

**COATINGS MANUAL
HRSD**

SECTION 7
STANDARD COATINGS SPECIFICATIONS
(to be fill in electronically)

PART 1 - GENERAL

1.01 LOCATION AND CONTACTS

Treatment Plant or Facility: _____
Address: _____
City, State and Zip Code: _____
Phone: _____ Fax: _____
Plant Manager: _____
Plant Superintendent: _____
Date: _____

1.02 SCOPE

- A. This specification covers surface preparation, application, clean-up and performance guarantee of coating of all surfaces as required and specified herein.
- B. The Contractor shall furnish all supervision, labor, tools, materials, equipment, scaffolding and/or other structure to complete the work. Actual scope of work is to (List Scope of Work)

1.03 SPECIFIC PROJECT REQUIREMENTS

- A. The work of this Contract is located at the (Plant or Facility name) owned by the Hampton Roads Sanitation District (HRSD).
- B. All work shall be done in strict accordance with this specification and the approved manufacturer's instructions.
- C. The Contractor shall provide protection for all structures and equipment from damage due to any blasting, cleaning, spraying or coating operations. **Notify the HRSD Representative Prior to Start of Blasting or Spraying** so vehicles can be moved and other preparations made as required.
- D. The Contractor shall collect and remove all debris associated with the coating operation from the plant site.
- E. The Contractor shall coordinate all work through the HRSD representative.

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- F. The Contractor is required to sign the three-year conditional Performance Guarantee on materials and workmanship attached to these specifications.
- G. An annual follow-up inspection shall be conducted following 12 months of service after acceptance of the coating work. A Contractor's representative and a representative of the coating system manufacturer (CSM) shall attend this follow-up inspection. This inspection will be repeated after two and three years of service following the completion of the coating work. Any defects identified during these inspections will be repaired by the Contractor in accordance with the performance guarantee at no additional cost to HRSD at HRSD's convenience.
- H. Normal work hours are (Insert days and time). Any work scheduled outside this time frame must be approved by HRSD.
- I. The Contractor will obtain, at their own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".
- J. Unusual Conditions: (List Unusual Conditions).
- K. Boundaries of Work Area or Access to Facilities: Contractor shall not block access for plant deliveries or access for operation and maintenance of plant facilities. (List any additional requirements).
- L. Storage Areas: (Designate Contractor Storage Area).
- M. Bathrooms: (Designate Contractor Bathroom Facilities).
- N. Confined Space: (Designate if Work Area is Covered by Confined Space Law).
- O. Inspection Hold Points Checklist: HRSD will conduct hold point inspections during the coating work. The Contractor is required to coordinate such hold points in the coating work with HRSD or its agent such that inspections can be performed on a scheduled basis. HRSD representatives must be given a minimum of two (2) hours of notice by the Contractor for conducting Hold Point Inspections. The Hold Point Inspection Checklist was distributed to all bidders during the prebid meeting. The Hold Points will be as follows:
 - 1. Environment and Site Conditions – Have the weather or environmental conditions within the structure been checked for compliance with the coating work? This involves ambient air and humidity checks as well as checks on site conditions such as proper protective measures for surfaces not to be coated and safety requirements for personnel.

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2. Pre-Surface Preparation – Checking of pre-surface preparation conditions. Can the proposed surface preparation method remove existing coatings and/or contaminants? Check to see if substrate repairs will be necessary to move forward. Is the substrate contaminated with oil or grease or soluble salts, etc.?
3. Monitoring of Surface Preparation – Spot checking of degree of cleanliness, surface profile, and surface pH testing, where applicable. Also, the cleanliness of compressed air should be checked for lack of oil and moisture.
4. Post Surface Preparation – Measure and inspect for proper degree of cleanliness and surface profile as specified in Section 7 and the Coating System Guidelines for the project.
5. Monitoring of Coatings Application – This is mainly checks on wet film thickness and general film quality (visual inspection) for lack of runs, sags, pinholes, holidays, etc. as the application work proceeds.
6. Post Application Inspection – Identify any defects in application work including pinholes, holidays, excessive runs or sags, and any other problems such as inadequate or excessive film thickness areas.
7. Post Cure Evaluation – This includes an overall Dry Film Thickness Survey, and adhesion testing, Holiday Detection, or cure testing as required based on the type of project and the specific requirements in the specifications in Section 7 or in the Coating System Guideline.
8. Follow-up to Corrective Actions and Final Inspection. This involves reinspection of all corrective coating work performed by the Contractor to repair defects identified at prior Hold Points F or G. This activity also combines with it the final careful visual inspection along with any follow-up tests like holiday detection, DFT surveys, etc.

1.04 DEFINITIONS

Specific coating terminology used in this section is in accordance with definitions contained in ASTM D16, ASTM D3960, and the following definitions:

- A. Wet Film Thickness: The primer or coating film's thickness immediately following application. Wet film thickness is measured in mils or thousandths of an inch (.001”) and is abbreviated WFT.

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- B. **Dry Film Thickness:** The primer or coating film's thickness following curing and drying. Dry film thickness is measured in mils or thousandths of an inch (.001”) and is abbreviated DFT.
- C. **Field Coat:** The application or the completion of application of the coating system after installation of the surface at the site of the work.
- D. **Tie Coat:** An intermediate coat used to bond different types of coatings. Coatings used to improve the adhesion of a succeeding coat.
- E. **Volatile Organic Compound (VOC) Content:** The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per liter or pounds per gallon.
- F. **Touch-Up Coating:** The application of a coating on areas of coated surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.
- G. **Coating System Manufacturer:** Refers to the approved coating system manufacturers, abbreviated as the CSM.
- H. **Coating System Manufacturer’s Technical Representative(s):** Refers to the technical representative(s) of the approved Coating System Manufacturer and shall be abbreviated as CTR.

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1.05 REFERENCES

This section contains references to the documents listed below. They are a part of this section. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued shall apply. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D3359, (Methods A and B), Adhesion
 - 2. ASTM D2200 (SSPC-Vis1), Pictorial Surface Preparation Standards for Painting Steel Surfaces.
 - 3. ASTM E337, Standard Test Method for Measuring Humidity With a Psychrometer.
 - 4. ASTM D3960, Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 - 5. ASTM D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - 6. ASTM D4417, Field Measurement of Surface Profile of Blast Cleaned Steel.
 - 7. ASTM D4541, Standard Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - 8. ASTM F1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 9. ASTM D4414, Measuring Wet Film Thickness With A Notched Gage.
- B. Federal Test Methods
 - 1. Standard No. F 595B, Federal Standard Colors.
- C. ICRI Guidelines

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ICRI Guideline No. 03732, International Concrete Repair Institute – Guidelines for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

- D. The Society for Protective Coatings Standards
1. SSPC-SP1, Solvent Cleaning
 2. SSPC-SP2, Hand Tool Cleaning
 3. SSPC-SP3, Power Tool Cleaning
 4. SSPC-SP5, White Metal Blast Cleaning
 5. SSPC-SP6, Commercial Blast Cleaning
 6. SSPC-SP7, Brush-Off Blast Cleaning
 7. SSPC-SP10, Near-White Blast Cleaning
 8. SSPC-SP11, Power Tool Cleaning to Bare Metal
 9. SSPC-SP-12, Surface Preparation and Cleaning Steel and Other Hand Materials by High and Ultra High Pressure Water Jetting Prior to Recoating.
 10. SSPC-SP13, Surface Preparation of Concrete
 11. SSPC-PA-2, Dry Film Thickness Measurement with Magnetic Gages.
 12. SSPC-TR2/NACE 6G198, Wet Abrasive Blast Cleaning.
 13. SSPC-TU-3, Overcoating.
 14. SSPC-TU-4, Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.
 15. SSPC-Guide 11, Guide for Coating Concrete.
 16. SSPC Paint Application Specification No. 1.

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1.06 QUALITY ASSURANCE

- A. The Contractor is ultimately responsible for the quality performance of the applied materials and workmanship. Inspections or acceptance by HRSD or their representative do not limit the Contractor's responsibility.
- B. Do not use or retain contaminated, outdated, or diluted materials for coating. Do not use materials from previously opened containers.
- C. Use only products of the approved Coating System Manufacturer (CSM). Provide the same products for repairs as for original coating work.
- D. Make available all locations and phases of the work for access for inspection by HRSD or other personnel designated by HRSD. The Contractor shall provide ventilation, egress, safety tripods and harnesses, and whatever other means are required for HRSD designated personnel to access the work areas safely including topside support or tank watches, etc.
- E. Conduct work so that the coating system is installed as specified herein. The Contractor shall continually inspect the work to determine conformance with the contract documents. The Contractor shall inform HRSD of the progress and the quality of the work through daily reports as specified in paragraph 1.06 F. below. Any nonconforming coating system work shall be corrected to meet the requirements specified herein.
- F. Provide daily inspection reports including test data, work progress, areas covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system installation to HRSD.
- G. The methods of construction shall be in accordance with all requirements of this specification and the best trade practices. Any changes in the coating system installation requirements shall be allowed only with the written approval of HRSD before work commences.
- H. Mock-ups and Standard of Work for Project.

At the discretion of the HRSD representative for this project, a mock-up to be used as the established standard of work shall be provided by the Contractor. (Insert Mock-up Requirements).

- I. Resolution of Conflicts.

It shall be the responsibility of the Contractor to arrange a meeting prior to the start of coating work, between the Contractor, the CTR and HRSD. All aspects of surface preparation, application and coating systems as covered by this specification will be reviewed at this meeting. Clarification shall be requested

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promptly from HRSD when instructions are lacking, conflicts occur in the specification, or the procedure seems improper or inappropriate for any reason.

- J. Employ only personnel who have been trained by the CTR or approved by the CTR in writing as being qualified to perform the coating system work covered by this Contract. Such training shall be at no additional cost to HRSD.

1.07 SUBMITTALS

- A. Submit a list of coating materials giving the manufacturer's name, product name and product line number for each coating system covered by this Contract and as specified herein.
- B. Submit the following for review and approval prior to commencing with any phase of the work covered by this Section:
 - 1. Two copies of the manufacturer's current printed recommendations and product data sheets for all coating system products including performance criteria, surface preparation and application instructions volatile organic compound (V.O.C.) data, mixing, thinning, and curing information, storage requirements, and safety requirements.
 - 2. Material Safety Data Sheets (MSDS) for any materials brought on site including all coating system materials, solvents, and abrasive blast media.
 - 3. Letter from CTR with a list of the application personnel who have satisfactorily completed training or who are approved based on the CTR's experience on other similar projects to perform the work covered by this contract.
 - 4. List of cleaning and thinner solutions allowed by the CSM.
 - 5. Storage requirements including temperature, humidity, and ventilation for Coating System Materials as recommended by the CSM.
 - 6. The CSM's detail drawings and/or written instructions or procedures for termination of the coating systems used on concrete or masonry substrates at pipe penetrations, metal embedments, expansion joints, control or construction joints, cracks and other transitions or changes in substrates. Attach the detail drawings to these specifications.
- C. Submit daily reports as specified in Paragraph 1.06 E. and F. of this Section.
- D. Submit a letter from the CTR indicating that a representative portion of all major steps in the coating work were inspected by the CTR and that all that work was

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performed in accordance with the CSM's recommendations and instructions. See Paragraph 1.10 of this Section.

- E. Color Samples
 - 1. Two samples of each color specified for the project.
 - 2. Make color sample at least 5" x 7" in size for each coating system.
- F. Submit a minimum of five (5) project references including contact name, address, and telephone number where similar coating work has been performed by their company in the past five years.

1.08 DELIVERY, STORAGE, HANDLING, AND DISPOSAL

- A. Provide in accordance with all other requirements of the Contract Documents.
- B. Store all materials only in areas designated by HRSD solely for this purpose. Confine mixing, thinning, clean-up and associated operations, and storage of coating system materials, related debris before authorized disposal, to these areas. All materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the temperature is maintained between 50°F and 100°F.
- C. Mix all coating materials in a designated enclosed mixing area. This enclosed area must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all the ground and other surfaces and finishes from any spillage of material(s) within the mixing area.
- D. Do not use facility drains or drain piping for disposal of coating materials, spent blast abrasive, or solvents.
- E. The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with the coating system materials as described on the pertinent Material Safety Data Sheets or container labels.
- F. Deliver all materials to the job site in new, unopened containers. Each container shall bear the CSM's name and label.
 - 1. Labels on all material containers must show the following information:
 - a. Name or title of product.
 - b. Manufacturer's batch number.
 - c. Manufacturer's name.
 - d. Generic type of material.

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- e. Application and mixing instructions.
 - f. Hazardous material identification label.
 - g. Shelf life expiration date.
2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.
 3. All materials shall be handled and stored to prevent damage or loss of label.
 4. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have exceeded their shelf life.
- G. Disposal: Contractor is responsible for hazardous waste storage and disposal according to Federal Register 40 CFR 262. This requirement specifically addresses waste solvents and coatings.

1.09 SAFETY

- A. The Contractor is required to attend an HRSD safety briefing prior to beginning of work.
- B. The Contractor shall make sure Contractor's employees are aware of any hazards peculiar to the jobsite, as well as location of contractor's first aid stations, emergency phone numbers and evacuation routes.
- C. Keep all work areas clean and safe.
- D. Obey all plant rules and regulations.
- E. The Contractor shall conduct all work covered by this section in accordance with all pertinent OSHA regulations.

1.10 REVIEW OF COATING SYSTEM WORK BY COATING TECHNICAL REPRESENTATIVE (CTR)

Obtain the services of the CTR to come to the job site early in the project to inspect and verify that each step of the coating work meets the CSM's recommendations. Include visual inspection of a representative portion of the project scope. Include review of completed surface preparation, application of each coat of the coating system (including filler/surfacers where applicable), proper application of coating, proper terminations at joints, embedments, etc. and proper cure of all coating system materials. The CTR will be required to submit a letter to the Contractor and to HRSD stating that the representative portions of the work inspected by the CTR were compliant with the CSM's recommendations and instructions.

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PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND COATING PRODUCTS

- A. The acceptable manufacturers and coating product designations for this project are:

(Insert Attachment 1 - Coating Systems from Section 5)

- B. Equivalent materials or other manufactures may be substituted only by approval by HRSD. Requests for substitution shall include manufacturer's literature for each product giving the name, generic type, descriptive information, solids by volume, recommended dry film thicknesses and a list of five projects where each product has been used and rendered satisfactory service under similar exposure conditions to the project covered by these specifications. No request for substitution shall be considered that would decrease film thickness or offer a change in the generic type of coating specified. Performance comparisons shall be made using ASTM and appropriate other standards. Manufacturer's certified test reports showing the substitute product(s) equal or exceed the performance of the specified products shall be submitted for each of the properties listed in the Comparative Spreadsheet for "Or Equal" Coating Product Submittals found in Subsection 4.3 of the HRSD Coatings Manual.
- C. The comparison of the properties for the submitted as "or equal" product to the Standard HRSD Coating Products shall be conducted in accordance with the procedure provided in the Coatings System Manual – Subsection 4.3.
- D. The cost of all testing and analyzing of the proposed substitute products that may be required for this comparison shall be paid by the Contractor or the coating supplier. If the proposed substitution requires changes in the contract work, the Contractor shall bear all such costs involved with the substitution.

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PART 3 – EXECUTION

3.01 GENERAL

- A. All surface preparation and coating application work shall follow the referenced standards and the requirements in the Coating System Guidelines in Paragraph 3.07 of this Section and the manufacturer's printed instructions. Material applied prior to approval of the surface by HRSD shall be removed and reapplied to the satisfaction of HRSD at no additional cost to HRSD.
- B. All work shall be performed by personnel qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of the Contractor's personnel shall be maintained and transfers of the Contractor's key personnel shall be coordinated with HRSD.

3.02 PRE-WORK INSPECTION

- A. The Contractor shall examine surfaces to be coated and report to HRSD any conditions that would adversely affect the appearance or performance of the coating systems and which cannot be put into an acceptable condition by the preparatory work specified herein.

3.03 WORK CONDITIONS

- A. Apply coatings only when the prevailing environmental conditions are in accordance with the manufacturers printed instructions.

3.04 SURFACE PREPARATION - Where applicable for the project substrate, the Contractor shall follow the requirements set forth below:

- A. GENERAL:
 - 1. Surfaces to be coated shall be clean and dry. Before applying coatings, oil, grease, dirt, rust, loose mill scale, old weathered coatings, and other foreign substances shall be removed except as specified otherwise in the Coating System Guideline. Oil and grease shall be removed before mechanical or abrasive blast cleaning is started. Where cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded and free of contaminants which might interfere with the adhesion of the coatings or cause soluble salt contamination of the substrate.
 - 2. Any solvent wash, solvent wipe, or cleaner used, including but not limited to those used for surface preparation in accordance with referenced Steel Structures Painting Council (SSPC) specifications, shall be of the emulsifying type which emits no more than 2.8 lb/gal (340 gms/l) VOCs, contains no phosphates, is biodegradable, removes no zinc, and is

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compatible with the specified primer. Clean cloths and clean fluids shall be used for solvent cleaning.

3. Cleaning shall be scheduled so that dust and spray from the cleaning process will not fall on wet, newly coated surfaces.
4. Hardware, hardware accessories, nameplates, data tags, machined surfaces, sprinkler heads, electrical fixtures, and similar uncoated items which are in contact with surfaces to be coated shall be removed and reinstalled or masked prior to surface preparation and coating operations. Following completion of coating, removed items shall be reinstalled.
5. Used or spent blast abrasive shall not be reused on this project.
6. The compressed air used for blast cleaning or blow down cleaning shall be filtered and shall contain no condensed water and no oil. Moisture traps shall be cleaned at least once every four hours or more frequently as required to prevent moisture from entering the supply air to the abrasive blasting equipment.
7. Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. These shall be checked on the same frequency as the moisture traps as defined in item 6 above.
8. Regulators, gauges, filters, and separators in good working order shall be in use on all of the compressor air lines to blasting nozzles at all times during this work.
9. An air dryer or desiccant filter drying unit shall be installed which dries the compressed air prior to blast pot connections. This dryer shall be used and maintained for the duration of all surface preparation work.
10. The abrasive blast nozzles used shall be of the venturi or other high velocity type supplied with a minimum of 100 psig air pressure and sufficient volume to obtain the blast cleaning production rates and cleanliness/specified herein.
11. The Contractor shall provide ventilation for airborne particulate evacuation (meeting all pertinent safety standards) to optimize visibility for both blast cleaning and inspection for the substrate during surface preparation work.
12. The Contractor is responsible for dust control and for protection of mechanical, electrical, and all other equipment adjacent to and surrounding the work area.

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13. Cleaning, Substrate Decontamination, and Degreasing of substrates to be coated previously exposed to wastewater splash, spillage, or immersion.
 - a. Degrease the surfaces prior to blast cleaning. Use alkaline cleaning solutions, steam cleaning, or hot water with detergents, followed by rinsing with clean, potable water, and until all traces of degreasing/cleaning solutions have been removed. Thoroughly rinse surfaces degreased with ample clean potable water.
 - b. The Contractor shall be responsible for cleaning of only those concrete and metal substrates to be coated and not any adjacent surfaces.
 - c. This decontamination shall consist of high pressure water cleaning using a minimum cleaning pressure of 1500 psi and a minimum cleaning volume of 3 gallons per minute.
 - d. This decontamination must remove all wastewater solids/residues, scum, all debris such as embedded dirt, and all other substances from the concrete and metal surfaces of the structures to be coated.
 - e. Remove all debris, wastewater constituents, and spent cleaning water from the structures to be coated by pumping and/or by vacuum cleaning. The waste and spent water used for this initial cleaning shall be handled and disposed of by the Contractor as directed by HRSD.

14. When performing touch-up coating work related surface preparation, remove loose, cracked, and poorly adhered coatings. Roughen or abrade all intact well-adhered coatings. Feather all exposed edges of existing coatings at periphery of coating removal areas. Roughen or abrade more aggressively 2 inches beyond existing coating removal areas in all directions or until tightly adhered coating is obtained or reached.

B. SPECIFIC COATING SYSTEM REQUIREMENTS:

In addition to the applicable general surface preparation requirements found herein, the Contractor shall follow the specific requirements found in the Coating System Guidelines attached hereto.

C. METALLIC SURFACES:

1. Metallic surfaces shall be prepared in accordance with applicable portions of surface preparation specifications of the Society for Protective Coatings specified in each coating system guidelines included in Part 3.07 of this Section. The profile depth of the surface to be coated shall generally be 20 to 25 percent of the coating dry film thickness as measured by Method C of

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ASTM D4417. Blast particle size shall be selected by the contractor to produce the specified surface profile in the Coating System Guidelines.

2. Preparation of carbon steel surfaces shall be based upon comparison with SSPC-VIS1-89 (ASTM D2200), and as described herein in the Coating System Guidelines.
3. Blast cleaning requirements for ductile iron or cast iron substrates and non-ferrous substrates are as follows:
 - a. All ductile or cast iron surfaces to be coated shall be abrasive blast cleaned to a clean, gray uniform metal appearance free of variations in color and loose materials.
 - b. Non-ferrous metals like aluminum shall be cleaned to produce a clean surface with complete removal of all corrosion products and contaminants.
4. Cleaning for Decontamination of Soluble Salts if required.

(Import language if needed from Item 15, Section 3.0 of this Manual)
5. If, between final surface preparation work and coating system application, contamination of the prepared and cleaned metallic substrates occurs, or if the prepared substrates' appearance darkens or changes color, recleaning by waterblasting or abrasive blast cleaning shall be required until the specified degree of cleanliness is reclaimed.
6. Acceptable surface preparation must produce a metal surface pH of 6.0 to 9.0 to be confirmed by surface pH testing as specified under Part 4.0 of this Section. If after surface preparation, the surface pH remains below 6.0, perform additional waterblasting or cleaning until additional pH testing indicates an acceptable pH level.

D. CONCRETE SURFACES

1. Surface preparation of concrete substrates can be accomplished using methods such as dry abrasive blast cleaning, high, or ultra high pressure water blast cleaning in accordance with SSPC-SP-13. The selected cleaning method must produce the requirements set forth below.
 - a. A clean substrate is achieved which is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Blast cleaning and any other means necessary shall be used to open up all air voids or “bugholes”

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to expose their complete perimeter. Leaving shelled over, hidden air voids beneath the exposed concrete surface will not be acceptable. Concrete substrate must be dry prior to the application of any filler/surfacer or coating system materials.

Acceptable surface preparation must produce a concrete surface pH of 8.0 to 11.0 to be confirmed by surface pH testing as specified under Part 4.0 of this Section. If after surface preparation, the surface pH remains below 8.0, perform additional waterblasting, cleaning, or abrasive blast cleaning until additional pH testing indicates an acceptable pH level.

- b. Following inspection of the concrete surface preparation by the Contractor and completion of inspection by HRSD or HRSD's agent, thoroughly vacuum clean all concrete surfaces to be coated to remove all loose dirt, and spent abrasive (if dry blast cleaning is used) leaving a dust free, sound concrete substrate. All debris produced by blast cleaning shall be removed from the structures to be coated and disposed of off site by the Contractor.
2. Should abrasive blast cleaning or high or ultrahigh pressure water blasting not remove degraded concrete, chipping or other abrading tools shall be used to remove the deteriorated concrete until a sound, clean substrate is achieved which is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Concrete substrates must be dry prior to the application of filler/surfacers or any coating system materials. Refer to Paragraph 4.01 A7 of this Section for moisture testing requirements.
3. Surface cleanliness of prepared concrete substrates shall be inspected after cleaning, preparation, and/or drying, but prior to application of any coating materials. If concrete surfaces are repaired, they shall be reinspected for surface cleanliness prior to application of the coating system.

E. MASONRY SURFACES

1. Prepare masonry surfaces such as Concrete Masonry Units (CMU) to remove chalk, all loose dirt, dried mortar splatter, dust, peeling or loose existing coatings, or otherwise deleterious substances to leave a clean, sound substrate.
2. Be certain masonry surfaces are dry prior to coating application. If pressure washing or low pressure water blast cleaning are used for preparation, allow the masonry to dry for at least 5 days under dry weather conditions or when the minimum ambient temperature is 70°F prior to coating application work.

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F. FIBERGLASS REINFORCED PLASTIC (FRP) SURFACES

Prepare FRP surfaces by sanding to establish uniform surface roughness and to remove any gloss from the resin in the FRP. Next, vacuum clean to remove all loose FRP dust, dirt, and other materials. Next, solvent clean using clean white rags and allow solvent to completely evaporate before application of any coating materials.

3.05 APPLICATION

A. WORKMANSHIP:

1. Coated surfaces shall be free from runs, drips, ridges, waves, laps, and brush marks. Coats shall be applied so as to produce an even film of uniform thickness completely coating corners and crevices. Coating work shall be done in accordance with the requirements of SSPC Paint Application Specification No. 1.
2. The Contractor's equipment shall be designed for application of the materials specified. Compressors shall have suitable traps and filters to remove water and oils from the air.
3. Each coat of a coating system shall be applied evenly and sharply cut to line. Care shall be exercised to avoid overspraying or splattering coatings on surfaces not to be coated. Glass, hardware, floors, roofs, and other adjacent areas and installations shall be protected by taping, drop cloths, masking tape or other suitable measures.
4. Application Method: Coating applications method can be conventional or airless spray, brush or roller, or trowel.
5. Allow each coat to cure or dry thoroughly, according to manufacturer's printed instructions, prior to recoating.
6. Vary color for each successive coat for all coating systems when possible.
7. Perform stripe painting on all edges, angles, weld seams, flanges, nuts, bolts, prior to application of the primer and other coats to ensure proper film build of the coating systems.
8. Cut in edges clean and sharp where work joins other materials or colors.
9. Make finish coat smooth, uniform in color, and free of brush marks, laps, runs, dry spray, over spray and skipped or missed areas.

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B. ATMOSPHERIC AND SUBSTRATE CONDITIONS:

1. Coatings shall be applied only on metal surfaces that are dry. Coatings shall not be applied over any substrates during rainy, misty weather, or on surfaces upon which there is frost or moisture condensation and when surface temperature is within 10° of dew point. During damp weather, when the temperature of the surface to be coated is within 10°F of the dew point, heating or forced dehumidification equipment may be used to maintain a minimum temperature of 40°F and 10°F above the dew point for the surfaces to be coated, the coated surface, and the atmosphere in contact with the surface. These conditions shall be maintained for a period of at least 8 hours or as recommended by the CSM for the specific coating products. Dehumidification equipment, fans, and/or heaters shall be used inside enclosed areas where conditions causing condensation are severe to maintain the required atmospheric and surface temperature requirements for proper coating application and cure.
2. When the surface temperatures of concrete substrates to be coated are rising or when these substrates are in direct sunlight, outgassing of air from the concrete will result in bubbling, pinhole formations, and/or blistering in the coating system. As such, the application of the coating system in such locations shall be postponed until the cooler evening hours or other measures shall be taken to prevent such rising substrate temperatures. Should bubbles, pinholes, or discontinuities form in the applied coating system material, they shall be repaired as recommended by the CSM at no additional cost to HRSD.
3. Do not apply coatings over metal surfaces when the metal substrate temperatures are higher than 90°F or below 40°F and when surface temperature is within 10° of dew point unless otherwise specified in the specific Coating System Guidelines.

C. FILM THICKNESS, CONTINUITY, AND FILM QUALITY

1. Coating system thickness is the total thickness of primer, intermediate, and finish coats. The mil thickness of the first coat of the coating system and all subsequent coats will be verified and documented by the Contractor, following application of each coat.
2. The surface area covered per gallon of coating for various types of surfaces shall not exceed those recommended by the manufacturer. The first coat, herein referred to as the prime coat, on metal surfaces refers to the first full coat and not to any solvent wash, grease emulsifiers or other pretreatment applications. Coatings shall be applied to the thickness specified in the coating system guideline.

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3. Note that the ability to obtain specified film thickness will generally be compromised when brush or roller application methods are used and, therefore, more coats will need to be applied to achieve the specified dry film thickness.

4. If after completion of surface preparation, the surface profile or roughness of concrete or masonry substrates cannot be hidden or covered by the coating system's film thickness and/or if there are frequent open air voids and "bugholes" in the concrete substrate that cannot be filled by the coating system, it will be necessary to apply a complete skim coat of an appropriate filler/surfacer material over the entire substrate prior to application of the coating system. When these conditions exist, consult with the CSM for the appropriate material and application recommendations to ensure compatibility with the coating system. Refer to 1.02 B., Scope of Work for this section where the requirements for complete substrate skim coating work with a filler/surfacer materials are to be described.

3.06 CLEANUP

Upon completion of coating work the Contractor shall remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray or other coating-related damage.

3.07 COATING SYSTEM GUIDELINES

The following Coating System Guidelines provide the specific requirements for each Standard Coating System to be used on this project:

(Insert the Coating System Guidelines from Section 8 here for each Standard Coating System to be used on this project)

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PART 4 - FIELD QUALITY CONTROL INSPECTION AND TESTING

4.01 GENERAL

- A. Inspection by HRSD or others designated by HRSD does not limit the Contractor's responsibilities for inspection, quality workmanship or quality control as specified herein or as required by the CSM's instructions. HRSD may perform or contract with a third party inspection agency to perform quality assurance inspection and testing of the coating work covered by this section.
- B. The Contractor shall:
1. Inspect all materials upon receipt to ensure that all are the specified or acceptable products as supplied by the CSM.
 2. Inspect to verify that specified storage conditions for the coating system materials, solvents and abrasives are provided.
 3. Inspect and record findings for the degree of cleanliness of substrates using SSPC-VIS-1 for carbon steel substrates and close visual inspection for ductile iron or cast steel.
 4. Test and record substrate pH. The pH of the concrete and metal substrates will be measured using pH indicating papers. pH testing is to be performed once every 100 square feet of metal surface area to be coated. Testing of pH shall be performed once every 100 square feet of concrete surface area to be coated.

Acceptable pH values for metal surfaces shall be between 6.0 and 9.0 and acceptable pH values for concrete surfaces shall be between 8.0 and 11.0 both as measured by a full-range (1-12) color indicating pH paper with readable color calibrations and a scale at whole numbers (minimum). Use Hydrion Insta-Chek Jumbo 0-13 or 1-12 or equal. The paper shall be touched to the surface once using moderate finger pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the one touch, lift the paper vertically to not "wipe" the surface. Compare the color indicated with the scale provided and record the pH.

For dry metal or concrete substrate spray the surface lightly with distilled, de-ionized water from a commercially available spray bottle that has been properly rinsed to preclude any dissolved solids. The spray shall just wet the surface to a "shiny" appearance and water shall not run down the wall. Wait 60 seconds to allow chemical equilibria to be established and then test the pH of the water on the surface and record the value.

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5. A paper blotter test shall be performed to determine if compressed air used for blast cleaning or other purposes on the project is free of moisture and oil. This should be performed two to three times per shift when coating work is underway.
6. Inspect and record substrate profile (anchor pattern) requirements using Testex Replica film for Metallic Substrates and visual inspection and comparison to ICRI 03732 concrete surface profile chips or replicas for concrete substrates. Perform metal substrate profile measurements in accordance with ASTM D4417, once for every 25 square feet of surface area to be coated. Perform profile comparison for concrete once every 50 square feet of area to be coated.
7. Test for excess moisture in concrete substrates using the Plastic Sheet Test in accordance with ASTM D4263. This simple go/no go test involves taping an 18 inch square clear sheet of plastic to a representative portion of the substrate. If following 16 hours, condensation appears on the underside of the plastic sheet or the concrete darkens, the substrate is too wet to coat. If this occurs, allow the substrate to dry longer until condensation or substrate darkening does not occur. This test should be performed once for every 500 SF of concrete to be coated.
8. Measure and record ambient air and substrate temperature at the beginning and end of each shift and once every two hours of each shift using a thermometer.
9. Measure and record relative humidity at the beginning and end of each shift and every two hours of each shift using a sling psychrometer in accordance with ASTM E337.
10. Inspect to verify that correct mixing of coating system materials is performed in accordance with CSM's instructions.
11. Inspect and record that the "pot life" of coating system materials is not exceeded during installation. Inspect to verify that recoat limitations for all coating materials are not exceeded.
12. Measure and record the thickness of each coat of the coating system using the following methods:
 - a. Use notched gauge in accordance with ASTM D4414 for Wet Film Thickness at least once every 50 square feet of coating system area for concrete and metallic substrates. Dry film thickness of coatings on concrete can be calculated from the wet film thickness by multiplying the wet film thickness by the percent solids of the material by the volume of the coating. Also, if the concrete

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substrate varies widely in roughness and WFT measurements are difficult, the dry film thickness can be calculated if the spreading rate and the percent solids by volume are known.

- b. Following cure, the coating systems over concrete surfaces shall be tested for dry film thickness (where required in the Coating System Guidelines) once for every 100 square feet of surface area using a Positector 100 DFT Gauge calibrated in accordance with the instrument manufacturer's instructions. Any areas found to be below the specified DFT above filled bug holes and above the peaks of the prepared substrate profile shall receive additional applications of the coating system or shall be removed/recoated as required to meet the total DFT requirements. Additional thickness may be problematic in areas where mechanical moving equipment tolerances are critical. At such locations, coating system removal and reapplication to the specified film thickness may be required.
 - c. Measure the dry film thickness of coatings applied over metallic surfaces using dry film thickness gages once for every 50 square feet of surface area coated. This should be performed in accordance with SSPC-PA-2 using magnetic gages for ferrous metal substrates and using electronic gages for non ferrous metal substrates. Measurements should be taken for each coat in the coating system, but not until at least 8 hours after application of the coating. If recoat times are shorter than 8 hours, rely on wet film thickness gage measurements for each coat. Any areas found to be below the specified DFT shall receive additional applications of the coating system or shall be removed and recoated if recoat times have been exceeded. Areas found to be over specified DFT must be evaluated. If thickness is 1 to 3 mils over specified DFT, no action shall be required provided runs and sags are not present. If film thickness is too excessive removal and recoating will be required by the contractor at no additional cost to HRSD.
13. Inspect to verify proper curing of the coating system in accordance with the CSM's instructions.
14. While scaffolding is still in place and upon completion of coating system installation for any given area, clean the coating surface and prepare to permit close visual inspection by HRSD or HRSD's agent.
- a. All coating surfaces shall be visually inspected for areas showing delamination, runs, sags, or any other defects in the coating system preventing proper protection of the surfaces to be protected. Any and all deficiencies or defective work will be marked by HRSD or

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its agent for repairs or removal/replacement by the Contractor at no additional cost to HRSD.

15. Perform discontinuity or holiday testing of coating systems over metallic substrates in accordance with ASTM D5162, Test Method B where required in the Coating System Guidelines.
16. Perform discontinuity or holiday testing of coating systems over concrete substrates in accordance with ASTM D4787 (low voltage, wet sponge Holiday Detector for coating systems with total DFT of 20 mils or less and higher voltage Holiday Detector for coating systems with total DFT greater than 20 mils) where required in Coating System Guidelines (see Section 8.0 of this Manual).

4.02 FINAL INSPECTION

- A. Perform a final inspection to determine whether coating system work meets the requirements of the specifications including the Coating System Guidelines. HRSD or HRSD's agent will subsequently conduct a final inspection with the Contractor for conformance to requirements of the contract documents.
- B. Any rework required shall be marked. Such areas shall be recleaned and repaired as specified herein or as recommended by the CSM at no additional cost to HRSD.

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ATTACHMENT 1

To

STANDARD COATINGS SPECIFICATIONS
(to be filled in electronically)

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND COATING PRODUCTS

- a. The acceptable manufacturers and coating product designations for this project are:

(Copy and paste Coating Systems from Section 5 here and delete these instructions)

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SECTION 7
STANDARD COATINGS SPECIFICATIONS

PART 1 - GENERAL

1.01 LOCATION AND CONTACTS

_____ Treatment Plant or Facility
_____ (Address)
_____ (City and State)
_____ (Phone and Fax)

PLANT MANAGER: _____

PLANT SUPERINTENDENT: _____

DATE: _____

1.02 SCOPE

A. This specification covers surface preparation, application, clean-up and performance guarantee of coating of all surfaces as required and specified herein.

B. The Contractor shall furnish all supervision, labor, tools, materials, equipment, scaffolding and/or other structure to complete the work. Actual scope of work is to _____

(list Scope of Work).

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1.03 SPECIFIC PROJECT REQUIREMENTS

- A. The work of this Contract is located at the _____ (Plant or Facility name) owned by the Hampton Roads Sanitation District (HRSD).
- B. All work shall be done in strict accordance with this specification and the approved manufacturer's instructions.
- C. The Contractor shall provide protection for all structures and equipment from damage due to any blasting, cleaning, spraying or coating operations. **Notify the HRSD Representative Prior to Start of Blasting or Spraying** so vehicles can be moved and other preparations made as required.
- D. The Contractor shall collect and remove all debris associated with the coating operation from the plant site.
- E. The Contractor shall coordinate all work through the HRSD representative.
- F. The Contractor is required to sign the three-year conditional Performance Guarantee on materials and workmanship attached to these specifications.
- G. An annual follow-up inspection shall be conducted following 12 months of service after acceptance of the coating work. A Contractor's representative and a representative of the coating system manufacturer (CSM) shall attend this follow-up inspection. This inspection will be repeated after two and three years of service following the completion of the coating work. Any defects identified during these inspections will be repaired by the Contractor in accordance with the performance guarantee at no additional cost to HRSD at HRSD's convenience.
- H. Normal work hours are _____ (insert days and time). Any work scheduled outside this time frame must be approved by HRSD.
- I. The Contractor will obtain, at their own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".
- J. Unusual Conditions: (List Unusual Conditions).
- K. Boundaries of Work Area or Access to Facilities: Contractor shall not block access for plant deliveries or access for operation and maintenance of plant facilities. (List any additional requirements.)
- L. Storage Areas: (Designate Contractor Storage Area.)

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- M. Bathrooms: (Designate Contractor Bathroom Facilities.)
- N. Confined Space: (Designate If Work Area is Covered by Confined Space Law.)
- O. Inspection Hold Points Checklist: HRSD will conduct hold point inspections during the coating work. The Contractor is required to coordinate such hold points in the coating work with HRSD or its agent such that inspections can be performed on a scheduled basis. HRSD representatives must be given a minimum of two (2) hours of notice by the Contractor for conducting Hold Point Inspections. The Hold Point Inspection Checklist was distributed to all bidders during the prebid meeting. The Hold Points will be as follows:
 - 1. Environment and Site Conditions – Have the weather or environmental conditions within the structure been checked for compliance with the coating work? This involves ambient air and humidity checks as well as checks on site conditions such as proper protective measures for surfaces not to be coated and safety requirements for personnel.
 - 2. Pre-Surface Preparation – Checking of pre-surface preparation conditions. Can the proposed surface preparation method remove existing coatings and/or contaminants? Check to see if substrate repairs will be necessary to move forward. Is the substrate contaminated with oil or grease or soluble salts, etc.?
 - 3. Monitoring of Surface Preparation – Spot checking of degree of cleanliness, surface profile, and surface pH testing, where applicable. Also, the cleanliness of compressed air should be checked for lack of oil and moisture.
 - 4. Post Surface Preparation – Measure and inspect for proper degree of cleanliness and surface profile as specified in Section 7 and the Coating System Guidelines for the project.
 - 5. Monitoring of Coatings Application – This is mainly checks on wet film thickness and general film quality (visual inspection) for lack of runs, sags, pinholes, holidays, etc. as the application work proceeds.
 - 6. Post Application Inspection – Identify any defects in application work including pinholes, holidays, excessive runs or sags, and any other problems such as inadequate or excessive film thickness areas.
 - 7. Post Cure Evaluation – This includes an overall Dry Film Thickness Survey, and adhesion testing, Holiday Detection, or cure testing as required based on the type of project and the specific requirements in the specifications in Section 7 or in the Coating System Guideline.

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8. Follow-up to Corrective Actions and Final Inspection. This involves reinspection of all corrective coating work performed by the Contractor to repair defects identified at prior Hold Points F or G. This activity also combines with it the final careful visual inspection along with any follow-up tests like holiday detection, DFT surveys, etc.

1.04 DEFINITIONS

Specific coating terminology used in this section is in accordance with definitions contained in ASTM D16, ASTM D3960, and the following definitions:

- A. Wet Film Thickness: The primer or coating film's thickness immediately following application. Wet film thickness is measured in mils or thousandths of an inch (.001") and is abbreviated WFT.
- B. Dry Film Thickness: The primer or coating film's thickness following curing and drying. Dry film thickness is measured in mils or thousandths of an inch (.001") and is abbreviated DFT.
- C. Field Coat: The application or the completion of application of the coating system after installation of the surface at the site of the work.
- D. Tie Coat: An intermediate coat used to bond different types of coatings. Coatings used to improve the adhesion of a succeeding coat.
- E. Volatile Organic Compound (VOC) Content: The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per liter or pounds per gallon.
- F. Touch-Up Coating: The application of a coating on areas of coated surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.
- G. Coating System Manufacturer: Refers to the approved coating system manufacturers, abbreviated as the CSM.
- H. Coating System Manufacturer's Technical Representative(s): Refers to the technical representative(s) of the approved Coating System Manufacturer and shall be abbreviated as CTR.

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1.05 REFERENCES

This section contains references to the documents listed below. They are a part of this section. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued shall apply. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D3359, (Methods A and B), Adhesion
 - 2. ASTM D2200 (SSPC-Vis1), Pictorial Surface Preparation Standards for Painting Steel Surfaces.
 - 3. ASTM E337, Standard Test Method for Measuring Humidity With a Psychrometer.
 - 4. ASTM D3960, Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 - 5. ASTM D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - 6. ASTM D4417, Field Measurement of Surface Profile of Blast Cleaned Steel.
 - 7. ASTM D4541, Standard Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - 8. ASTM F1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 9. ASTM D4414, Measuring Wet Film Thickness With A Notched Gage.
- B. Federal Test Methods
 - 1. Standard No. F 595B, Federal Standard Colors.
- C. ICRI Guidelines

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ICRI Guideline No. 03732, International Concrete Repair Institute – Guidelines for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

- D. The Society for Protective Coatings Standards
1. SSPC-SP1, Solvent Cleaning
 2. SSPC-SP2, Hand Tool Cleaning
 3. SSPC-SP3, Power Tool Cleaning
 4. SSPC-SP5, White Metal Blast Cleaning
 5. SSPC-SP6, Commercial Blast Cleaning
 6. SSPC-SP7, Brush-Off Blast Cleaning
 7. SSPC-SP10, Near-White Blast Cleaning
 8. SSPC-SP11, Power Tool Cleaning to Bare Metal
 9. SSPC-SP-12, Surface Preparation and Cleaning Steel and Other Hand Materials by High and Ultra High Pressure Water Jetting Prior to Recoating.
 10. SSPC-SP13, Surface Preparation of Concrete
 11. SSPC-PA-2, Dry Film Thickness Measurement with Magnetic Gages.
 12. SSPC-TR2/NACE 6G198, Wet Abrasive Blast Cleaning.
 13. SSPC-TU-3, Overcoating.
 14. SSPC-TU-4, Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.
 15. SSPC-Guide 11, Guide for Coating Concrete.
 16. SSPC Paint Application Specification No. 1.

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1.06 QUALITY ASSURANCE

- A. The Contractor is ultimately responsible for the quality performance of the applied materials and workmanship. Inspections or acceptance by HRSD or their representative do not limit the Contractor's responsibility.
- B. Do not use or retain contaminated, outdated, or diluted materials for coating. Do not use materials from previously opened containers.
- C. Use only products of the approved Coating System Manufacturer (CSM). Provide the same products for repairs as for original coating work.
- D. Make available all locations and phases of the work for access for inspection by HRSD or other personnel designated by HRSD. The Contractor shall provide ventilation, egress, safety tripods and harnesses, and whatever other means are required for HRSD designated personnel to access the work areas safely including topside support or tank watches, etc.
- E. Conduct work so that the coating system is installed as specified herein. The Contractor shall continually inspect the work to determine conformance with the contract documents. The Contractor shall inform HRSD of the progress and the quality of the work through daily reports as specified in paragraph 1.06 F. below. Any nonconforming coating system work shall be corrected to meet the requirements specified herein.
- F. Provide daily inspection reports including test data, work progress, areas covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system installation to HRSD.
- G. The methods of construction shall be in accordance with all requirements of this specification and the best trade practices. Any changes in the coating system installation requirements shall be allowed only with the written approval of HRSD before work commences.
- H. Mock-ups and Standard of Work for Project.

At the discretion of the HRSD representative for this project, a mock-up to be used as the established standard of work shall be provided by the Contractor.

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I. Resolution of Conflicts.

It shall be the responsibility of the Contractor to arrange a meeting prior to the start of coating work, between the Contractor, the CTR and HRSD. All aspects of surface preparation, application and coating systems as covered by this specification will be reviewed at this meeting. Clarification shall be requested promptly from HRSD when instructions are lacking, conflicts occur in the specification, or the procedure seems improper or inappropriate for any reason.

J. Employ only personnel who have been trained by the CTR or approved by the CTR in writing as being qualified to perform the coating system work covered by this Contract. Such training shall be at no additional cost to HRSD.

1.07 SUBMITTALS

A. Submit a list of coating materials giving the manufacturer's name, product name and product line number for each coating system covered by this Contract and as specified herein.

B. Submit the following for review and approval prior to commencing with any phase of the work covered by this Section:

1. Two copies of the manufacturer's current printed recommendations and product data sheets for all coating system products including performance criteria, surface preparation and application instructions volatile organic compound (V.O.C.) data, mixing, thinning, and curing information, storage requirements, and safety requirements.
2. Material Safety Data Sheets (MSDS) for any materials brought on site including all coating system materials, solvents, and abrasive blast media.
3. Letter from CTR with a list of the application personnel who have satisfactorily completed training or who are approved based on the CTR's experience on other similar projects to perform the work covered by this contract.
4. List of cleaning and thinner solutions allowed by the CSM.
5. Storage requirements including temperature, humidity, and ventilation for Coating System Materials as recommended by the CSM.
6. The CSM's detail drawings and/or written instructions or procedures for termination of the coating systems used on concrete or masonry substrates at pipe penetrations, metal embedments, expansion joints, control or construction joints, cracks and other transitions or changes in substrates. Attach the detail drawings to these specifications.

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- C. Submit daily reports as specified in Paragraph 1.06 E. and F. of this Section.
- D. Submit a letter from the CTR indicating that a representative portion of all major steps in the coating work were inspected by the CTR and that all that work was performed in accordance with the CSM's recommendations and instructions. See Paragraph 1.10 of this Section.
- E. Color Samples
 - 1. Two samples of each color specified for the project.
 - 2. Make color sample at least 5" x 7" in size for each coating system.
- F. Submit a minimum of five (5) project references including contact name, address, and telephone number where similar coating work has been performed by their company in the past five years.

1.08 DELIVERY, STORAGE, HANDLING, AND DISPOSAL

- A. Provide in accordance with all other requirements of the Contract Documents.
- B. Store all materials only in areas designated by HRSD solely for this purpose. Confine mixing, thinning, clean-up and associated operations, and storage of coating system materials, related debris before authorized disposal, to these areas. All materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the temperature is maintained between 50°F and 100°F.
- C. Mix all coating materials in a designated enclosed mixing area. This enclosed area must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all the ground and other surfaces and finishes from any spillage of material(s) within the mixing area.
- D. Do not use facility drains or drain piping for disposal of coating materials, spent blast abrasive, or solvents.
- E. The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with the coating system materials as described on the pertinent Material Safety Data Sheets or container labels.
- F. Deliver all materials to the job site in new, unopened containers. Each container shall bear the CSM's name and label.
 - 1. Labels on all material containers must show the following information:

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- a. Name or title of product.
 - b. Manufacturer's batch number.
 - c. Manufacturer's name.
 - d. Generic type of material.
 - e. Application and mixing instructions.
 - f. Hazardous material identification label.
 - g. Shelf life expiration date.
2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.
 3. All materials shall be handled and stored to prevent damage or loss of label.
 4. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have exceeded their shelf life.
- G. Disposal: Contractor is responsible for hazardous waste storage and disposal according to Federal Register 40 CFR 262. This requirement specifically addresses waste solvents and coatings.

1.09 SAFETY

- A. The Contractor is required to attend an HRSD safety briefing prior to beginning of work.
- B. The Contractor shall make sure Contractor's employees are aware of any hazards peculiar to the jobsite, as well as location of contractor's first aid stations, emergency phone numbers and evacuation routes.
- C. Keep all work areas clean and safe.
- D. Obey all plant rules and regulations.
- E. The Contractor shall conduct all work covered by this section in accordance with all pertinent OSHA regulations.

1.10 REVIEW OF COATING SYSTEM WORK BY COATING TECHNICAL REPRESENTATIVE (CTR)

Obtain the services of the CTR to come to the job site early in the project to inspect and verify that each step of the coating work meets the CSM's recommendations. Include visual inspection of a representative portion of the project scope. Include review of completed surface preparation, application of each coat of the coating system (including filler/surfacers where applicable), proper application of coating, proper terminations at joints, embedments, etc. and proper cure of all coating system materials. The CTR will

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PART 3 – EXECUTION

3.01 GENERAL

- A. All surface preparation and coating application work shall follow the referenced standards and the requirements in the Coating System Guidelines in Paragraph 3.07 of this Section and the manufacturer's printed instructions. Material applied prior to approval of the surface by HRSD shall be removed and reapplied to the satisfaction of HRSD at no additional cost to HRSD.
- B. All work shall be performed by personnel qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of the Contractor's personnel shall be maintained and transfers of the Contractor's key personnel shall be coordinated with HRSD.

3.02 PRE-WORK INSPECTION

- A. The Contractor shall examine surfaces to be coated and report to HRSD any conditions that would adversely affect the appearance or performance of the coating systems and which cannot be put into an acceptable condition by the preparatory work specified herein.

3.03 WORK CONDITIONS

- A. Apply coatings only when the prevailing environmental conditions are in accordance with the manufacturers printed instructions.

3.04 SURFACE PREPARATION - Where applicable for the project substrate, the Contractor shall follow the requirements set forth below:

- A. GENERAL:
 - 1. Surfaces to be coated shall be clean and dry. Before applying coatings, oil, grease, dirt, rust, loose mill scale, old weathered coatings, and other foreign substances shall be removed except as specified otherwise in the Coating System Guideline. Oil and grease shall be removed before mechanical or abrasive blast cleaning is started. Where cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded and free of contaminants which might interfere with the adhesion of the coatings or cause soluble salt contamination of the substrate.
 - 2. Any solvent wash, solvent wipe, or cleaner used, including but not limited to those used for surface preparation in accordance with referenced Steel Structures Painting Council (SSPC) specifications, shall be of the emulsifying type which emits no more than 2.8 lb/gal (340 gms/l) VOCs, contains no phosphates, is biodegradable, removes no zinc, and is

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compatible with the specified primer. Clean cloths and clean fluids shall be used for solvent cleaning.

3. Cleaning shall be scheduled so that dust and spray from the cleaning process will not fall on wet, newly coated surfaces.
4. Hardware, hardware accessories, nameplates, data tags, machined surfaces, sprinkler heads, electrical fixtures, and similar uncoated items which are in contact with surfaces to be coated shall be removed and reinstalled or masked prior to surface preparation and coating operations. Following completion of coating, removed items shall be reinstalled.
5. Used or spent blast abrasive shall not be reused on this project.
6. The compressed air used for blast cleaning or blow down cleaning shall be filtered and shall contain no condensed water and no oil. Moisture traps shall be cleaned at least once every four hours or more frequently as required to prevent moisture from entering the supply air to the abrasive blasting equipment.
7. Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. These shall be checked on the same frequency as the moisture traps as defined in item 6 above.
8. Regulators, gauges, filters, and separators in good working order shall be in use on all of the compressor air lines to blasting nozzles at all times during this work.
9. An air dryer or desiccant filter drying unit shall be installed which dries the compressed air prior to blast pot connections. This dryer shall be used and maintained for the duration of all surface preparation work.
10. The abrasive blast nozzles used shall be of the venturi or other high velocity type supplied with a minimum of 100 psig air pressure and sufficient volume to obtain the blast cleaning production rates and cleanliness/specified herein.
11. The Contractor shall provide ventilation for airborne particulate evacuation (meeting all pertinent safety standards) to optimize visibility for both blast cleaning and inspection for the substrate during surface preparation work.
12. The Contractor is responsible for dust control and for protection of mechanical, electrical, and all other equipment adjacent to and surrounding the work area.

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13. Cleaning, Substrate Decontamination, and Degreasing of substrates to be coated previously exposed to wastewater splash, spillage, or immersion.
 - a. Degrease the surfaces prior to blast cleaning. Use alkaline cleaning solutions, steam cleaning, or hot water with detergents, followed by rinsing with clean, potable water, and until all traces of degreasing/cleaning solutions have been removed. Thoroughly rinse surfaces degreased with ample clean potable water.
 - b. The Contractor shall be responsible for cleaning of only those concrete and metal substrates to be coated and not any adjacent surfaces.
 - c. This decontamination shall consist of high pressure water cleaning using a minimum cleaning pressure of 1500 psi and a minimum cleaning volume of 3 gallons per minute.
 - d. This decontamination must remove all wastewater solids/residues, scum, all debris such as embedded dirt, and all other substances from the concrete and metal surfaces of the structures to be coated.
 - e. Remove all debris, wastewater constituents, and spent cleaning water from the structures to be coated by pumping and/or by vacuum cleaning. The waste and spent water used for this initial cleaning shall be handled and disposed of by the Contractor as directed by HRSD.

14. When performing touch-up coating work related surface preparation, remove loose, cracked, and poorly adhered coatings. Roughen or abrade all intact well-adhered coatings. Feather all exposed edges of existing coatings at periphery of coating removal areas. Roughen or abrade more aggressively 2 inches beyond existing coating removal areas in all directions or until tightly adhered coating is obtained or reached.

B. SPECIFIC COATING SYSTEM REQUIREMENTS:

In addition to the applicable general surface preparation requirements found herein, the Contractor shall follow the specific requirements found in the Coating System Guidelines attached hereto.

C. METALLIC SURFACES:

1. Metallic surfaces shall be prepared in accordance with applicable portions of surface preparation specifications of the Society for Protective Coatings specified in each coating system guidelines included in Part 3.07 of this Section. The profile depth of the surface to be coated shall generally be 20 to 25 percent of the coating dry film thickness as measured by Method C of

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ASTM D4417. Blast particle size shall be selected by the contractor to produce the specified surface profile in the Coating System Guidelines.

2. Preparation of carbon steel surfaces shall be based upon comparison with SSPC-VIS1-89 (ASTM D2200), and as described herein in the Coating System Guidelines.
3. Blast cleaning requirements for ductile iron or cast iron substrates and non-ferrous substrates are as follows:
 - a. All ductile or cast iron surfaces to be coated shall be abrasive blast cleaned to a clean, gray uniform metal appearance free of variations in color and loose materials.
 - b. Non-ferrous metals like aluminum shall be cleaned to produce a clean surface with complete removal of all corrosion products and contaminants.
4. Cleaning for Decontamination of Soluble Salts if required.

(Import language if needed from item 15, Section 3.0 of this Manual.)
5. If, between final surface preparation work and coating system application, contamination of the prepared and cleaned metallic substrates occurs, or if the prepared substrates' appearance darkens or changes color, recleaning by waterblasting or abrasive blast cleaning shall be required until the specified degree of cleanliness is reclaimed.
6. Acceptable surface preparation must produce a metal surface pH of 6.0 to 9.0 to be confirmed by surface pH testing as specified under Part 4.0 of this Section. If after surface preparation, the surface pH remains below 6.0, perform additional waterblasting or cleaning until additional pH testing indicates an acceptable pH level.

D. CONCRETE SURFACES

1. Surface preparation of concrete substrates can be accomplished using methods such as dry abrasive blast cleaning, high, or ultra high pressure water blast cleaning in accordance with SSPC-SP-13. The selected cleaning method must produce the requirements set forth below.
 - a. A clean substrate is achieved which is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Blast cleaning and any other means necessary shall be used to open up all air voids or “bugholes”

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to expose their complete perimeter. Leaving shelled over, hidden air voids beneath the exposed concrete surface will not be acceptable. Concrete substrate must be dry prior to the application of any filler/surfacer or coating system materials.

Acceptable surface preparation must produce a concrete surface pH of 8.0 to 11.0 to be confirmed by surface pH testing as specified under Part 4.0 of this Section. If after surface preparation, the surface pH remains below 8.0, perform additional waterblasting, cleaning, or abrasive blast cleaning until additional pH testing indicates an acceptable pH level.

- b. Following inspection of the concrete surface preparation by the Contractor and completion of inspection by HRSD or HRSD's agent, thoroughly vacuum clean all concrete surfaces to be coated to remove all loose dirt, and spent abrasive (if dry blast cleaning is used) leaving a dust free, sound concrete substrate. All debris produced by blast cleaning shall be removed from the structures to be coated and disposed of off site by the Contractor.
2. Should abrasive blast cleaning or high or ultrahigh pressure water blasting not remove degraded concrete, chipping or other abrading tools shall be used to remove the deteriorated concrete until a sound, clean substrate is achieved which is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Concrete substrates must be dry prior to the application of filler/surfacers or any coating system materials. Refer to Paragraph 4.01 A7 of this Section for moisture testing requirements.
3. Surface cleanliness of prepared concrete substrates shall be inspected after cleaning, preparation, and/or drying, but prior to application of any coating materials. If concrete surfaces are repaired, they shall be reinspected for surface cleanliness prior to application of the coating system.

E. MASONRY SURFACES

1. Prepare masonry surfaces such as Concrete Masonry Units (CMU) to remove chalk, all loose dirt, dried mortar splatter, dust, peeling or loose existing coatings, or otherwise deleterious substances to leave a clean, sound substrate.
2. Be certain masonry surfaces are dry prior to coating application. If pressure washing or low pressure water blast cleaning are used for preparation, allow the masonry to dry for at least 5 days under dry weather conditions or when the minimum ambient temperature is 70°F prior to coating application work.

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F. FIBERGLASS REINFORCED PLASTIC (FRP) SURFACES

Prepare FRP surfaces by sanding to establish uniform surface roughness and to remove any gloss from the resin in the FRP. Next, vacuum clean to remove all loose FRP dust, dirt, and other materials. Next, solvent clean using clean white rags and allow solvent to completely evaporate before application of any coating materials.

3.05 APPLICATION

A. WORKMANSHIP:

1. Coated surfaces shall be free from runs, drips, ridges, waves, laps, and brush marks. Coats shall be applied so as to produce an even film of uniform thickness completely coating corners and crevices. Coating work shall be done in accordance with the requirements of SSPC Paint Application Specification No. 1.
2. The Contractor's equipment shall be designed for application of the materials specified. Compressors shall have suitable traps and filters to remove water and oils from the air.
3. Each coat of a coating system shall be applied evenly and sharply cut to line. Care shall be exercised to avoid overspraying or splattering coatings on surfaces not to be coated. Glass, hardware, floors, roofs, and other adjacent areas and installations shall be protected by taping, drop cloths, masking tape or other suitable measures.
4. Application Method: Coating applications method can be conventional or airless spray, brush or roller, or trowel.
5. Allow each coat to cure or dry thoroughly, according to manufacturer's printed instructions, prior to recoating.
6. Vary color for each successive coat for all coating systems when possible.

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7. Perform stripe painting on all edges, angles, weld seams, flanges, nuts, bolts, prior to application of the primer and other coats to ensure proper film build of the coating systems.
8. Cut in edges clean and sharp where work joins other materials or colors.
9. Make finish coat smooth, uniform in color, and free of brush marks, laps, runs, dry spray, over spray and skipped or missed areas.

B. ATMOSPHERIC AND SUBSTRATE CONDITIONS:

1. Coatings shall be applied only on metal surfaces that are dry. Coatings shall not be applied over any substrates during rainy, misty weather, or on surfaces upon which there is frost or moisture condensation and when surface temperature is within 10° of dew point. During damp weather, when the temperature of the surface to be coated is within 10°F of the dew point, heating or forced dehumidification equipment may be used to maintain a minimum temperature of 40°F and 10°F above the dew point for the surfaces to be coated, the coated surface, and the atmosphere in contact with the surface. These conditions shall be maintained for a period of at least 8 hours or as recommended by the CSM for the specific coating products. Dehumidification equipment, fans, and/or heaters shall be used inside enclosed areas where conditions causing condensation are severe to maintain the required atmospheric and surface temperature requirements for proper coating application and cure.
2. When the surface temperatures of concrete substrates to be coated are rising or when these substrates are in direct sunlight, outgassing of air from the concrete will result in bubbling, pinhole formations, and/or blistering in the coating system. As such, the application of the coating system in such locations shall be postponed until the cooler evening hours or other measures shall be taken to prevent such rising substrate temperatures. Should bubbles, pinholes, or discontinuities form in the applied coating system material, they shall be repaired as recommended by the CSM at no additional cost to HRSD.
3. Do not apply coatings over metal surfaces when the metal substrate temperatures are higher than 90°F or below 40°F and when surface temperature is within 10° of dew point unless otherwise specified in the specific Coating System Guidelines.

C. FILM THICKNESS, CONTINUITY, AND FILM QUALITY

1. Coating system thickness is the total thickness of primer, intermediate, and finish coats. The mil thickness of the first coat of the coating system and all

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subsequent coats will be verified and documented by the Contractor, following application of each coat.

2. The surface area covered per gallon of coating for various types of surfaces shall not exceed those recommended by the manufacturer. The first coat, herein referred to as the prime coat, on metal surfaces refers to the first full coat and not to any solvent wash, grease emulsifiers or other pretreatment applications. Coatings shall be applied to the thickness specified in the coating system guideline.
3. Note that the ability to obtain specified film thickness will generally be compromised when brush or roller application methods are used and, therefore, more coats will need to be applied to achieve the specified dry film thickness.
4. If after completion of surface preparation, the surface profile or roughness of concrete or masonry substrates cannot be hidden or covered by the coating system's film thickness and/or if there are frequent open air voids and "bugholes" in the concrete substrate that cannot be filled by the coating system, it will be necessary to apply a complete skim coat of an appropriate filler/surfacer material over the entire substrate prior to application of the coating system. When these conditions exist, consult with the CSM for the appropriate material and application recommendations to ensure compatibility with the coating system. Refer to 1.02 B., Scope of Work for this section where the requirements for complete substrate skim coating work with a filler/surfacer materials are to be described.

3.06 CLEANUP

Upon completion of coating work the Contractor shall remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray or other coating-related damage.

3.07 COATING SYSTEM GUIDELINES

The following Coating System Guidelines provide the specific requirements for each Standard Coating System to be used on this project:

(Insert the Coating System Guidelines from Section 8.0 here for each Standard Coating System to be used on this project.)

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PART 4 - FIELD QUALITY CONTROL INSPECTION AND TESTING

4.01 GENERAL

- A. Inspection by HRSD or others designated by HRSD does not limit the Contractor's responsibilities for inspection, quality workmanship or quality control as specified herein or as required by the CSM's instructions. HRSD may perform or contract with a third party inspection agency to perform quality assurance inspection and testing of the coating work covered by this section.
- B. The Contractor shall:
1. Inspect all materials upon receipt to ensure that all are the specified or acceptable products as supplied by the CSM.
 2. Inspect to verify that specified storage conditions for the coating system materials, solvents and abrasives are provided.
 3. Inspect and record findings for the degree of cleanliness of substrates using SSPC-VIS-1 for carbon steel substrates and close visual inspection for ductile iron or cast steel.
 4. Test and record substrate pH. The pH of the concrete and metal substrates will be measured using pH indicating papers. pH testing is to be performed once every 100 square feet of metal surface area to be coated. Testing of pH shall be performed once every 100 square feet of concrete surface area to be coated.

Acceptable pH values for metal surfaces shall be between 6.0 and 9.0 and acceptable pH values for concrete surfaces shall be between 8.0 and 11.0 both as measured by a full-range (1-12) color indicating pH paper with readable color calibrations and a scale at whole numbers (minimum). Use Hydrion Insta-Chek Jumbo 0-13 or 1-12 or equal. The paper shall be touched to the surface once using moderate finger pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the one touch, lift the paper vertically to not "wipe" the surface. Compare the color indicated with the scale provided and record the pH.

For dry metal or concrete substrate spray the surface lightly with distilled, de-ionized water from a commercially available spray bottle that has been properly rinsed to preclude any dissolved solids. The spray shall just wet the surface to a "shiny" appearance and water shall not run down the wall. Wait 60 seconds to allow chemical equilibria to be established and then test the pH of the water on the surface and record the value.

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5. A paper blotter test shall be performed to determine if compressed air used for blast cleaning or other purposes on the project is free of moisture and oil. This should be performed two to three times per shift when coating work is underway.
6. Inspect and record substrate profile (anchor pattern) requirements using Testex Replica film for Metallic Substrates and visual inspection and comparison to ICRI 03732 concrete surface profile chips or replicas for concrete substrates. Perform metal substrate profile measurements in accordance with ASTM D4417, once for every 25 square feet of surface area to be coated. Perform profile comparison for concrete once every 50 square feet of area to be coated.
7. Test for excess moisture in concrete substrates using the Plastic Sheet Test in accordance with ASTM D4263. This simple go/no go test involves taping an 18 inch square clear sheet of plastic to a representative portion of the substrate. If following 16 hours, condensation appears on the underside of the plastic sheet or the concrete darkens, the substrate is too wet to coat. If this occurs, allow the substrate to dry longer until condensation or substrate darkening does not occur. This test should be performed once for every 500 SF of concrete to be coated.
8. Measure and record ambient air and substrate temperature at the beginning and end of each shift and once every two hours of each shift using a thermometer.
9. Measure and record relative humidity at the beginning and end of each shift and every two hours of each shift using a sling psychrometer in accordance with ASTM E337.
10. Inspect to verify that correct mixing of coating system materials is performed in accordance with CSM's instructions.
11. Inspect and record that the "pot life" of coating system materials is not exceeded during installation. Inspect to verify that recoat limitations for all coating materials are not exceeded.
12. Measure and record the thickness of each coat of the coating system using the following methods:
 - a. Use notched gauge in accordance with ASTM D4414 for Wet Film Thickness at least once every 50 square feet of coating system area for concrete and metallic substrates. Dry film thickness of coatings on concrete can be calculated from the wet film thickness by multiplying the wet film thickness by the percent solids of the material by the volume of the coating.

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Also, if the concrete substrate varies widely in roughness and WFT measurements are difficult, the dry film thickness can be calculated if the spreading rate and the percent solids by volume are known.

- b. Following cure, the coating systems over concrete surfaces shall be tested for dry film thickness (where required in the Coating System Guidelines) once for every 100 square feet of surface area using a Positector 100 DFT Gauge calibrated in accordance with the instrument manufacturer's instructions. Any areas found to be below the specified DFT above filled bug holes and above the peaks of the prepared substrate profile shall receive additional applications of the coating system or shall be removed/recoated as required to meet the total DFT requirements. Additional thickness may be problematic in areas where mechanical moving equipment tolerances are critical. At such locations, coating system removal and reapplication to the specified film thickness may be required.
 - c. Measure the dry film thickness of coatings applied over metallic surfaces using dry film thickness gages once for every 50 square feet of surface area coated. This should be performed in accordance with SSPC-PA-2 using magnetic gages for ferrous metal substrates and using electronic gages for non ferrous metal substrates. Measurements should be taken for each coat in the coating system, but not until at least 8 hours after application of the coating. If recoat times are shorter than 8 hours, rely on wet film thickness gage measurements for each coat. Any areas found to be below the specified DFT shall receive additional applications of the coating system or shall be removed and recoated if recoat times have been exceeded. Areas found to be over specified DFT must be evaluated. If thickness is 1 to 3 mils over specified DFT, no action shall be required provided runs and sags are not present. If film thickness is too excessive removal and recoating will be required by the contractor at no additional cost to HRSD.
13. Inspect to verify proper curing of the coating system in accordance with the CSM's instructions.
14. While scaffolding is still in place and upon completion of coating system installation for any given area, clean the coating surface and prepare to permit close visual inspection by HRSD or HRSD's agent.
- a. All coating surfaces shall be visually inspected for areas showing delamination, runs, sags, or any other defects in the coating system preventing proper protection of the surfaces to be protected. Any and all deficiencies or defective work will be marked by HRSD or

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its agent for repairs or removal/replacement by the Contractor at no additional cost to HRSD.

15. Perform discontinuity or holiday testing of coating systems over metallic substrates in accordance with ASTM D5162, Test Method B where required in the Coating System Guidelines.
16. Perform discontinuity or holiday testing of coating systems over concrete substrates in accordance with ASTM D4787 (low voltage, wet sponge Holiday Detector for coating systems with total DFT of 20 mils or less and higher voltage Holiday Detector for coating systems with total DFT greater than 20 mils) where required in Coating System Guidelines (see Section 8.0 of this Manual).

4.02 FINAL INSPECTION

- A. Perform a final inspection to determine whether coating system work meets the requirements of the specifications including the Coating System Guidelines. HRSD or HRSD's agent will subsequently conduct a final inspection with the Contractor for conformance to requirements of the contract documents.
- B. Any rework required shall be marked. Such areas shall be recleaned and repaired as specified herein or as recommended by the CSM at no additional cost to HRSD.