shall be coordinated with the Owner.
- C. The Contractor shall provide an English-speaking supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign change orders, coordinate work, and make decisions pertaining to the fulfillment of the contract.
- D. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.
- E. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Contractor's equipment shall be subject to approval of the Owner.
- F. Application of the first coat shall follow immediately after surface preparation and cleaning and before rust bloom or flash rusting occurs. Any cleaned areas not receiving first coat within this period shall be recleaned prior to application of first coat.

### **4.02 SURFACE PREPARATION**

- A. The latest revision of the following surface preparation specifications of the Steel Structures Painting Council and NACE shall form a part of this specification:
  - 1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a solvent or cleaning action.
  - 2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by hand chipping, scraping, sanding and wire brushing.
  - 3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust' loose mill scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders.

4. Brush-Off Blast Cleaning (SSPC-SP7/NACE 4): Brush-off blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating. Tightly adherent mill scale, rust, and coating may remain on the surface. Mill scale, rust, and coating are considered tightly adherent if they cannot be removed by lifting with a dull putty knife after abrasive blast cleaning has been performed.
  5. Commercial Blast Cleaning (SSPC-SP6/NACE 3): Blast cleaning until at least 66 percent of each element of surface area is free of all visible residues.
  6. Near White Blast Cleaning (SSPC-SP10/NACE 2): Blast cleaning to nearly white metal cleanliness, until at least 95 percent of each element of surface area is free of all visible residues.
  7. Surface Preparation of Concrete (SSPC-SP13/NACE 6): This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.
  8. Power Tool Cleaning to Bare Metal (SSPC-SP11): This standard covers the requirements for power tool cleaning to produce a bare metal surface and to retain or produce a minimum 25 micrometer (1.0 mil) surface profile. This standard is suitable where a roughened, clean, bare metal surface is required, but where abrasive blasting is not feasible or permissible.
- B. Blast cleaning for all surfaces shall be by dry method unless otherwise directed.
  - C. Particle size of abrasives used in blast cleaning shall be that which will produce a 1.5 – 2.0 mil (37.5 microns - 50.0- microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.
  - D. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved by the Owner.
  - E. During blast cleaning operations, caution shall be exercised to insure that surrounding existing coatings or paint are not exposed to abrasion from blast cleaning.
  - F. The Contractor shall keep the area of his work and the surrounding environment in a clean condition. He shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities, or nuisance to the surrounding environment.
  - G. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint. No coatings or paint shall be applied over damp or moist surfaces.
  - H. Specific Surface Preparation: Surface preparation for the specific system shall be as noted in Section 2.01 Paragraphs D.

#### **4.03 APPLICATION, GENERAL**

- A. Coating and paint application shall conform to the requirements of the Steel Structures Painting Council Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting," and the manufacturer of the coating and paint materials.
- B. Thinning shall be permitted only as recommended by the manufacturer approved by the Owner, and utilizing the thinners stated in Section 2.01 Paragraphs D.

- C. Each application of coating or paint shall be applied evenly, free of brush marks, sags, runs, with no evidence of poor workmanship. Care shall be exercised to avoid lapping on glass or hardware. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.
- D. Protective coverings or drop cloths shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent coatings or paint from being spattered onto surfaces that are not to be coated or painted. Surfaces from which materials cannot be removed satisfactorily shall be recoated or repainted as required to produce a finish satisfactory to the Owner. The Contactor is responsible for any and all drips, spills, overspray or other surface that are painted.
- E. When two coats of coating or paint are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.
- F. Film thickness per coat specified in Section 2.01 Paragraphs D are minimum required. If roller application is deemed necessary, the Contractor shall apply additional coats as to achieve the specified thickness.
- G. All material shall be applied as specified.
- H. All welds, edges and other irregular surfaces shall receive a brush coat of the specified product prior to application of the first complete coat.

#### **4.04 COATING SYSTEMS APPLICATION**

- A. After completion of surface preparation as specified for the specific system, materials shall be applied as noted in Section 2.01 Paragraphs D.

#### **4.05 COLOR SCHEME**

- A. Colors: Submittals will be made to the Owner for approval prior to application.

#### **4.06 SOLVENT VAPOR REMOVAL**

- A. Where appropriate all solvent vapors shall be completely removed by suction-type exhaust fans and blowers before placing in operating service.

#### **4.07 CLEAN UP**

- A. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in a manner approved by the Owner. Coating or paint spots and oil or stains upon adjacent surfaces shall be removed and the jobsite cleaned. All damage to surfaces resulting from the work of this section shall be cleaned, repaired, or refinished to the satisfaction of the Owner at no cost to the Owner.

#### **4.8 WARRANTY**

- A. The Contractor will warrant the work free of defects in material and workmanship for a period of one year from the acceptance of the work. At the end of one year, the Contractor will return for a one-year anniversary inspection of the work. The Contractor will correct any deficiencies found with no cost to the owner. Inspections shall be conducted in to conform to owners spec.