

Water Tank Painting Project

PROJECT SPECIFICATIONS

COATING & PAINTING STEEL WATER STORAGE TANKS

PART 1. GENERAL

1.1. SCOPE

- A. The work of this section covers the coating of all interior surfaces, including but not limited to wall, roof framing, roof plates, columns, floor, interior piping, flanged access manholes, flanged outlets, and interior ladder and cage. Painting of exterior surfaces is not included in the scope of work for this project.

1.2. REFERENCE SPECIFICATIONS AND STANDARDS

- A. Without limiting the general aspects of the requirements of these specifications, all surface preparation, coating and painting of interior and exterior surfaces shall conform to applicable requirements of the American Water Works Association, the Association for Materials Protection and Performance, the National Sanitation Foundation and the manufacturer's printed instructions.
- B. The CONTRACTOR shall, in conducting their WORK, conform to the following requirements (references to standards refer to the most recently adopted version of the standard, unless otherwise noted):
 - 1.) American Water Works Association (AWWA)
 - AWWA D102-24 Coating Steel Water-Storage Tanks
 - AWWA C652-19 Disinfection of Water-Storage Facilities
 - 2.) Association for Materials Protection and Performance (AMPP)
 - SSPC-SP11
 - SSPC-SP10
 - SSPC-SP7
 - SSPC-SP3
 - SSPC-SP2
 - SSPC-VIS 1
 - SSPC-VIS 2
 - SSPC-PA1
 - SSPC-PA2
 - NACE TM 01-70
 - 3.) National Sanitation Foundation (NSF)
 - NSF 61/600

4.) Manufacturer's printed instructions

- C. The ENGINEER'S decision shall be final as the interpretation and/or discrepancy between any of the referenced specifications and standards contained herein.

1.3. PAINTING CONTRACTOR

- A. The Painting CONTRACTOR shall be approved by the City for performing surface preparation and coating/painting work prior to the beginning of work and shall have a minimum of five years practical experience and successful history in the application of specified products to surfaces of steel water tanks. They shall substantiate this requirement by furnishing a list of references prior to the Pre-Construction Meeting. The City shall give notice to the General CONTRACTOR of acceptance of the Painting CONTRACTOR.

1.4. PRE-CONSTRUCTION MEETING

- A. A pre-construction meeting shall be scheduled prior to start of the painting portion of the work. The OWNER, CONTRACTOR, Coatings and Paint Manufacturer and ENGINEER shall be present. A schedule of work to be accomplished and a list of labor, material and equipment production rates for the work will be established and maintained throughout the project.

1.5. QUALITY CONTROL

A. GENERAL

- 1.) Quality control 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 ENGINEER.

B. SURFACE PREPERATION

- 1.) Surface preparation will be based upon comparison with "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-VIS 1 ASTM Designation D 220; "Standards Methods of Evaluating Degree of Rusting on Painted Steel Surfaces", SSPC-VIS 2 ASTM Designation D 610; Visual Standard for Surface of New Steel Airblast Cleaned with Sand Abrasive", NACE Standard TM-01-70; and as described below. Anchor profile for prepared surfaces shall be measured by use of a non-destructive instrument such as a Keane-Tator Surface Profile Comparator.
- 2.) To facilitate inspection, the CONTRACTOR shall on the first day of sandblasting operations, sandblast metal panels to both SSPC-SP10 and

SSPC-SP7 Standards. These panels shall be equivalent to the tank plate stock with minimum measurement of 8-1/2 inches by 11 inches (216 mm X 280mm). After agreeing a specific panel meets the requirements of the specification, the panel shall be initialed by the CONTRACTOR and ENGINEER and coated with a clear non-yellowing finish. Panels shall be utilized for inspection purposes throughout the duration of sandblasting operations.

C. APPLICATION

- 1.) No coating or paint shall be applied: When the surrounding air temperature or the temperature of the surface to be coated or painted is below the minimum application temperature recommended by the paint manufacturer or below 40 degrees F; to wet or damp surfaces or in rain, snow, fog, or mist; when the temperature is less than 5 degrees above the dewpoint; when it is expected the air temperature will drop below the minimum application temperature recommended by the paint manufacturer, or below 40 degrees F., or below 5 degrees F. above the dewpoint within eight hours after application of coating and paint. 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.
- 2.) 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.

D. THICKNESS AND HOLIDAY CHECKING

- 1.) Thickness of coatings and paint shall be checked with non-destructive, magnetic type thickness gauge in accordance with SSPC-PA2. Use an instrument such as a Tooke Gage if a destructive tester is deemed necessary. Coating integrity of interior coated surfaces below the water line shall be tested with an approved inspection device. Holiday detection shall be performed after application of finish coats. Non-destructive holiday detectors shall not exceed 67-1/2 volts nor shall destructive holiday detectors exceed the voltage recommended by the manufacturer of the coating system. 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.

E. INSPECTION DEVICES

- 1.) The CONTRACTOR shall furnish, until final acceptance of coating and painting, inspection devices in good working conditions 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 Standards certified thickness calibration plates to test accuracy of dry-film thickness and certified instrumentation to test accuracy of holiday detectors.

- 2.) Dry-film thickness gauges and holiday detectors shall be made available for the ENGINEER'S use at all times until final acceptance of application. Holiday detection will be performed by the CONTRACTOR in the presence of the ENGINEER. Holiday detector equipment will also be available for operation by the ENGINEER at ENGINEER'S discretion.

F. ACCEPTABLE INSPECTION DEVICES

- 1.) Acceptable devices for ferrous metal surfaces include, but are not limited to K-D "Bird-Dog" holiday detector for coatings to 20 mils (500 microns) dry film thickness, Tinker-Razor Models AP and AP-W holiday detectors for coating in excess of 20 mils (500 microns) dry-film thickness, and "Inspector" or "Mikrotest" units for dry-film thickness gauging. Non-ferrous metal surfaces shall be checked with an instrument such as an Elcometer "Eddy Current" Tester. Inspection devices shall be operated in accordance with the manufacturer's instructions.

G. WARRANTY INSPECTION

- 1.) Warranty inspection shall be conducted during the eleventh month following completion of all coating and painting WORK. All defective WORK shall be repaired with this specification and to the satisfaction of the City.

1.6. SAFETY AND HEALTH REQUIREMENTS

A. GENERAL

- 1.) 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 in or about the project site, and as required by AWWA D 102-24 Section 4.8.1.

B. HEAD AND FACE PROTECTION AND RESPIRATORY DEVICES

- 1.) 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, half-mask or mouthpiece respirator with appropriate filter. Barrier creams shall be used on any exposed areas of the skin.

C. VENTILATION

- 1.) 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 that a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

D. SOUND LEVELS

- 1.) 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

- 1.) Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the ENGINEER, the CONTRACTOR shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the ENGINEER.

F. TEMPORARY LADDERS AND SCAFFOLDING

- 1.) All temporary ladders and scaffolding shall conform to applicable safety requirements. They shall be erected where requested by the ENGINEER to facilitate inspection and be moved by the CONTRACTOR to locations requested by the ENGINEER.

PART 2. PRODUCTS

2.1. GENERAL

- A. Materials shall be approved by the ENGINEER. Requests for approval of "equals" must be approved in writing by the City. "Equals" shall have a successful experience record verifiable and acceptable to the City."
- B. All materials shall be brought to jobsite in original sealed containers. They shall not be used until the ENGINEER has inspected contents and obtained data from information on containers or label. 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 with all safety codes for flammable coating or paint materials. At all times coatings and paints shall be protected from freezing.

- D. Interior pit repair will be performed by the CONTRACTOR as needed and as directed by the ENGINEER. This work will be measured and paid for by the SF. The CONTRACTOR shall use approved materials for pit repair.
- E. Joints specified to be sealed shall be sealed with an approved elastomeric sealant/adhesive. Requests for approval of "equals" must be approved in writing by the City. "Equals" shall have a successful experience record verifiable and acceptable to the City.

2.2. DISINFECTION MATERIALS

- A. Disinfection materials shall conform to all the requirements of applicable AWWA Standards and regulatory agencies.

PART 3. EXECUTION

3.1. GENERAL

- A. All surface preparation, coating and painting shall conform to applicable standards of the Association for Materials Protection and Performance, the American Water Works Association and the manufacturer's printed instructions. Material applied prior to approval of the surface by the ENGINEER shall be removed and re-applied to the satisfaction of the ENGINEER at the expense of the CONTRACTOR.
- B. All work shall be performed by skilled craftsman 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 limited by the CONTRACTOR to emergency conditions only. Key personnel shall be continuously on job during CONTRACT.
- C. The Painting CONTRACTOR shall provide a supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign for 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 approved cleaning solvent and wiped dry with clean rags.
- E. Any water that results from a rinsing or cleaning process used by the Contractor (process water) must be contained, collected, and properly disposed of. The Contractor shall select their own method for containment, collection, and disposal of process water. The City will allow process water to be disposed of at the "Mud Pond" located on the Water Plant site (refer to the "Water Plant Site Layout Exhibit" included with this Addendum). Contractors may submit, for approval by the Engineer, a Method Statement to excavate and cut into the tank's discharge pipe

and collect process water from there. In order for a Method Statement for this procedure to be approved it must address, to the satisfaction of the Engineer, the following items: method to prevent process water from continuing past the collection point and discharging from the site; appropriate method for excavation, pipe removal, and pipe repair; and method to transport process water from the collection point to the disposal site. The cost to handle and dispose of process water will be considered incidental and will not be paid for separately.

- F. Coating and painting systems include surface preparations, prime coating and finish coatings. Unless otherwise specified, prime coating shall be field applied. Where prime coatings are shop applied, the CONTRACTOR shall instruct suppliers to provide the prime coat compatible with the finish coat specified. Any off-site work which does not conform to this specification is subject to rejection by the ENGINEER.
- G. Shop applied prime coatings which are damaged during transportation, construction or installation shall be thoroughly cleaned and touched up in the field as approved by the ENGINEER. The CONTRACTOR shall use repair procedures which insure the complete protection of all adjacent primer. The specified repair method and equipment may include hand or power tool cleaning and dry air blast cleaning. In order to prevent injury to surrounding painted areas cleaning may require use of lower air pressure, small nozzle and abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive or uneconomical to touch-up, then the item shall be recleaned and coated or painted as approved by the ENGINEER.
- H. 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 ENGINEER.
- I. Application of the first coat shall follow immediately after surface preparation and cleaning and prior to any formation of any rust bloom. Any cleaned areas not receiving first coat prior to the formation of any rust bloom shall be recleaned prior to application of first coat.
- J. Prior to assembly, all surfaces made inaccessible after assembly shall be prepared as specified herein and shall receive the coating or paint system specified.

3.2. SURFACE PREPERATION

- A. The latest revision of the following surface preparation specifications of the Association for Materials Protection and Performance shall form a part of this specification:

- 1.) Solvent Cleaning (SSPC-SPI): 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, scrapping, sanding and wirebrushing.
 - 3.) Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by power wirebrushing, power impact tools or power sanders.
 - 4.) White Metal Blast Cleaning (SSPC-SP5): Blast cleaning to a gray-white uniform metallic color until each element of surface area is free of all visible residues.
 - 5.) Commercial Blast Cleaning (SSPC-SP6): Blast cleaning until at least two-thirds of each elements of surface area is free of all visible residues.
 - 6.) Brush-off Blast Cleaning (SSPC-SP7): Blast cleaning to remove loose rust, loose mill scale and other detrimental foreign matter to degree specified.
 - 7.) Near White Blast Cleaning (SSPC-SP10): Blast cleaning to nearly white metal cleanliness, until at least 95 percent of each element of surface area is free of all visible residues.
- B. Field 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 1-1/2 - 2 mil (37.5 microns - 50.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.
- 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 ENGINEER.
- E. During blast cleaning operations, caution shall be exercised to insure that existing coatings or paint are not exposed to abrasion from blast cleaning.
- F. The CONTRACTOR shall keep the area of this WORK in a clean condition and shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the prosecution of the work or the operation of the existing facilities.

- 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. All welds shall be neutralized with a suitable chemical compatible with the specified coating materials.
- I. Specific Surface Preparation: Surface preparation for the specific system shall be approved by the ENGINEER and as required by the specific paint system to be furnished and the manufacturer's requirements.
- J. Grind all rough edges, weld seams, and erection scab marks to a smooth curve prior to coating. Re-blast any ground or smoothed surfaces.
- K. If a section of the steel tanks needs to be removed to facilitate sand blasting and cleanup process, the Contractor will be required to furnish the City with a letter guaranteeing that all welding will be accomplished with a certified welder, x-rayed, and guarantee the weld against future failure due to stresses normally encountered with a water storage tank. Additionally, a rectangular shaped section of the tank exterior that extends 5 FT beyond the area disturbed by the temporary access hole shall be painted after the completion of the weld testing and acceptance. The exterior painting shall conform to the Project Specifications. The cost of all work associated with providing a temporary access hole will be considered incidental and will not be measured and paid for separately.
- L. All interior joints between un-connected steel surfaces shall be sealed with the specified elastomeric sealant/adhesive. Welded joints between steel components that show no signs of corrosion or rust AND that can be completely coated and sealed by the paint system, are not required to be sealed with caulk. Sealing of joints shall occur after all painting and cleanup from painting has been completed. Interior joints that shall be sealed include but are not limited to the following:
 - 1.) Joints surrounding the bolted connection between Rafters and Girders.
 - 2.) Joints surrounding the bolted connection between Girders and Columns.
 - 3.) Joints on the floor around the Column Bases and the floor.

3.3. APPLICATION, GENERAL

- A. Coating and paint application shall conform to the requirements of the Association for Materials Protection and Performance Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting", and recommended practices of the American Water Works Association and the manufacture of the coating and paint materials.
- B. Interior steel surfaces prepared for Full Removal or Spot Repair shall be coated according to the following AWWA D102-24 Inside Coating System standard:

1A.) AWWA D102-24 Inside Coating System No. 3 (ICS-3)

Coat	Minimum DFT (mils)
Primer (Organic Zinc-Rich)	2.5
Stripe Coat (Two-Component Epoxy)	20.0
Finish Coat (Two-Component Epoxy)	20.0
Total System	22.5

Note: Consult the coating manufacturer for coating thickness limitations.

OR

1B.) AWWA D102-24 Inside Coating System No. 4 (ICS-4)

Coat	Minimum DFT (mils)
Primer	2.5
Stripe Coat	25.0
Finish Coat	25.0
Total System	27.5

Note: Consult the coating manufacturer for coating thickness limitations.

- 2.) A Stripe Coat shall also be applied to all welds, edges, corners and bolts.
- C. Thinning shall be permitted only as recommended by the manufacturer and approved by the ENGINEER.
- D. 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 hardware. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.
- E. Protective coverings or drop cloths shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent coatings or paints from being splattered onto surfaces which 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 ENGINEER.
- F. 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.
- G. Film thickness per coat specified in tabular form are minimum required. CONTRACTOR shall apply additional coats as necessary to achieve the specified thickness.
- H. All material shall be applied as specified or according to manufacturer's printed instructions.

- I. All welds and irregular surfaces shall receive a brush coat of the primer prior to application of the first complete priming coat.

3.4. COATING SYSTEMS APPLICATION

- A. Apply coatings in accordance with manufacturers recommendations.
- B. After the coatings have been cured, the ENGINEER will inspect the coated surfaces. Any damaged or defective coatings shall be repaired by approved methods.

3.5. COLOR SCHEME

- A. The City shall select the colors for the tanks. The Painting CONTRACTOR shall submit a current chart of the manufacturer's available colors to the ENGINEER thirty days prior to the start of coating and painting operations.

3.6. DISINFECTION

- A. Disinfection of interior surfaces shall be performed in the presence of the PLANT OPERATIONS SUPERVISOR in accordance with all the requirements of AWWA C652-19 (or more recent) Disinfection of Water Storage Facilities using chlorination method number two. The disinfection shall meet Colorado Health Department Regulations.
- B. Disinfection shall be performed after protective coatings have been applied to the interior surfaces and after the full drying period has elapsed.
- C. Prior to disinfecting, the complete interior shall be washed down with clean water and thoroughly flushed.
- D. All interior surfaces shall be thoroughly washed with a solution having a minimum chlorine content of 200 P.P.M. Chlorine solution accumulated on the bottom shall be drained to waste. Rinsing with clear water is not required.
- E. Water will be furnished at the nearest outlet of the City, by the City.

3.7. SOLVENT VAPOR REMOVAL

- A. All solvent vapors shall be completely removed by suction type exhaust fans, and blowers before placing tank in operating service.

3.8. 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 ENGINEER. Coating or paint spots and/or oil stains upon adjacent surfaces shall be removed and the job site cleaned. All damage to surfaces resulting from WORK of this section shall be

cleaned, repaired, or refinished to the satisfaction of the ENGINEER at no cost to the OWNER.