

Preparing Activity: NAVFAC

Superseding
UFGS-09 97 13.15 (May 2024)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2026

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LOW VOC FLEXIBLE INTERIOR COATING OF STEEL FUEL TANKS
05/26

NOTE: This guide specification covers the requirements for a low VOC (50 grams/liter) (0.42 pounds/gallon), high adhesion, highly flexible epoxy coating system for interiors of steel or concrete (with sealer) bulk fuel storage tanks. For maintenance coating design, see notes herein. Conditions of severe corrosion and corrosion pitting are not addressed in this specification. This Section is ordinarily used with Section 33 56 21.17 SINGLE WALL ABOVEGROUND FIXED ROOF STEEL POL STORAGE TANK, or Section 33 01 50.75 REPAIR OF FIELD FABRICATED FUEL STORAGE TANKS.

Adhere to [UFC 1-300-02](#) Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a [Criteria Change Request \(CCR\)](#).

NOTE: A designer must not alter products or processes specified herein without thorough knowledge of the need for the change and the implications of changes. Use of alternate coating systems must be justified by evaluating lifecycle costs using 50 year life as a baseline.

NOTE: The metric standard for measuring coating thickness is microns (25.4 microns = 1 mil; use nominal 25 microns = 1 mil).

NOTE: This specification is for a field applied system. Applied coating system is compliant with EPA Volatile Organic Compounds (VOC) regulations.

Coating under this Section complies with 50 grams per liter (g/l) 0.42 pounds per gallon (lbs./gal.) maximum VOC.

The designer must review state and local regulations and determine whether the coating in this Section complies with restrictions on VOC and other chemical constituents.

NOTE: Edit the SURFACE PREPARATION paragraph and subparagraphs to the needs of cleaning that will be required in preparation for coating. Note that abrasive blasting for tank inspection (if performed) must not conflict with profile or roughness requirements in this Section. Do not create excessive profile that necessitates an increased thickness of the first coat. For repair projects, specify appropriate surfacing requirements (according to NACE SP0178) in Section 33 01 50.75 REPAIR OF FIELD FABRICATED FUEL STORAGE TANKS or Section 33 56 21.17 SINGLE WALL ABOVE GROUND FIXED ROOF STEEL POL STORAGE TANK.

NOTE: Base designs for repair of a coating system on recent inspection. Without competent inspection there is no reliable means to determine type, condition, or whether an existing system can be successfully overcoated. Spot coating on the bottom can be successful but often is not cost effective compared to replacing the entire bottom coating system. The bottom system must remain intact and flexible for the entire service interval which can be 20-years.

In general, do not overcoat a fuel tank interior unless recommended by a Protective Coatings Specialist (PCS) to increase corrosion protection. Provide complete removal and replacement or spot repairs to existing coating. Overcoating the interior of a tank is generally a liability unless extraordinary measures are taken to ensure adhesion

to the old coating, regardless of whether it is epoxy or urethane.

PART 1 GENERAL

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

- API Std 650 (2025) Welded Tanks for Oil Storage
- API Std 653 (2014; Addendum 1 2018; Errata 1 2010; Addendum 2 2020; Addendum 3 2023; Errata 2 2025; Addendum 4 2025) Tank Inspection, Repair, Alteration, and Reconstruction

ASTM INTERNATIONAL (ASTM)

- ASTM C920 (2018; R 2024) Standard Specification for Elastomeric Joint Sealants
- ASTM D3276 (2015; E 2016) Standard Guide for Painting Inspectors (Metal Substrates)
- ASTM D3335 (1985a; R 2020) Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
- ASTM D3718 (1985a; R 2015) Low Concentrations of Chromium in Paint by Atomic Absorption Spectroscopy
- ASTM D3925 (2002; R 2015) Sampling Liquid Paints and

Related Pigmented Coatings

- ASTM D4285 (1983; R 2018) Indicating Oil or Water in Compressed Air
- ASTM D4417 (2021) Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
- ASTM D4940 (2015) Standard Test Method for Conductometric Analysis of Water Soluble Ionic Contamination of Blast Cleaning Abrasives

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 8502-3 (2017) Preparation of Steel Substrates Before Application of Paints and Related Products - Tests for the Assessment of Surface Cleanliness - Part 3: Assessment of Dust on Steel Surfaces Prepared for Painting (Pressure-Sensitive Tape Method)
- ISO 9001 (2015) Quality Management Systems- Requirements
- ISO/IEC 17025 (2017) General Requirements for the Competence of Testing and Calibration Laboratories

MASTER PAINTERS INSTITUTE (MPI)

- MPI 505 (2020) Low VOC, Polysulfide, Modified Epoxy Novolac Coating

NACE INTERNATIONAL (NACE)

- NACE SP0178 (2007) Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to be Lined for Immersion Service
- NACE SP0188 (2024) Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

- SSPC AB 1 (2015; E 2017) Mineral and Slag Abrasives
- SSPC AB 2 (2015; E 2016) Cleanliness of Recycled Ferrous Metallic Abrasive
- SSPC AB 3 (2023; R 2023) Ferrous Metallic Abrasive
- SSPC Guide 12 (2023) Guide for Illumination of Industrial Painting Projects
- SSPC PA 1 (2024) Shop, Field, and Maintenance Coating of Metals

SSPC PA 2	(2015; E 2018) Procedure for Determining Conformance to Dry Coating Thickness Requirements
SSPC QP 1	(2019) Standard Procedure for Evaluating the Qualifications of Industrial/Marine Painting Contractors (Field Application to Complex Industrial Steel Structures and Other Metal Components)
SSPC QP 2	(2019) Standard Procedure for Evaluating the Qualifications of Industrial/Marine Painting Contractors (Removal of Hazardous Coatings from Structures)
SSPC QP 5	(2022) Standard Procedure for Evaluating the Qualifications of Coating and Lining Inspection Companies
SSPC QS 1	(2015) Standard Procedure for Evaluating a Contractor's Advanced Quality Management System
SSPC SP 1	(2015) Solvent Cleaning
SSPC SP 10/NACE No. 2	(2015) Near-White Blast Cleaning
SSPC SP 11	(2020) Surface Preparation Standard No. 11 - Power Tool Cleaning to Bare Metal
SSPC SP COM	(2016; E 2017) Surface Preparation Commentary for Steel and Concrete Substrates
SSPC VIS 1	(2002; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910-SUBPART Z	Toxic and Hazardous Substances
29 CFR 1910.134	Respiratory Protection
29 CFR 1910.1000	Air Contaminants
29 CFR 1926.59	Hazard Communication

1.2 DEFINITIONS

- a. Bottom. Interior tank surfaces below the horizontal plane approximately 1 meter 40 inches above the shell-to-bottom joint, including columns, plates, piping, pipe supports, and other steel

components in this area.

- b. Independent. Impartial third-party not a part or affiliated with Contractor or subcontractor principal or subsidiary businesses, and not a materials supplier.
- c. Gloss Removal. Procedure that ensures adhesion of a second coat of paint by mechanically removing gloss and creating a surface profile.
- d. Quality Assurance Inspector (QAI). As used in this Section, third-party independent specialist with responsibility to inspect, test, and monitor quality of the applied coating system. Inspector(s) is a QC Specialist pursuant to Section 01 45 00 QUALITY CONTROL and is part of the contractor quality control organization. The QAI role is separate and distinct from the QCM and QCI roles.
- e. Quality Control Inspector (QCI). As used in this Section, personnel designated by the coating contractor pursuant to AMPP QS-1 as part of the coating contractor quality management system. The QCI role is separate and distinct from the QCM and QAI roles.
- f. Quality Control Manager (QCM). Individual designated by the prime contractor to be in responsible charge of the quality control program for the entire project pursuant to Section 01 45 00 QUALITY CONTROL. The QCM role is separate and distinct from the QAI and QCI roles.
- g. Roof. Interior tank surfaces that extend from the horizontal plane at the designated maximum fill height upward, including the upper portion of the tank shell, columns, structural steel, the underside of the roof plates and other steel components in this area.
- h. Shell. Interior tank surfaces that extend from the horizontal plane approximately 1 meter 40 inches above the shell-to-bottom joint upward to the horizontal plane at the maximum fill height, including columns, plates, and other steel components in this area.
- i. Spot Repair. Repair to coating system requiring surface preparation to bare metal.
- j. Stripe Coat. An additional corrosion protection measure applied on edges, outside corners, crevices, bolt heads, welds, and other irregular surfaces, including minor surface preparation on sharp edges.

1.3 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy and Air Force projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contract Errors, Omissions, and Other Discrepancies

Corrective Action Procedures

Corrective Action Request (CAR) Form

Coating Work Plan

Inspection Report Form

CIH Qualification and Certification; G

PCS Qualification and Certification; G

Coating Inspection Company Qualification and Certification; G

QAI Qualification and Certification; G

Coating Company Qualification and Certification

Abrasive Blasting Personnel

Coating Applicator

Plural Component Equipment Operator

SD-05, Design Data

Environmental Control System

SD-06 Test Reports

Coating Conformance Test Report; G
Non-Metallic Abrasive Qualification Test Report; G
Ferrous Metallic Abrasive Qualification Test Report
Coating Field Test Reports
Abrasive Field Test Reports
Recycled Metallic Abrasive Test Reports (Daily, Weekly)
Daily Inspection Reports

SD-07 Certificates

Coating Materials Certificate of Conformance
Joint Sealant Certificate of Conformance
Joint Sealant Compatibility
Non-Metallic Abrasive Certificate of Conformance
Ferrous Metallic Abrasive Certificate of Conformance
Coating Material Test Laboratory
Abrasive Material Test Laboratory

SD-08 Manufacturer's Instructions

Joint Sealant Instructions
Coating System Instructions

SD-11 Closeout Submittals

Disposal of Used Abrasive; G
Inspection Logbook; G
Corrective Action Log; G

1.4 QUALITY ASSURANCE

1.4.1 Contract Errors, Omissions, and Other Discrepancies

Submit all errors, omissions, and other discrepancies in contract documents to the Contracting Officer within 30 days of contract award for work covered in this Section, other than work that will not be uncovered until a later date. All such discrepancies must be addressed and resolved, and the Coating Work Plan modified, prior to the preparatory phase meeting for application. Discrepancies that become apparent only after work is uncovered must be identified at the earliest discoverable time, and submitted for resolution. Build float into the project schedule at points where old work is to be uncovered, or where access is not available during the first 30 days after award, to allow for resolution of

contract discrepancies.

1.4.2 Corrective Action (CA)

CA must be included in the Contractor Quality Control Plan as outlined in Section 01 45 00 QUALITY CONTROL.

1.4.2.1 Corrective Action Procedures

Develop procedures for determining the root cause of each non-compliance, developing a plan to eliminate the root cause so that the non-compliance does not recur, and following up to ensure that the root cause was eliminated.

1.4.2.2 Corrective Action Request (CAR) Form

Develop Corrective Action Request (CAR) forms for initiating CA and for tracking and documenting each step. The CAR should be included with the Corrective Action Procedures. A CAR must be initiated by either the Contractor or the Contracting Officer. The Protective Coatings Specialist (PCS) must approve each CAR at the root cause identification stage, the plan for elimination stage, and the close out stage after verification that the root cause has been eliminated.

1.4.2.3 Corrective Action Log

When a CAR is initiated, the Contractor must take action to identify and eliminate the root cause of each non-compliance so as to prevent recurrence. These actions must apply to non-compliance in the work, and to non-compliance in the Quality Control (QC) System. Corrective actions must be appropriate to the effects of the non-compliance encountered. The corrective action must be documented in a report that is serialized and tracked in the Corrective Action Log until project completion and acceptance by the Contracting Officer. All corrective action reports must be retained in project records. The Corrective Action Log, showing status of each CAR, must be submitted to the Contracting Officer monthly.

1.4.3 Coating Work Plan

NOTE: For spot coating, add requirement for pre-work determination of the existing surface profile. If paint removal is specified in another Section, such as a blast cleaning prior to inspection or repair, or in the lead removal Section, include this evaluation of existing profile such that the paint removal operation does not create excessive profile.

NOTE: Choose the options pertaining to the floating pan that apply to the project. The pan must be removed for any significant coating work on the SHELL and ROOF.

NOTE: If there is a possibility that generating non-detectable soluble salt levels per

PRE-APPLICATION TESTING FOR SOLUBLE SALTS
CONTAMINATION could cause delays in surface
preparation, include a section in the Coating Work
Plan that guides the strategy should
greater-than-zero soluble salt levels be detected.

NOTE: Ensure coordination between all parties,
including the welder, weld inspector, coating
Contractor, QAI, and QCI, on weld preparation and
surface profile requirements.

The Coating Work Plan is part of the Contractor Quality Control Plan as
outlined in Section 01 45 00 QUALITY CONTROL.

Submit the Coating Work Plan, approved by the PCS, prior to mobilization.
The Coating Work Plan must explain in detail all procedures including, but
not limited to, sequential processes, quality control for each process,
quality assurance for each process, and safety considerations. Coating
Plan must address performance and inspection responsibilities necessary
for weld structural requirements of API Std 650 and API Std 653 to
complement surface roughness requirements of NACE SP0178. At minimum,
include the following subsections.

- a. Purpose;
- b. Introduction (including the scope of work);
- c. Safety, fire, and health information;
- d. Contractor and worker qualifications with certifications;
- e. Project management organization and documents;
- f. Timeline in Gantt chart format;
- g. Project document references;
- h. Reference to all applicable standards (e.g., AMPP, NACE, SSPC, ISO,
and ASTM);
- i. Coating manufacturer supporting documentation;
- j. Description and explanation of exceptions from the coating
manufacturer;
- k. Coating and blasting equipment, model names, and, if applicable,
calibration dates;
- l. Containment design and/or details;
- m. Environmental testing;
- n. Material delivery, storage, and handling details;
- o. Surface preparation[(include procedures for if the pre-existing
anchor profile is greater than 100 microns 4 mils as specified in

paragraph ABRASIVE BLASTING)];

- p. Pre-application test panel validation for field-applied external coating as outlined in SURFACE STANDARD;
- q. Coating materials, mixing, application, recoat windows, and coating curing times, if applicable;
- r. Coating repairs and rework;
- s. Non-conformance;
- t. Spent material handling and effluent discharge containment and disposal;
- u. Inspection test plan and log as outlined in paragraph FIELD INSPECTION, and including inspection hold points, both QAI and QCI responsibilities, and daily documentation and delivery;
- v. Instruments and test kits;
- w. Soluble salt testing (include procedures that must be used if greater-than-zero soluble salt levels are not able to be removed from the steel surface);
- x. Warranty (in writing, signed by the Contractor and the coating manufacturer representative);
- y. Demobilization;
- z. PCS and PM approval;

1.4.4 Design Data

1.4.4.1 Environmental Control System

Submit design details of the proposed environmental control system to include ventilation, humidity control, and temperature regulation. Provide calculations for humidity control during separate surface preparation and coating application procedures, ventilation requirements during coating application, and maximum allowable coating application rates to coincide with ventilation. Include basis of design data on local conditions. Provide equipment layout sketches and procedures showing function of each piece of equipment and fail-safe measures. A Certified Industrial Hygienist must approve calculations, work procedures, and personal protective equipment.

1.4.5 Test Reports

NOTE: Two types of coating material testing are required: (1) qualification and (2) conformance.

1. A manufacturer must test material to qualify the product in accordance with requirements in MPI 505. Once qualification has been accomplished, MPI will publish the product on the MPI 505 Approved Products List.

2. For a qualified product selected for use in a contract that requires this Section, a conformance test must be conducted. The purpose is to validate the material that will be provided to a jobsite matches material qualified by MPI.

Use discretion on the frequency of conformance tests. Edit the test frequency area to suit project risk. For extensive application areas on multiple tanks, require additional tests during multiple phases of production to assure material remains conformant.

1.4.5.1 Coating Conformance Test Report

Obtain sample from batch of coating material that will be delivered on site to apply on project work. Time the sampling and testing regime to precede onsite coating work. Deliver sample to an independent laboratory for conformance testing. Test the material in accordance with MPI 505 Delivery Conformance Test Criteria Table. Test frequency is once for an initial application area up to 2787 m² 30,000 sf, and another test for each additional multiple of the same area.

Use an independent laboratory to determine whether conformance sample meets acceptance criteria in MPI 505. Submit analysis and determination of acceptable conformance from the independent laboratory in the Coating Conformance Test Report no less than 30 calendar days prior to onsite commencement of application. Material delivered onsite is not accepted until the Coating Conformance Test Report is approved by the Government. The coating material must remain in conformance during the entirety of its application on the project.

1.4.5.2 Ferrous Metallic Abrasive Qualification Test Report

Submit results for abrasive to meet requirements of SSPC AB 3. Submit test results from an independent laboratory of representative samples of each abrasive to be used on the jobsite. Samples must have been tested within the last 3 years. Note that this testing is for the purpose of pre-qualifying the abrasive.

1.4.5.3 Non-Metallic Abrasive Qualification Test Report

Submit results for abrasive to meet requirements of SSPC AB 1. Submit test results from an independent laboratory of representative samples of each abrasive to be used on the jobsite. Samples must have been tested within the last 3 years. Note that this testing is for the purpose of pre-qualifying the abrasive.

1.4.5.4 Recycled Metallic Abrasive Test Reports (Daily, Weekly)

Submit test results from an independent laboratory of daily and weekly Quality Control field testing required by SSPC AB 2, as modified in paragraph ABRASIVE.

1.4.6 Qualification and Certification

1.4.6.1 Certified Industrial Hygienist (CIH)

Provide a CIH experienced with hazards involved in coating work inside a fuel storage tank. The hygienist must be certified by the American Board of Industrial Hygiene in comprehensive practice and remain certified during the entire project. Notify the Contracting Officer of any change in certification status within 10 days of the change. If certification expires, the hygienist is disqualified from performing any hygienist function and all hygienist work must stop until the certification is reissued or another CIH is approved. An inactive certification is not justification for an extension of contract time or for delay to completion of the project.

Submit [CIH Qualification and Certification](#) to include certification number, date of certification, name, address, telephone number, and e-mail address. Provide evidence of CIH experience managing hazards associated with coating inside a fuel storage tank.

1.4.6.2 Protective Coating Specialist (PCS)

Provide an independent PCS experienced with flexible high-adhesion coating systems used inside a fuel storage tank. The PCS must be certified by the Association for Materials Protection and Performance (AMPP) and remain certified during the entire project. Notify the Contracting Officer of any change in certification status within 10 days of the change. If certification expires, the PCS is disqualified from performing any PCS function and all PCS work must stop until the certification is reissued or another PCS is approved. An inactive certification is not justification for an extension of contract time or for delay to completion of the project. The PCS can be employed by the same company to which the QAI is employed and not violate the independent requirement. The PCS can not be the QAI. Minimum protective coatings specialist responsibilities are outlined in paragraphs QA AND QC PERSONNEL ROLES.

Submit independent [PCS Qualification and Certification](#) to include certification number, date of certification, name, address, telephone number, and e-mail address. Provide evidence of PCS experience with flexible high-adhesion coating systems used inside a fuel storage tank.

1.4.6.3 Independent Inspection Company

Provide an independent coating inspection company to perform third-party inspection functions as required in the project scope and this Section. The coating inspection company submitted and approved must remain and cannot be changed through completion of the contract without prior approval of the Contracting Officer. The inspection company must be certified by AMPP to requirements of [SSPC QP 5](#) prior to contract award and must remain certified for the duration of the coating work. Notify the Contracting Officer of any change in certification status within 10 days of the change. If certification expires, the coating inspection company is disqualified from performing any inspection function and all surface preparation and coating application work must stop until the certification is reissued or another company is approved. An inactive certification is not justification for an extension of contract time or for delay to completion of the project. Notify the Contracting Officer of all scheduled and unannounced on-site audits from AMPP and furnish a copy of all audit reports. The coating inspection company must not engage in any

activity that may conflict with independence of judgment and integrity in relation to inspection activities. In particular, they must not be engaged in the manufacture, supply, application, surface preparation, purchase, or maintenance of the applied coating in this project.

Submit independent [Coating Inspection Company Qualification and Certification](#) to include certification number, date of certification, name, address, telephone number, and e-mail address.

1.4.6.4 Quality Assurance Inspector

Provide independent coating QAI(s) experienced with coating inside a fuel storage tank. Inspector(s) must be employed by the [SSPC QP 5](#) independent coating inspection company, be certified at minimum to AMPP CIP Level II, and remain certified during the entire project. Each inspector must remain employed by the coating inspection company while performing any coating inspection functions. Notify the Contracting Officer of any change in certification status within 10 days of the change. If certification expires, an inspector is disqualified from performing any inspection function and all surface preparation and coating application work must stop until the certification is reissued or another inspector is approved. An inactive certification is not justification for an extension of contract time or for delay to completion of the project. Coating inspector(s) must not engage in any activity that may conflict with independence of judgment and integrity in relation to inspection activities. In particular, inspector(s) must not be engaged in the manufacture, supply, application, surface preparation, purchase, or maintenance of the applied coating in this project. Minimum QAI responsibilities are outlined in paragraphs QA AND QC PERSONNEL ROLES and QAI RESPONSIBILITIES.

Submit independent [QAI Qualification and Certification](#) to include certification number, date of certification, name, address, telephone number, and e-mail address.

1.4.6.5 Coating Contractor

NOTE: If project involves removal of paint containing hazardous materials, add requirement for SSPC QP 2 certification in section of specification where the hazardous paint removal is specified, generally Section 02 83 00 LEAD REMEDIATION.

NOTE: Solicitations requiring certification for pre-qualification must point out the existence and location of the certification requirement on the PROJECT INFORMATION FORM. This requirement must be pointed out in the solicitation documents for the "prior to contract award" requirement to be enforceable. Certification is a special responsibility requirement pursuant to FAR 9.104-2 Special Standards. This is analogous to requiring bidders to have a specified level of experience or expertise and GAO has sustained these types of special requirements.

All Contractors and Subcontractors that perform surface preparation or coating application must be certified to both [SSPC QP 1](#) and [SSPC QS 1](#) prior to contract award, and must remain certified while accomplishing any surface preparation or coating application. If Contractor or Subcontractor certification expires, the firm is disqualified from performing any work until the certification is reissued. An inactive certification is not justification for an extension of contract time or for delay to completion of the project. Notify the Contracting Officer of any change in certification status. Notify the Contracting Officer of all scheduled and unannounced on-site audits from AMPP and furnish a copy of all audit reports.

Submit [Coating Company Qualification and Certification](#) to include certification numbers, date of certifications, name, address, telephone number, and e-mail address.

[For projects located outside the United States, Guam, and Puerto Rico, the certifications for the coating Contractor ([SSPC QP 1](#) and [SSPC QS 1](#)) can be substituted if the coating Contractor meets all of the below requirements:

- a. [ISO 9001](#) certified;
- b. Eight demonstrable years of experience with industrial coating on POL tank interiors;
- c. Evidence of recent work that has Contractor Performance Assessment Report System (CPARS) ratings, [and][or] other quality/performance ratings, that are equivalent to, or exceed, "Satisfactory";
- d. Evidence of an independent audit from AMPP demonstrating equivalency to [SSPC QP 1](#) and [SSPC QS 1](#) within the last 2 years.

[e. Evidence of an independent audit from AMPP demonstrating equivalency to [SSPC QP 2](#) within the last 2 years.

] Coating Contractors and Subcontractors must be certified to [ISO 9001](#) prior to contract award and must remain so certified for the duration of the project. If Contractor or Subcontractor certification expires, the firm is disqualified from performing any work until the certification is reissued. An inactive certification is not justification for an extension of contract time or for delay to completion of the project. Notify the Contracting Officer of any change in certification status. Notify the Contracting Officer of all scheduled and unannounced on-site inspections from the ISO certifying organization and furnish a copy of all inspection reports.

11.4.6.6 Abrasive Blasting Personnel

Submit name, address, and telephone number of each blaster that will be performing abrasive blasting. Submit [Abrasive Blasting Personnel](#) documentation each blaster is qualified by AMPP to the SSPC C7 Abrasive Blaster Qualification Program or CAS Coating Application Specialist Level 2 Certification Program (Interim Status). Each blaster must remain certified during the entire period of abrasive blasting, and the Contracting Officer must be notified of any change in qualification status within 10 days of the change. If a blaster qualification expires, the blaster is disqualified from performing any blasting function until the qualification is reissued. An inactive certification is not justification

for an extension of contract time or for delay to completion of the project.

1.4.6.7 Coating Applicator

Submit name, address, and telephone number of each person applying coating. Submit [Coating Applicator](#) documentation each applicator is qualified by AMPP to the SSPC CAS Coating Application Specialist Level 2 Certification Program (Interim Status) or SSPC C12 Spray Application Certification. Each applicator must remain certified during the entire period of coating application, and the Contracting Officer must be notified of any change in qualification status within 10 days of the change. If an applicator qualification expires, the applicator is disqualified from performing any application function until the qualification is reissued. An inactive certification is not justification for an extension of contract time or for delay to completion of the project.

1.4.6.8 Plural Component Equipment Operator

Submit name, address, and telephone number of each person operating plural component equipment. Submit documentation that each operator is qualified by AMPP to the SSPC C 14 Marine Plural Component Program (MPCAC-C14). Each operator must remain certified during the entire period of coating application and the Contracting Officer must be notified of any change in qualification status within 10 days of the change. If an operator qualification expires, the operator is disqualified from operating the equipment until the qualification is reissued. An inactive certification is not justification for an extension of contract time or for delay to completion of the project.

1.4.6.9 Coating Material Test Laboratory

Provide material testing from an independent laboratory accredited to [ISO/IEC 17025](#). Submit accreditation number, name, address, telephone number, and e-mail address of the independent laboratory or laboratories selected to perform testing of coating samples for qualification and compliance with this Section. Submit documentation the laboratory is regularly engaged in testing of paint samples for conformance with specifications and that employees performing testing are qualified.

1.4.6.10 Abrasive Material Test Laboratory

Provide material testing from an independent laboratory accredited to [ISO/IEC 17025](#). Submit name, address, telephone number, and e-mail address of the independent laboratory selected to perform testing of abrasives for compliance with this section. Submit documentation the laboratory has experience in testing samples of abrasive for conformance with specifications and that the employees performing testing are qualified.

1.4.6.11 Coating Materials Certificate of Conformance

Provide manufacturer certification of materials conformance to [MPI 505](#).

1.4.6.12 Joint Sealant Certificate of Conformance

Provide manufacturer certification of conformance to [ASTM C920](#) and as modified in this Section.

1.4.6.13 Joint Sealant Compatibility

Provide manufacturer certification that the selected joint sealant is compatible with the coating materials.

1.4.6.14 Ferrous Metallic Abrasive Certificate of Conformance

Provide manufacturer certification of conformance that the materials are currently in conformance with SSPC AB 3 and as modified in this Section, and have been tested within the last 3 years.

1.4.6.15 Non-Metallic Abrasive Certificate of Conformance

Provide manufacturer certification of conformance that the materials are currently in conformance with SSPC AB 1 and as modified in this Section, and have been tested within the last 3 years.

1.4.7 QA and QC Personnel Roles

1.4.7.1 QCM

The QC Manager role is pursuant to Section 01 45 00 QUALITY CONTROL. The QCM is responsible to lead the quality control program, manage the PCS and QAI specialists, and oversee the QCI to ensure work output meets requirements. The QCM must monitor quality and stop non-compliant work.

1.4.7.2 PCS

The PCS is a QC Specialist reporting to the QCM pursuant to Section 01 45 00 QUALITY CONTROL. The PCS must approve all coating-related submittals prior to submission to the QC Manager for approval or submission to the government for approval.

PCS responsibilities include, but are not limited to, the following:

- a. Review, comment, reject for rework (as-necessary), and approve all coating-related submittals. Approval is to the project QC program and QCM.
- b. Obtain, review, and understand all project documentation including project scope, this Section, Coating Work Plan, inspection and test plan (ITP), and manufacturer data sheets and instructions. Review all coating-related submittals before the feature of work starts, during the project, and during rework;
- c. Attend all pre-job coating-related meetings (in-person, phone, or virtually). Attendance includes coating-related preparatory and initial phase meetings.
- d. Attend pre-final coating application walk-through (mandatory) and attend final coating application walk-through (as required).

1.4.7.3 QAI

The QAI is a QC Specialist and reports to the QCM. The QAI must be present during all pre-preparation testing, surface preparation, coating application, initial cure of the coating system, during all coating repair work, and during completion activities. The QAI must provide complete documentation of conditions and occurrences on the job site and be aware

of conditions and occurrences that are potentially detrimental to the coating system. QAI requirements for inspection listed in this Section are distinct from QCM inspection and reporting requirements specified in Section 01 45 00 QUALITY CONTROL.

Responsibilities of the QAI are defined in paragraph QAI. These responsibilities are separate and distinct from responsibilities of the QCI.

1.4.7.4 QCI

The QCI must monitor quality and stop non-compliant work. Minimum responsibilities of the QCI are defined in paragraph QCI. These responsibilities are separate and distinct from the responsibilities of the QAI.

1.4.8 Pre-Application Meeting

After approval of submittals but prior to initiation of coating work, Contractor representatives, including at a minimum, project superintendent, QC manager, paint foreman, QAI, and PCS, must have a pre-application coating preparatory phase meeting. This meeting must be in addition to the pre-construction conference. Specific items addressed must include: corrective action requirements and procedures, coating work plan, safety plan, coordination with other Sections, inspection standards, inspection requirements and tools, test procedures, environmental control system, safety plan, and test logs. Notify Contracting Officer at least 10 days prior to meeting.

1.5 PRODUCT DATA

1.5.1 Coating System Instructions

Submit manufacturer printed instructions, including detailed mixing and application procedures, number and types of coats required, minimum and maximum application temperatures, and curing procedures. If plural component spray equipment is required, provide equipment model numbers, hose sizes, hose pressures, hose types (i.e., heated), and pail or drum heating element types. Include Safety Data Sheets (SDS) for materials used at the job site in accordance with 29 CFR 1926.59.

1.5.2 Joint Sealant Instructions

Submit manufacturer printed instructions, including detailed mixing and application procedures, minimum and maximum application temperatures, and curing procedures. Include Safety Data Sheets (SDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.

1.6 DELIVERY AND STORAGE

Ship, store, and handle materials in accordance with SSPC PA 1 as modified in this Section, and manufacturer instructions. Maintain temperature in storage spaces between 5 and 29 degrees C 40 and 85 degrees F, and air temperature more than 3 degrees C 5 degrees F above the dew-point at all times. Inspect materials for damage prior to use and return non-compliant materials to manufacturer. Remove materials with expired shelf life from government property immediately and notify the Contracting Officer.

If materials are approaching shelf life expiration and an extension is

desired, samples must be sent to the manufacturer, along with complete records of storage conditions, with a request for shelf life extension. If the manufacturer finds the samples and storage data suitable for shelf life extension, the manufacturer must issue an extension, referencing the product evaluation and the review of storage records. Products must not be extended longer than allowed in the product specification.

1.7 COATING HAZARDS

**NOTE: This specification section must be used with
Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.**

Adhere to EM 385-1-1. Ensure that employees are trained in all aspects of the safety plan. Specified coating may have potential health hazards if ingested or improperly handled. Follow coating manufacturer safety precautions throughout handling, mixing, application, and curing of coating. During tank cleaning, cleanup, surface preparation, and paint application phases, ensure that employees are protected from toxic and hazardous chemical agents which exceed concentrations in 29 CFR 1910.1000. Comply with respiratory protection requirements in 29 CFR 1910.134. The CIH must approve work procedures and personal protective equipment.

1.8 WORK SEQUENCE

**NOTE: Modify tank construction specification to
indicate that floating pan will be installed over
coated bottom and that the coating must be fully
protected during pan installation with protective
mats. Any required repairs must be done according
to paragraph PROCEDURE FOR HOLIDAY AND SPOT REPAIRS
OF NEWLY APPLIED COATING.**

[Coat tank interior following tank tightness testing.][Coat tank interior before installation of floating pan.][_____].

1.9 JOB SITE REFERENCES

**NOTE: Include any other job-site-related references
that might be added during design.**

Make available to the Contracting Officer at least one copy each of API Std 653, ASTM C920, ASTM D3276, ASTM D3925, ASTM D4285, ASTM D4417, ASTM D4940, ISO 8502-3, NACE SP0178 and companion visual comparator, NACE SP0188, SSPC SP COM, SSPC SP 1, SSPC SP 10/NACE No. 2, SSPC SP 11, SSPC PA 1, SSPC PA 2, SSPC Guide 12, SSPC VIS 1, SSPC CAS, SSPC C 14, SSPC QP 1, [SSPC QP 2,] SSPC QS 1, and an SSPC Certified Contractor Evaluation Form at the job site.

PART 2 PRODUCTS

2.1 COATING SYSTEM

NOTE: Include bracketed text for new construction only.

Coating systems must be as specified herein; alternate systems will not be considered. All coating materials must be manufactured by one manufacturer and supplied by one supplier. [The entire coating system is intended to be applied in the field. Alternatively, surface preparation may be accomplished in the shop, following all temperature, humidity, and testing requirements listed herein, followed by an application of a hold-primer. Upon completion of field fabrication, all shop-applied coating must be removed, surfaces prepared to **SSPC SP 10/NACE No. 2**, and the specified coating system applied. Adjust all shop preparation to avoid conflicts with final surface preparation requirements.]

2.1.1 Coating Materials

Low VOC, flexible, high adhesion epoxy material qualified to **MPI 505**, on the MPI approved Product List, and upon Government receipt of a determination of conformance from an independent laboratory. Coating material must remain qualified and must remain in conformance during the entirety of its application on the project. See paragraph COATING CONFORMANCE TEST REPORT for conformance test requirements.

The first and finish coat materials are identical except that colors must contrast to allow identification.

2.2 JOINT SEALANT

Industrial grade, two-component, minimum 95 percent solids by volume, polysulfide type caulking material that has a minimum history of 10 years acceptable service in fuel tanks. Sealant must be compatible with the coating and suitable for direct application to prepared steel surfaces. Sealant must contain no more than 0.06 percent by dry weight lead, no more than 0.06 percent by dry weight cadmium, and no chromium. Joint sealant must be qualified to **ASTM C920**, Type M, Grade NS or P. Provide sealant [Class 100/50][Class 50][of class suitable to withstand maximum differential joint movement] pursuant to **ASTM C920**.

2.3 COATING FIELD SAMPLE COLLECTION KIT

Provide a kit for each sample to be collected. Each kit must contain: a one liter quart can for the base of the coating material; one appropriately sized can for the activator of the coating material; dipping cups for each component to be sampled; a shipping box sized for the samples to be shipped; and packing materials. Mark cans for the appropriate components including manufacturer name, address, batch numbers, batch size shipped to the project site, and date of manufacture. Store in the QC Manager office until completion of the project. Provide shipping documents, including either pre-paid shipping labels or a shipping number that can be used by the QC Manager to arrange pickup, addressed to the approved coating testing laboratory.

2.4 ABRASIVE FIELD SAMPLE COLLECTION KIT

Provide a kit for each sample to be collected. Each kit must contain one suitable plastic bag or container for each sample to be collected. Mark containers with manufacturer name, address, batch number, batch size, and date of manufacture. Provide shipping documents, including either

pre-paid shipping labels or a shipping number that can be used by the QC Manager to arrange pickup, addressed to the approved coating testing laboratory.

2.5 INSPECTION TEST KITS

2.5.1 Test Kit for Measuring Chloride, Sulfate, and Nitrate Ions on Steel and Coated Surfaces

Provide test kits that meet all of the following requirements:

- a. Contains all materials, supplies, tools, and instructions for field testing and on-site quantitative evaluation of chloride, sulfate, and nitrate ions;
- b. Extract solution is acidic, factory pre-measured, pre-packaged, and of uniform concentration;
- c. Components and solutions are mercury free and environmentally friendly;
- d. Contains new materials and solutions for each test extraction;
- e. Contains an extraction test container (vessel, sleeve, cell, etc.) creates a sealed, encapsulated environment during salt ion extraction;
- f. Contains a test extract container suitable for testing the following steel surfaces: horizontal (up/down configuration), vertical, flat, curved, smooth, pitted, and rough;
- g. All salt ion concentrations are directly measured in micrograms per square centimeter.

2.5.2 Test Kit for Measuring Chlorides in Abrasives

Provide test kits that meet all of the following requirements:

- a. Is a completely self-contained test kit with all materials, supplies, tools, and instructions to take tests and identify results;
- b. Uses identifiable, consistent, factory pre-measured test extract solution;
- c. Provides for testing equal volumes of abrasive and test solution;
- d. Provides for taking direct measurements of the chloride ion in parts per million (PPM), without using conversion charts or tables;
- e. Provides all new components for extraction and titration for each test;
- f. Provides a factory sealed titration device for each test;
- g. Uses the extract sampling container as the titration container.

2.5.3 Test Kit for Identifying Amine Blush on Epoxy Surfaces

Provide test kits that meet all of the following requirements:

- a. Is a completely self-contained field test kit with all materials, supplies, tools, and instructions to perform tests and indicate the

presence of unreacted amines;

- b. Uses an identifiable, consistent, uniform, pre-packaged, factory pre-measured indicating solution;
- c. Contains no mercury or lead and is environmentally friendly;
- d. Contains a solution of an unreacted amine for the purpose of "self checking" the indicator solution.

2.6 ABRASIVE

Use abrasive that is specifically selected to provide a sharp, angular profile to the specified depth. Abrasive must meet all requirements of this Section each time that it is placed in the blast pot. A maximum limit for soluble salt contamination (chloride) is specified herein; however, this maximum level of contamination does not guarantee that contamination will not be transferred to the steel surface during abrasive blasting. Other factors, such as on-site handling and recycling, can allow contamination of abrasive that can be transferred to the steel surface. Contractors are cautioned to verify that the chosen abrasive, along with work and storage processes, allow the final surface cleanliness requirements to be achieved. Successful testing of contamination in abrasive does not negate the final acceptance testing of steel surfaces.

NOTE: The following paragraph is mandatory for all PACNAVFACENCOM projects. All other agencies may use it after checking applicability.

[Abrasive material used must contain a maximum of one percent by weight of any toxic substance listed in either Table Z-1, Z-2, or Z-3 of 29 CFR 1910-SUBPART Z, with the exception of inert or nuisance dust materials, arsenic, beryllium, cadmium, cobalt, lead, mercury, rhodium, silver, tellurium, thallium, and uranium.

] *****
NOTE: Reduce allowable gross gamma radioactivity to 5 picocuries per gram for all PACDIV projects. Reduce in other areas if states or localities require.

[Gross gamma radioactivity must not exceed 5 picocuries per gram.

]2.6.1 Ferrous Metallic Abrasive

2.6.1.1 New and Remanufactured Steel Grit

New and remanufactured steel grit abrasive must conform to the chemical and physical properties of SSPC AB 3 Class 1 (Steel). Do not use Class 2 (Iron) abrasive.

To develop a suitable work mix from new steel abrasive, a minimum of 200 to 400 recycles is required; therefore, it may be advantageous for a Contractor to use remanufactured steel grit or grit reclaimed from a previous project. Such grit must be traced to new grit conforming to

SSPC AB 3 Class 1 and it meets all cleanliness requirements of SSPC AB 3 Class 1 when brought to the current jobsite. Submit one representative sample of this work mix to the independent laboratory for testing, along with samples of new material. Acceptance and use of this work mix must not be used to justify any deviation from surface preparation requirements.

2.6.1.2 Recycled Steel Grit

Recycled steel grit abrasive media must conform to the chemical and physical properties of SSPC AB 2 except that:

- a. The maximum allowable chromium and cadmium content of the work mix must be 0.1 percent by weight when tested in accordance with ASTM D3718 for chromium and ASTM D3335 for cadmium. Modify the requirements of SSPC AB 2 to add requirement for one chromate test and one cadmium test for each "LEAD" test required.
- b. The maximum allowable chloride content is 25 parts per million (PPM) as measured with the test kit described in paragraph TEST KIT FOR MEASURING CHLORIDES IN ABRASIVES. Modify the requirements of SSPC AB 2 to substitute requirement for one chloride test for each "WATER SOLUBLE CONTAMINANTS" test.

2.6.2 Non-Metallic Abrasive

Non-metallic abrasive must be graded to the appropriate surface profile range and must conform to the chemical and physical properties of SSPC AB 1, Class A except that:

- a. The maximum allowable chromium and cadmium content of the work mix must be less than 0.1 percent by weight when tested in accordance with ASTM D3718 for chromium and ASTM D3335 for cadmium.
- b. Must contain less than 7 PPM chlorides when tested with the kit provided in paragraph TEST KIT FOR MEASURING CHLORIDES IN ABRASIVES. Modify the requirements of SSPC AB 1 to substitute requirement for one chloride test for each "CONDUCTIVITY TEST" required in SSPC AB 1 (one random sample per 50 bags of abrasive or three random samples from each shipment, if abrasive is delivered in bulk).

PART 3 EXECUTION

Perform all work, rework, and repair in accordance with approved procedures in the Coating Work Plan. The Coating Work Plan must be submitted and approved by the PCS prior to mobilization, in accordance with the paragraph COATING WORK PLAN.

3.1 FIELD SAMPLE COLLECTION AND TESTING

Sample and test materials delivered to the jobsite as required in the subsequent subparagraphs. Notify the Contracting Officer 3 days in advance of sampling. The QCM, and either the PCS or QAI must witness all sampling.

3.1.1 Coating Field Sample Collection

Coating qualified to MPI 505 requires one sample to be collected. This sample must be collected and set aside for the duration of the project, and must be tested if unforeseen coating issues arise or if testing is

requested by the Contracting Officer. Coating that are not qualified to **MPI 505** require a random field sample from each lot of coating material used on-site in accordance with **ASTM D3925**. Each random sample must be tested.

For sampling, utilize sample collection kits as outlined in the paragraph COATING FIELD SAMPLE COLLECTION KIT. Each sample must consist of one **liter quart** of the base material, and a sample of activator that is proportional to the mix ratio. Prior to sampling, mix contents of each sealed container to ensure uniformity. As an alternative to collecting small samples from kits, entire kits may be randomly selected and shipped to the independent laboratory, observing all requirements for witnessing and traceability. For purposes of quality conformance inspection, a lot is defined as that quantity of materials from a single, uniform batch produced and offered for delivery at one time. A batch is defined as that quantity of material processed by the manufacturer at one time and identified by number on the label. Identify samples by designated name, specification number, batch number, project contract number, sample date, intended use, and quantity involved. If testing is required, the QC Manager will take possession of the packaged samples, contact the shipping company to arrange for pickup, and ship one complete sample of each material in question (including base and activator) with all batch information to the independent laboratory for testing as required in paragraph COATING FIELD TEST REPORTS.

3.1.2 Abrasive Field Sample Collection

Utilize the sample collection kits as required in paragraph ABRASIVE FIELD SAMPLE COLLECTION KIT to obtain samples from each lot of abrasive delivered to site. Use sampling techniques and schedule of one sample per every 50 bags for ferrous metallic abrasive, Chapter 4 requirements of **SSPC AB 2** for recycled ferrous metallic abrasives, or Chapter 5 requirements of **SSPC AB 1** for non-metallic abrasives.

For purposes of quality conformance inspection, a lot must consist of all abrasive materials of the same type from a single, uniform batch produced and offered for delivery at one time. The addition of any substance to a batch must constitute a new lot. Identify samples by designated name, specification number, lot number, project contract number, sample date, intended use, and quantity involved. The QC Manager will take possession of the packaged samples, contact the shipping company to arrange for pickup, and relinquish the samples only to the shipping representative for shipment to the approved laboratory for testing as required by paragraph ABRASIVE FIELD TEST REPORTS.

3.1.3 Coating Field Test Reports

Submit test results for each sample that requires testing in paragraph COATING FIELD SAMPLE COLLECTION. Test samples of coating material for conformance with requirements of **MPI 505**. Reject entire batch represented by samples that fail one or more tests, select new lots, and test samples.

3.1.4 Abrasive Field Test Reports

Submit test results for each lot of abrasive delivered to the jobsite. Test samples of ferrous metallic abrasive to requirements of Chapter 5 of **SSPC AB 3**, excluding the durability procedure. Test samples of recycled metallic abrasives to Chapter 4 requirements of **SSPC AB 2**. Test samples of non-metallic abrasive to Chapter 5 requirements of **SSPC AB 1**. Reject

entire lot represented by samples that fail one or more tests, select new lots, and test samples.

[3.2 REMOVAL OF COATING CONTAINING HAZARDOUS MATERIALS

NOTE: Include Section 02 83 00 LEAD REMEDIATION in a project specification that requires removal or disturbance of coating containing hazardous materials. Include a contractor qualification requirement similar to the coating contractor qualification requirement in PART 1 of this Section, except the contractor must be qualified to SSPC QP 2, Category A. Coating containing hazardous materials can be removed and the new coating applied in a continuous operation if the contractor provides appropriate coordination of removal, cleaning, and coating application. It is specified as two separate operations to allow separate contractors to accomplish different phases of the project. With the use of SSPC QP-1 and QP-2 requirements in contracts, the same contractor will generally be accomplishing both phases of the work, and will probably want to perform both phases as a single operation to avoid preparing the surfaces twice. To accomplish coating removal and recoating in a continuous operation, scrutinize Contractor plan for appropriate controls on the removal process, and on the surface preparation/coating application process. Delete this paragraph if no paint containing hazardous material is to be removed.

Coating containing hazardous materials and identified for disturbance during surface preparation, including removal, must be handled in accordance with Section 02 83 00 LEAD REMEDIATION. Coordinate surface preparation requirements from Section 02 83 00 LEAD REMEDIATION with this Section.

][3.3 FUEL REMOVAL AND TANK CLEANING

Remove fuel and clean storage tanks in accordance with Section 33 01 50.55 CLEANING OF PETROLEUM STORAGE TANKS.

]3.4 LIGHTING

Provide lighting for all work areas as prescribed in SSPC Guide 12.

3.5 ENVIRONMENTAL CONDITIONS

[3.5.1 Tank Containment

NOTE: Delete this requirement where exterior containment is not required. Containment aids in maintaining environmental conditions by moderating extreme conditions.

Maintain exterior tank containment in full working condition during interior surface preparation, coating application, and initial curing to aid in maintaining interior environmental conditions.

13.5.2 Control System Requirements

Provide and utilize dehumidification and ventilation equipment to control humidity, temperature, and vapor levels in tank from beginning of abrasive blasting through coating application and for 16 hours after the last coating is applied. System must maintain vapor concentrations at or below 10 percent of Lower Explosive Limit (LEL). System may incorporate any combination of solid desiccant and direct expansion refrigeration equipment. No liquid, granular, calcium chloride, or lithium chloride drying systems will be accepted. Use only electric, indirect fired combustion, indirect friction, or steam coil auxiliary heaters. System must be compatible with removal of dust and solvent vapors, and must have fail-safe measures to ensure reliability during operations.

3.5.2.1 Automated Monitoring Requirements

Provide continuous monitoring of dehumidification equipment, temperature, relative humidity, and dew point data at pertinent points on the structure, during surface preparation, coating application, and initial cure. This data does not suffice for documentation of conformity to surface conditions during application and cure of coating. Locate sensors to provide pertinent data for the surface preparation and coating application being performed, as well as the temperature extremes on the structure. Describe the location plan, including anticipated probe location changes, in the Coating Work Plan. Provide monitoring equipment to perform as follows:

- a. Acquire data in the field unit in 15-minute increments in standard database format. Collect these data and make available to the Contracting Officer, QAI, and QCM;
- b. Monitoring equipment must have backup power such that data collection will be uninterrupted during the entire period of the dehumidification requirement;
- c. Monitoring equipment must have capability to measure surface temperatures at a minimum of four locations anywhere on a structure, regardless of the size of the structure;
- d. Monitoring equipment must have capability to measure interior and exterior dry bulb temperature (DB), relative humidity (RH), and dewpoint temperature (DP).

There is no requirement for connectivity of the monitoring system to control the dehumidification equipment; therefore, any combination of equipment having the required functionality will be accepted.

3.5.2.2 Humidity Control for Surface Preparation and Coating Application

Provide and utilize dehumidification equipment to maintain relative humidity at appropriate level to prevent prepared steel surfaces from corroding at all times during abrasive blasting through coating application. Failure of humidity control system, or failure to maintain proper conditions, during surface preparation stage may allow surface rusting, which will be rejected and require rework. All surfaces to be

coated must meet all requirements at time of coating application. Failure of humidity control system during coating application stage will be cause for removal and replacement of all materials applied and cured while conditions were not as prescribed above.

Note that reduction of relative humidity below approximately 25 percent may affect application and curing characteristics. Contact coating manufacturer for appropriate limitations on lower relative humidity levels.

3.5.2.3 Humidity Control for Initial Curing of Coating

Provide and utilize dehumidification equipment to maintain relative humidity at the coldest steel surface in tank below 55 percent at all times during coating application and initial curing. This measurement is not the same as measuring the relative humidity of ambient air in the tank, and will require either electronic equipment to monitor relative humidity at the steel surface, or complex calculations to convert relative humidity of air in tank to relative humidity at steel surface. An approved alternative method of monitoring dehumidification that requires less sophisticated equipment or calculations is to maintain a minimum dew point depression of 10 degrees C 18 degrees F below coldest steel surface temperature. This is in lieu of specific relative humidity and dew point requirements in this Section. Failure to maintain specified humidity control during application may cause formation of condensation during the coating application stages prior to the indicated dry-hard period and will be cause for removal and replacement of all materials contacted by condensation.

3.6 EQUIPMENT USED IN TANK

Equipment used in the tank after surface preparation begins must not leave any oily residue from exhaust or other sources. Internal combustion driven equipment, other than that powered by natural or bottled gas, must not be used.

3.7 SURFACES TO BE COATED

NOTE: See UFC 3-460-01 for new coating system guidance on which interior tank surfaces should be coated. Coordinate with Section 33 01 50.75 REPAIR OF FIELD FABRICATED FUEL STORAGE TANKS.

Prepare and coat interior tank surfaces, including[BOTTOM][, SHELL][, ROOF][spot repair of [_____] square meters square feet]. Remove interior piping to ensure complete coverage of the bottom and underside of pipe supports. Do not coat aluminum floating pan.

3.8 SURFACE PREPARATION

NOTE: When editing this specification for maintenance or repair coating work for which SSPC-SP WJ-1/NACE WJ-1, SSPC-SP WJ-2/NACE WJ-2, SSPC-SP WJ-3/NACE WJ-3, or SSPC-SP WJ-4/NACE WJ-4 is to be allowed, include requirement for contractor to use potable water, monitor quality of the water, and adjust water quality to assure appropriate surface

preparation and final surface requirements. Add appropriate SSPC-SP-WJ reference to the Section Reference Article. There are many problems that can arise from dissolved and suspended material. A common occurrence is water with high chloride content, even in potable water, which may leave unacceptable contamination on cleaned surfaces, and is not suitable for waterjetting.

Prepare steel surfaces in accordance with **SSPC PA 1** and as specified herein.

3.8.1 Abrasive Blasting Equipment

Use abrasive blasting equipment of conventional air, force-feed, or pressure type. Maintain a minimum pressure of **650 kPa 95 psig** at nozzle. Confirm that air supply for abrasive blasting is free of oil and moisture when tested in accordance with **ASTM D4285**. Test air quality at each startup, but in no case, less often than every 5 operating hours.

3.8.2 Field Abrasive Contamination Testing

Test abrasive for salt contamination and oil contamination as required in **SSPC AB 1** for non-metallic abrasives, **SSPC AB 2** for recycled ferrous abrasives, and **SSPC AB 3** for ferrous abrasives. Modify the schedule of testing to be daily, at startup, and every 5 operating hours thereafter.

3.8.3 Surface Standard

Inspect surfaces to be coated and select plate with similar properties and surface characteristics for use as a surface standard. Blast clean one or more **300 mm 1 foot** square steel panels as specified in paragraph SURFACE PREPARATION. Record blast nozzle type and size, air pressure at nozzle and compressor, distance of nozzle from panel, and angle of blast to establish procedures for blast cleaning. Measure surface profile in accordance with **ASTM D4417**, Method C. When the surface standard complies with all specified requirements, seal with a clearcoat protectant. Use the surface standard for comparison to abrasive blasted surfaces throughout the course of work.

3.8.4 Pre-Preparation Testing for Surface Contamination

Perform testing, abrasive blasting, and testing in the prescribed order.

3.8.4.1 Pre-Preparation Testing for Oil and Grease Contamination

NOTE: When specifying maintenance painting, use a water based, pH-neutral degreaser to avoid damaging existing coating.

Inspect all surfaces for oil or grease contamination using two or more of the following inspection techniques:

- (1) VISUAL INSPECTION - Observe surface for evidence of dirt or oil.
- (2) WATER BREAK TEST - Spray atomized mist of distilled water onto

surface and observe for water beading. If water wets surface rather than beading up, surface can be considered free of oil or grease contamination. Beading of water (water forms droplets) is evidence of oil or grease contamination.

- (3) CLOTH RUB TEST - Rub a clean, white, lint-free, cotton cloth onto the surface and observe for discoloration. To confirm oil or grease contamination in lightly stained areas, a non-staining solvent may be used to aid in oil or grease extraction. Any visible discoloration is evidence of oil or grease contamination.

- (4) BLACK LIGHT TEST - Inspect surfaces for oil or grease contamination using the light specified in paragraph BLACK LIGHT. Use light no more than 381 mm 15 inches from surface unless testing indicates that the specific oil or grease found in tank fluoresce at a greater distance. Use light in tank that is completely sealed from light infiltration, under a hood, or at night. Any fluorescing on steel surfaces is indication of petroleum oil/grease contamination. Use either WATER BREAK TEST or CLOTH RUB TEST to confirm both contaminated and non-contaminated areas detected by BLACK LIGHT TEST. The BLACK LIGHT TEST must not be used during inspection of prepared surfaces for oil and grease contamination unless proven to fluoresce the oil and grease found in the specific tank and documented during testing prior to abrasive blasting. Generally, only petroleum oil/grease will fluoresce; however, some may not fluoresce sufficiently to be recognized and other methods, such as the WATER BREAK TEST or CLOTH RUB TEST, must be used to confirm findings of the BLACK LIGHT TEST.

Reject oil or grease contaminated surfaces, clean[using a water based pH neutral degreaser]in accordance with SSPC SP 1, and recheck for contamination until surfaces are free of oil and grease.

3.8.4.2 Pre-Preparation Testing for Soluble Salts Contamination

NOTE: Testing for chlorides, sulfates, and nitrates (CSN) is especially important if there was evidence of corrosion production or if the bare surface has been contaminated prior to surface preparation.

Test all surfaces at rate of three tests for the first 100 square meters 1000 square feet, plus one test for each additional 200 square meters 2000 square feet, or part thereof.[Concentrate testing of bare steel at areas of coating failure to bare steel and areas of corrosion pitting.][Perform 30 percent of tests on bare steel at welds, divided equally between horizontal and vertical welds.] Reject the surface if one or more readings greater than non-detectable for chlorides, sulfates, or nitrates is measured. Wash the surface as described below, allow to dry, and re-test until all required tests show allowable results. Label all test tubes and retain for test verification.

Effective washing and removal of soluble salts will require removal of any barrier to the steel surface, including rust. This procedure may necessitate combinations of wet abrasive blasting, high pressure water rinsing, and cleaning using a solution of water and soluble salts remover. The soluble salts remover must be acidic, biodegradable,

non-toxic, non-corrosive, and after application, will not interfere with coating adhesion. Use potable water, or potable water modified with a soluble salt remover, for all washing or wet abrasive blasting. Additional testing is required when there are delays between testing and preparation or testing and coating application. Test methods and equipment used in this phase are as stated in the Coating Work Plan.

This phase is required since pre-preparation testing and washing are generally more advantageous than attempting to remove soluble salt contamination after abrasive blasting. Soluble salt testing is also required in paragraph PRE-APPLICATION TESTING FOR SOLUBLE SALTS CONTAMINATION as a final acceptance test of prepared surfaces after abrasive blasting. Successful completion of this phase does not negate that requirement.

3.8.5 Abrasive Blasting

NOTE: The issue of maximum profile on new structures is an important one. Once a profile is established, it is nearly impossible to reduce it, therefore, the initial profile will dictate the profile for the life of the structure.

The specified 2-4 mil surface profile is the preferred depth for preparing for the coating system. On steel that was previously prepared to a deeper depth and coated, a depth of 6 to 8 mils can be tolerated, if necessary.

It is the responsibility of the coating contractor to achieve the profile required by properly selecting the appropriate abrasive size. Harder, smaller abrasive can result in lower (shallower) profile height.

If higher (deeper) pre-existing profile height is anticipated or encountered, both the PCS and the coating manufacturer must provide approval in writing to coat the higher surface profile. The government will not be responsible for the cost of additional coating materials for higher than specified surface profiles. Procedures for coating higher pre-existing surface profiles and gathering specific approvals must be included in the Coating Work Plan.

Abrasive blast steel surfaces to near-white metal in accordance with **SSPC SP 10/NACE No. 2**. Prepared surfaces must conform to **SSPC VIS 1** and match the prepared test-panels as specified in paragraph SURFACE STANDARD. Provide a **50 to 100 micron 2 to 4 mil** surface profile. Reject profile greater than **100 microns 4 mils**, discontinue abrasive blasting, and modify processes and materials to provide the specified profile. Measure surface profile in accordance with **ASTM D4417**, Method A and Method C. The appearance of the surface after blasting must have the appearance of a Sand or Grit comparator. A rounded profile shape or peened surface is not acceptable. Record all measurements required in this standard. Measure profile at rate of three test areas for the first **100 square meters**

1000 square feet plus one test area for each additional 100 square meters 1000 square feet or part thereof. When surfaces are re-blasted for any reason, retest profile as specified. Following abrasive blasting, remove dust and debris by vacuum cleaning. Dust and debris tend to collect at welds, plate overlaps, and surface irregularities. Do not attempt to wipe surface clean.

[On previously coated and prepared surfaces, determine and establish the average existing surface profile. If the pre-existing surface profile is greater than 100 microns 4 mils, or than what is allowable by the coating system instructions, the contractor must acquire written approval by the manufacturer to utilize a higher anchor profile. The manufacturer supporting letter must state that the additional profile will not degrade coating performance in any way and will be warranted the same. Abrasive blast the steel surfaces to near-white metal in accordance with SSPC SP 10/NACE No. 2 using abrasive and technique which does not increase the existing profile. Provide a surface profile of at least 100 microns 4 mils but no additional profile than that existing. Reject profile greater than existing, discontinue abrasive blasting, and modify processes and materials to provide the specified agreed existing profile. Prepared surfaces must conform to SSPC VIS 1 and must match the prepared test-panels as specified in paragraph SURFACE STANDARD. Measure surface profile in accordance with ASTM D4417, Method A and Method C. Record all measurements required in this standard. Measure profile at rate of three test areas for the first 100 square meters 1000 square feet plus one test area for each additional 100 square meters 1000 square feet or part thereof. Provide two additional measurements for each non-compliant measurement. When surfaces are re-blasted for any reason, retest profile as specified. Following abrasive blasting, remove dust and debris by vacuum cleaning. Dust and debris tend to collect at welds, plate overlaps, and surface irregularities. Do not attempt to wipe surface clean. On previously coated and prepared surfaces, profiles higher than 100 microns 4 mils should be anticipated and these procedures must be included in the Coating Work Plan.

13.8.6 Disposal of Used Abrasive

Dispose of used abrasive off Government property in accordance with Federal, State, and Local mandated regulations.

3.8.7 Pre-Application Testing for Surface Contamination

3.8.7.1 Pre-Application Testing for Oil and Grease Contamination

Ensure tank surfaces are free of contamination as described in paragraph PRE-PREPARATION TESTING FOR OIL AND GREASE CONTAMINATION.

3.8.7.2 Pre-Application Testing for Soluble Salts Contamination

NOTE: In new tanks, require 30 percent of tests to be accomplished at welds. In tanks that have been in service, corroded areas must be tested for high chlorides.

NOTE: The testing for chlorides, sulfates, and nitrates (CSN) is especially important if there was

evidence of corrosion production or if the bare surface has been contaminated prior to coating application.

Test surfaces for soluble salt contamination using the test kit described in paragraph TEST KIT FOR MEASURING CHLORIDE, SULFATE, AND NITRATE IONS ON STEEL AND COATED SURFACES. Test all surfaces at rate of three tests for the first 100 square meters 1000 square feet, plus one test for each additional 200 square meters 2000 square feet, or part thereof.[Concentrate testing of bare steel where areas of coating failure to bare steel and areas of corrosion pitting were located.][Perform 30 percent of tests on bare steel at welds, divided equally between horizontal and vertical welds.] Label all test tubes and retain for test verification. One or more readings greater than non-detectable for chlorides, sulfates, or nitrates is evidence of soluble salt contamination. Reject contaminated surfaces, wash as required in paragraph PRE-PREPARATION TESTING FOR SOLUBLE SALTS CONTAMINATION, allow to dry, and re-test until all required tests show acceptable results. Re-blast tested areas using vacuum equipped blast equipment. An atmospheric event, such as a coastal storm blowing onshore, can bring chloride contamination. Following an atmospheric event, spot testing must be accomplished to verify satisfactory conditions and to avoid intercoat contamination. Where visual examination or spot testing indicates contamination, perform sufficient testing to verify non-contamination, or to define extent of contamination for appropriate treatment.

3.8.7.3 Pre-Application Testing for Surface Cleanliness

Apply coating to dust free surfaces. To test surfaces, use ISO 8502-3. Use a kit that is compliant with ISO 8502-3. A rating of 2 or better must be achieved for acceptance. If the test does not result in a rating of 2 or better, then reject contaminated surfaces, clean by vacuum, and retest. Test surfaces at rate of three tests for the first 100 square meters 1000 square feet, plus one test for each additional 100 square meters 1000 square feet, or part thereof. Provide two additional tests for each failed test or questionable test. Document test results in the Daily Inspection Report and attach tape to the Daily Inspection Log.

Ferrous abrasives may become magnetized and difficult to remove from the steel substrate. If ferrous abrasives are used, additional visual inspection must be performed to ensure no surface contamination by the abrasive is present.

3.9 MIXING AND APPLICATION OF COATING SYSTEM AND SEALANT

Mix and apply in accordance with approved coating system instructions, which may differ for each product. Do not mix partial kits unless standardized measuring cups are utilized. Do not alter mix ratios. All mixing processes must be witnessed by the QAI.

3.9.1 Mixing Joint Sealant and Coating Materials

Each of the products is a two-component material supplied in separate containers and must be mixed at proper ratios prior to application. Mix materials in same temperature and humidity conditions specified in paragraph DELIVERY AND STORAGE. Allow mixed material to stand for the required induction time.

3.9.1.1 Pot Life

Apply mixed products within stated pot life for each product. Stop applying when material becomes difficult to apply in a smooth, uniform wet film. Do not add solvent to extend pot life. All required solvent must be added at the time of mixing. Pot life is based on standard conditions at 21 degrees C 70 degrees F and 50 percent relative humidity. For every 10 degrees C 18 degrees F rise in temperature, pot life is reduced by approximately half, and for every 10 degrees C 18 degrees F drop, it is approximately doubled. Usable pot life depends on the temperature of the material at the time of mixing and the sustained temperature at the time of application. Other factors such as the shape of the container and volume of mixed material may also affect pot life. In hot climates, pre-cooling or exterior icing of components for at least 24 hours to a minimum of 10 degrees C 50 degrees F will extend pot life.

3.9.1.2 Application Conditions and Recoat Windows

NOTE: These requirements are provided in an attempt to prevent the significant number of intercoat delamination failures that are frequently found on industrial structures. The requirements on application conditions and recoat windows may require work during abnormal hours, including weekends. Contractor work hours must allow for such during coating application.

NOTE: Cold-weather application is not covered by this specification. If a project is designed for coating in cold weather, then the enclosure and heating requirements may be significant. It is not intended that contractors be forced to apply coating in cold weather; however, the underlying premise is that coating must be applied within the specified temperature ranges. A cold-weather specification must not be used to simply save money, as the coating system will generally not have the same longevity as one applied within 16-48 degrees C 60-120 degrees F.

The curing process for coating materials is time, temperature, and moisture sensitive. Application condition requirements help mitigate delamination problems frequently found on industrial structures.

- a. Plan coating application to ensure that specified temperature, humidity, and condensation conditions are met. If conditions do not allow for orderly application of the coating system and sealant as outlined in APPLICATION OF COATING SYSTEM AND JOINT SEALANT, use appropriate means of controlling air and surface temperatures, as required. Partial or total enclosures, insulation, heating or cooling, or other appropriate measures may be required to control conditions to allow for orderly application of all required coats. Enclosure design must be included in the Coating Work Plan.
- b. Maintain air and steel surface temperature within the range allowable

by the coating system instructions during application and the first 4 hours of cure. Maintain steel surface temperature more than 3 degrees C 5 degrees F above the dew-point of the ambient air for the same period. These conditions may require environmental controls through containment.

- c. If coating is not applied during recoat window specified by the coating manufacturer, or if surface temperature exceeds the temperature recommended in the coating system instructions between applications, provide gloss removal. The finish coat must be free of defects and be of uniform appearance in accordance with SSPC PA 1. Lack of hiding by the finish coat must require additional applications to obtain uniform appearance.
- d. Gloss Removal - Where required, hand sand in a circular fashion to remove gloss using 120-200 grit wet/dry sandpaper, vacuum-remove all dust, and solvent wipe with a clean rag soaked with denatured alcohol. If steel is exposed during gloss removal, repair in accordance with paragraph PROCEDURE FOR HOLIDAY AND SPOT REPAIRS OF NEWLY APPLIED COATING. Gloss removal of a finish coat is to scarify the surface completely and may include removal of up to 250 microns 10 mils of coating to eliminate excess thickness.

3.9.2 Amine Blush Testing of Coating Prior to Overcoating

Test coating surfaces prior to application of any subsequent coat for amine blush contamination using the test kit described in paragraph TEST KIT FOR IDENTIFYING AMINE BLUSH ON EPOXY SURFACES. Test all surfaces at a rate of three tests for the first 100 square meters 1000 square feet, plus one test for each additional 200 square meters 2000 square feet, or part thereof. If one or more tests show positive results for amine blush contamination, either treat all surfaces using the approved amine blush removal procedure or increase testing to ensure that all contamination is located, and then treat identified contamination using the approved procedure.

3.9.3 Application of Coating System and Joint Sealant

Apply coating in accordance with SSPC PA 1 and as specified herein. Apply sealant and coating to surfaces that meet all stated surface preparation requirements.

- a. Application - Apply coating in a consistent wet film, at 90 degrees to previous coat. Ensure that coating overlaps of any previous coats are no less than 150 mm 6 inches from welds. Apply stripe coat by brush, working the material into corners, crevices, pitted areas, and welds, and onto outside corners and angles. For convenience, stripe coat material may be delivered by spray if followed immediately with brush-out and approved procedures include appropriate controls on thickness. Apply all other coats by spray application. Use appropriate controls to prevent airborne coating fog from drifting beyond [3][] meters [15][] feet from the tank perimeter [the tank berm]. The cleanliness, temperature, recoat windows, and airborne paint containment requirements may necessitate the use of portable shelters or other appropriate controls.
- b. Intercoat contamination - After application of first coat and prior to application of each subsequent coat, perform testing prescribed in paragraph PRE-APPLICATION TESTING FOR SURFACE CONTAMINATION to ensure

minimal intercoat contamination. If contamination is detected, wash per **SSPC SP 1** and re-inspect. This testing may be reduced to one half of the prescribed rate for bare steel if the testing indicates no contamination when sampling is evenly distributed over surfaces being tested. If contamination is found between coats, revert to the specified testing rate. Generally, oil and grease contamination and soluble salts contamination are not encountered if subsequent coats are applied within specified recoat windows and the quality of air entering the tank is controlled. Spot testing must be accomplished to verify satisfactory conditions and to avoid intercoat contamination. Where visual examination or spot testing indicates contamination, perform sufficient testing to verify non-contamination or to define extent of contamination for appropriate treatment.

NOTE: The flexible high adhesion material used in this section does not develop typical high stresses of epoxy coating; therefore, maximum thicknesses may be exceeded without adversely affecting the coating integrity.

Apply coating at the following specified thickness and in the following order:

<u>Coat</u>	<u>Minimum DFT (Microns)</u>	<u>Maximum DFT (Microns)</u>
Stripe Coat (not included in total)	125	200
First coat	300	375
Finish coat	300	375
Total system	600	750

<u>Coat</u>	<u>Minimum Mils DFT</u>	<u>Maximum Mils DFT</u>
Stripe Coat (not included in total)	5	8
First coat	12	15
Finish coat	12	15
Total system	24	30

Measure coating thickness in accordance with **SSPC PA 2** to confirm that coating application is within the specified range and within the tolerances of that standard. For non-compliant areas, increase number of test areas to identify all non-compliant application as required by

SSPC PA 2. Add coating as required to correct low DFT areas, and remove coating with excess thickness to bare steel and reapply as specified in PROCEDURE FOR HOLIDAY AND SPOT REPAIRS OF NEWLY APPLIED COATING.

3.9.3.1 Application of Stripe Coat

Apply stripe coat by brush, working the material into corners, crevices, pitted areas, welds, and onto outside corners and angles. A stripe coat must be applied to areas where joint sealant will be applied. This application must be consistent with APPLICATION OF COATING SYSTEM AND JOINT SEALANT. The stripe coat must be in a contrasting color and extend a width of no less than 38 mm 1.5 inches on each side of the feature being protected.

3.9.3.2 Application of First Coat

Apply first coat to all bare surfaces and stripe coat areas within recoat window of first coat.

3.9.3.3 Application of Finish Coat

Make all required repairs to first coat as specified in PROCEDURE FOR HOLIDAY AND SPOT REPAIRS OF NEWLY APPLIED COATING prior to applying finish coat. Apply finish coat of contrasting color to the first coat within recoat window of first coat. Touch-up blemishes and defects within recoat window of finish coat.

3.9.3.4 Application of Joint Sealant

After a full coating system has been installed, holiday tested, and repaired as necessary, apply sealant to the roof-to-shell joint, to all roof plate lap joints, and to roof-to-rafter joints up to 25 mm 1 inch gap to exclude moisture from these marginally prepared crevice areas.

3.9.4 Holiday Testing

When the first coat is dry to handle, but before the joint sealant is applied, perform holiday testing. For coating DFT less than 400 microns 20 mils, perform holiday testing in accordance with the low voltage wet sponge method of NACE SP0188, with no added surfactants. Dry to handle is defined as curing to the degree that the surface will not be marred or damaged by normal foot traffic. Repair holidays per PROCEDURE FOR HOLIDAY AND SPOT REPAIRS OF NEWLY APPLIED COATING. After repairs to first coat are complete, apply finish coat within recoat window.

3.9.5 Procedure for Holiday and Spot Repairs of Newly Applied Coating

Repair coating film defects at the earliest practicable time, and before application of any succeeding coats. Any holiday found must have a stripe coat applied in the area prior to application of the finish coat. Observe all requirements for soluble salts contamination, cleanliness between coats, and application conditions. Prepare defective area in accordance with SSPC SP 10/NACE No. 2, to leave 150 mm 6 inches of each succeeding coat feathered and abraded. If spot repair locations are less than 0.5 percent of the surface area and no area greater than 150 mm 6 inches in diameter, prepare surface to SSPC SP 10/NACE No. 2 vacuum blasting or SSPC SP 11 using an impact tool to create an acceptable surface profile. Protect adjacent areas from damage and overspray. Remove dust and solvent wipe the prepared area plus any additional 150 mm 6 inches beyond the

prepared area with clean denatured alcohol. Apply each coat within recoat window of preceding coat. Apply first coat to prepared steel within 4 hours of preparation and feather onto prepared coating. Apply each repair coat to approximate thickness of surrounding coating system.

3.9.6 Tank Occupancy After Coating Application

Verify the coating has reached a cured state that will allow foot traffic. Use clean canvas, or other approved, shoe covers when walking on coated surfaces, regardless of curing time allowed. Provide cushioned mats for all traffic areas.

3.9.7 Extended Cure of Coating System Prior to Immersion Service

Allow a cure time of at least 14 days after the final coating material has been applied before introducing water or fuel into tank. [Allow a cure time of 12 days after the final coating material has been applied before beginning installation of the floating pan.]

3.10 PROJECT IDENTIFICATION

At the completion of the tank work, stencil the following information on the exterior of the tank adjacent to the main manway opening in 3/4- to one-inch Helvetica style letters of contrasting color using acrylic stencil paint:

Date Interior Coated:

Project Number:

Contractor:

Address:

Coating System

Surface Prep: SSPC SP __ Profile: ____

First Coat: _____ Thickness: ____

Finish Coat: _____ Thickness: ____

Total Thickness: ____

3.11 FIELD QUALITY CONTROL

Project documentation, including inspection and testing records, must be used to determine Contractor compliance with contract requirements and approved procedures. The Contractor certifications of completion, for both invoices and for project completion, must be based on documented evidence of compliance with all requirements and approved Coating Work Plan procedures. Track inspections and tests in the Test Plan and Log.

3.11.1 Field Inspection

3.11.1.1 Inspection and Documentation Requirements

- a. Perform field inspection in accordance with [ASTM D3276](#) and the approved Coating Work Plan.
- b. Provide all tools and instruments required to perform the required testing, as well as any tools or instruments that the inspector considers necessary to perform the required inspections and tests. Document each inspection and test, including required hold points and other required inspections and tests, as well as those inspections and tests deemed prudent from on-site evaluation to document a particular process or condition, as follows:

- (1) Location or area;
- (2) Purpose (required or special);
- (3) Method;
- (4) Criteria for evaluation;
- (5) Results;
- (6) Determination of compliance;
- (7) List of required rework;
- (8) Observations.

c. Collect and record environmental conditions as described in [ASTM D3276](#) on a 24 hour basis, as follows:

- (1) During surface preparation, every hour, or when changes occur;
- (2) During coating application and the first 4 days of initial cure, every hour, or when changes occur;
- (3) Note location, time, and temperature of the highest and lowest surface temperatures each day;
- (4) Use a non-contact thermometer to locate temperature extremes, then verify with contact thermometers.

d. Data collected on environmental conditions in AUTOMATED MONITORING REQUIREMENTS may be used for overnight data; however, the data must be constantly verified as to location of sensors and validity of data with respect to the coating work being accomplished.

e. Document all equipment used in inspections and testing, including manufacturer, model number, serial number, last calibration date and future calibration date, and results of on-site calibration performed. Work documented using data from equipment found to be out of calibration must be considered as non-compliant since last calibration or calibration check, as required.

f. Document Contractors compliance with the Coating Work Plan.

3.11.1.2 [Inspection Report Form](#)

Develop project-specific report forms, as required, to report measurement and test results and observations being complete and compliant with contract requirements. This includes all direct requirements of the contract documents and indirect requirements of referenced documents. Show acceptance criteria with each requirement and indication of compliance of each inspected item. Annotation of non-compliance must be conspicuous so as to facilitate identification and transfer to the Rework Log. Report forms must include requirements and acceptance and rejection criteria, and must be legible and presented so that entered data can be quickly compared to the appropriate requirement. The data may be in any format, but must be legible and presented so that entered data can be quickly compared to the appropriate requirement.

3.11.1.3 Daily Inspection Reports

Submit one copy of daily inspection report completed each day when performing work under this Section, to the Contracting Officer. Note all non-compliance issues, and all issues that were reported for rework, in accordance with QC procedures of Section 01 45 00 QUALITY CONTROL. Each report must be signed by the QAI and the QCM. Submit report within 24 hours of date recorded on the report.

3.11.1.4 Inspection Logbook

A continuous record of all activity related to this Section must use an electronic reporting program as outlined in Table 1 and be maintained on a daily basis. The computer/software package must be used to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information including photo documentation where appropriate.

In areas where photography is not allowed, the computer must come with verification that the camera/photo capability has been removed. Alternatively, a continuous record of all activity related to this Section must be maintained in an Inspection Logbook on a daily basis. The logbook must be hard or spiral-bound book or digital program with consecutively numbered pages, and must be used to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information. Submit the original Inspection Logbook to the Contracting Officer upon completion of the of the project and prior to final payment.

3.11.1.5 Inspection Equipment

All equipment must be in good condition, operational within its design range, and calibrated as required by the specified standard for use of each device.

3.11.1.5.1 Black Light

Use a black light having a 365-nanometer intensity of 4,000 microwatts per square centimeter minimum at 380 mm 15 inches.

3.11.2 QCI Responsibilities

Minimum duties and responsibilities of the QCI include complete documentation of all daily inspection and production activities for the entire coating project as outlined in the SSPC QS-1, the Coating Work Plan, scope of work, project program, and this Section. This includes, but is not limited to, the following duties.

- a. Attend and document the pre-job meeting to review the scope of work, inspection and test plan log, schedule, and reporting requirements.
- b. Perform a project site walk-through with the QAI, QCM, inspecting at least the following:
 - (1) Surfaces to be coated
 - (2) Equipment and placement of equipment
 - (3) Materials delivery and storage

- (4) Facility operational requirements during the project
- c. Perform and report all daily and hold point inspections including, but not limited to, the following.
- (1) Check equipment, including blotter test to verify compressed air cleanliness
 - (2) Perform non-visible contaminants testing (in accordance with paragraphs PRE-PREPARATION TESTING FOR SOLUBLE SALTS CONTAMINATION and PRE-APPLICATION TESTING FOR SOLUBLE SALTS CONTAMINATION)
 - (3) Perform visible contaminants testing (in accordance with paragraphs PRE-PREPARATION TESTING FOR OIL AND GREASE CONTAMINATION and PRE-APPLICATION TESTING FOR OIL AND GREASE CONTAMINATION)
 - (4) Obtain, record, and report environmental data
 - (5) Perform abrasive field testing per [SSPC AB 1](#), [SSPC AB 2](#), or [SSPC AB 3](#)
 - (6) Perform surface preparation monitoring and testing
 - (7) Perform surface cleanliness testing
 - (8) Perform dust quantity testing
 - (9) Record materials storage documentation (record all coating and abrasive materials information, batch numbers, segregation, and storage temperature)
 - (10) Witness all coating material mixing and record mix materials temperatures, with verification of time of coating pot life
 - (11) Verify, witness, and record application method
 - (12) Perform random wet film thickness (WFT) measurements
 - (13) Perform inspection of coating application
 - (14) Obtain dry film thickness (DFT) measurements per [SSPC PA 2](#)
 - (15) Perform holiday testing in accordance with paragraph HOLIDAY TESTING
 - (16) Observe label asset identification (label stickers)
 - (17) Write Correction Action Reports (CAR), if needed
 - (18) Write Non-Conformance Reports (NCR), if needed
- d. Write a daily detailed summary of work shift inspection, testing, and the day events, including any meetings and relevant conversations. The final daily report must include a project summary that must be part of the last daily coating inspection report.

- e. The QCI must stop all non-compliant work.

3.11.3 QAI Responsibilities

QAI field responsibilities include complete documentation of all on-site work associated with coating work. These responsibilities include, but are not limited to, the following duties.

- a. Attend and document the pre-job meeting to review scope of work, ITP, schedule, and reporting requirements.
- b. Perform a project site walk-through with the QCI, prime Contractor, and QCM, inspecting at least the following:
 - (1) Surfaces) to be coated
 - (2) Equipment and placement of equipment
 - (3) Materials delivery and storage
 - (4) Facility operational requirements during the project
- c. Verify all daily and hold point inspections performed by the QCI or QCM by performing independent mirror inspections including, but not limited to, the following. Data and findings produced are not for use by the QCI and must be objectively reported through the QC program.
 - (1) Verify equipment check, including blotter test to verify compressed air cleanliness
 - (2) Verify visible contaminants testing
 - (3) Take environmental readings
 - (4) Perform surface preparation monitoring and testing
 - (5) Perform surface cleanliness testing
 - (6) Perform dust quantity test
 - (7) Record materials storage documentation (record all coating and abrasive materials information, batch numbers, segregation, and storage temperature)
 - (8) Witness all coating material mixing and record mix materials temperatures, with verification of time of coating pot life
 - (9) Verify, witness, and record application method
 - (10) Inspect coating application
 - (11) Perform dry film thickness (DFT) readings per [SSPC PA 2](#)
 - (12) Inspect asset identification (label stickers)
 - (13) Write Correction Action Reports (CAR), if needed
 - (14) Write Non-Conformance Reports (NCR), if needed

- d. The following testing is witnessed by the QAI but performed by the QCI or QCM.
 - (1) Wet film thickness (WFT) readings by coating applicator(s)
 - (2) Non-visible contaminants testing for chlorides, sulfates, and nitrates (CSN)
 - (3) Abrasive field testing per **SSPC AB 1**, **SSPC AB 2**, or **SSPC AB 3**
 - (4) Holiday testing
- e. Produce a daily detailed summary of the work shift inspections, testing, and day's events, including any meetings and relevant conversations. The final daily report must include a project summary that will be part of the last daily coating inspection report.

3.12 POST-COATING CLEANLINESS

Following completion of the work, remove all foreign matter such as blast media, dust, dirt, debris, grease, and oils. Wipe all dry to handle coated surfaces with damp lint-free cloth. Provide interior surfaces free from sources of product contamination, fit for service in[F-76][aviation turbine] [_____] fuel storage, and to the satisfaction of the Contracting Officer. Inspect for damaged coating or contamination and if found, remedy the finding to the satisfaction of the Contracting Officer.

[After removal of protective coverings, inspect motors, pumps, impellers, risers, floating roof, and gauges to ensure contamination or damage has not taken place. Should damage or contamination be found, remedy the finding to the satisfaction of the Contracting Officer.
]

Table 1 QA/QC Reporting Program Requirements	
Administrative Controls:	
Administrators must be able to turn on and off unique access to specific jobs and contracts.	
Administrators must be able to remotely enable and disable access for users.	
Administrators must be able to associate contract specific documents and specification limits quickly and easily.	
Administrators must be able to associate Product Data Sheet (PDS), SDS, blueprints, scope of work, and contracts uniquely to each job.	
Objectivity Controls:	
Data entry fields must be by multi-selectable choices, numeric keypads, pickers and skip logic to ensure repeatable data entry in a way that makes running analytics and metrics easy and objective.	
Retrievable storage must be provided for all job-related reports and documents for a minimum time of 5 years from completion of the job or project. Archiving of the documents after 5 years will be the responsibility of the Government.	
Document Library:	
All reports must be in searchable and annotatable Portable Document Format (PDF).	
Annotations and modifications must be locked and associated with the document. Only the Administrator has rights to modify or delete annotations or allow modifications to the document library especially all related inspection reports.	
Customization:	
The program must be capable of being customized to specific jobs, contracts or specifications.	

-- End of Section --