SECTION 09 97 13.00 - FUEL SYSTEM COATINGS

PART 1 - GENERAL

1.1 SUMMARY:

A. The work to be performed in this specification includes the cleaning, preparation, painting, coating, and identification of fuel system piping materials and components.

B. The preparation and application for the system shall include both field and shop operations.

C. The applicable methods and system identification to be used shall be as follows. Reference the data sheets included in this section for individual systems:

Item	Surface	Application	System
Internal Coating of Piping, Fittings, Tanks, and Equipment	Interior	Shop/Field	1
External Coating of Below Ground Piping	Exterior	Shop	4
External Coating of Below Ground Piping Joints, Repairs, and Fittings	Exterior	Field	5
External Coating of Vault and Pit Piping	Exterior	Shop	6

1.2 RELATED SECTIONS:

A. Section 33 52 43.00 - Fuel System General Provisions

B. Section 33 52 43.11 - Fuel System Piping Specialties

C. Section 33 52 43.13 - Aviation Fuel Pipe, Fittings, and Installation

D. Section 33 52 43.15 - Fuel System General Valves

E. Section 33 52 43.30 - Fuel System Service Pits and Access Covers

1.3 REFERENCES:

A. American Society of Testing and Materials (ASTM):

1. D4414 - Standard Practice for Measurement of Wet Film Thickness by Notch Gages
2. D4417 - Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
3. D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
4. E337 - Standard Test Method for Measuring Humidity with a Psychrometer

B. American Society of Mechanical Engineers (ASME):

1. A13.1 – Scheme for the Identification of Piping System
2. Z535.1 - Safety Colors

C. Energy Institute

1. EI Standard 1541 - Performance Requirements for Protective Coating Systems Used in Aviation Fuel Handling Systems
2. EI Standard 1542 - Identification markings for dedicated aviation fuel manufacturing and distribution facilities, airport storage and mobile fueling equipment

D. Association for Materials Protection and Performance (AMPP) - formerly National Association of Corrosion Engineers (NACE) and Society for Protective Coatings (SSPC)

1. SP0178 - Design, Fabrication and Surface Finish Practices for Tanks and Vessels to be lined for Immersion Service
2. SP0188 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
3. SP0490 - Holiday Detection of Fusion-Bonded Epoxy External Pipeline Coating of 250 to 760 µm (10 to 30 mil)
4. SSPC-SP 1 - Solvent Cleaning. Removes oil, grease, soil, and other substances. Used with other methods to remove rust, paint and mill scale.
5. SSPC-SP 3 - Power Tool Cleaning. Prepares steel surfaces by the use of non-power hand tools.
6. SSPC-SP 5 - White Metal Wet Abrasive Blast Cleaning. Removes all scale, rust, and foreign matter. Leaves surface gray-white uniform metallic color.
7. SSPC-SP 6 - Commercial Blast Cleaning. Two-thirds of every 9 square inches free of all visible residues, remainder only light discoloration.
8. SSPC-SP 7 - Brush-Off Wet Abrasive Blast Cleaning. Removes only loose material, remaining surface tight and abraded to give anchor.
9. SSPC-SP 10 - Near-White Metal Wet Abrasive Blast Cleaning. At least 95% of every 9 square inches shall be free of all visible residues.
10. SSPC-SP 11 - Power Tool Cleaning to Bare Metal
11. SSPC-PA 1 - Shop, Field, and Maintenance Coating of Metals
12. SSPC-PA 2 - Procedure for Determining Conformance to Dry Coating Thickness Requirements

E. National Fire Protection Association

1. NFPA 407 - Aircraft Fuel Servicing
2. NFPA 704 - Standard System for the Identification of the Fire Hazards of Materials for Emergency Response

1.4 SUBMITTALS:

A. Submittals shall include, but not be limited to:

1. Surface preparation requirements.
2. Product manufacturer, name of coating, and number designation of coating.
3. Method of application and the minimum and maximum dry film thickness of coating (per coat) to be applied.
4. Certification from the manufacturer that the unthinned maximum VOC content of the field applied coating products is below the maximum allowable for the project location.
5. Color charts for selection of paint color by the Owner.
6. Technical and material safety data sheets.
7. Third party AMPP Certified testing agency and their graphical report indicating test locations and results.

1.5 QUALITY ASSURANCE:

A. The coating applicator for field operations or for shop operations shall have a minimum of 5 years of experience in the Systems specified. The coating applicator shall certify in writing that he has previous experience applying all of the coating systems in this specification for which he is responsible.

B. Compliance submittals and certification of experience shall be submitted to the Engineer prior to starting the work.

C. The coating applicator shall provide a certificate of quality control procedures utilized during application of internal and external coatings. The certification shall include surface preparation, film thickness per coat, curing procedures, and holiday testing.

D. The coating manufacturer shall certify that the internal pipe coating used in all fuel contact locations is compatible for submersible use in Jet-A Fuel.

E. All coatings shall be applied in strict accordance with the manufacturer’s recommendations including environmental conditions, surface preparation, coating method and coverage, etc.

F. Contractor shall ensure that all newly painted surfaces remain clean and are not contaminated by subsequent blasting and painting operations. Contractor shall clean and/or recoat surfaces deemed not acceptable due to product contamination at no cost to the Owner.

G. Coating Inspection

1. Contractor shall employ the services of a third-party AMPP Certified testing agency to perform all QC requirements.
2. Field or shop inspector shall hold a AMPP Level II minimum certification and inspect the surface preparation, perform all wet film and dry film thickness testing on all shop and field applied coatings. Contractor shall submit to the Engineer the proposed testing agency for approval.
3. Inspector shall record ambient temperature, humidity, and surface temperature.
4. Inspect dry film for holidays, runs and sags.
5. Inspector shall complete a daily inspection report similar to the sample report at the end of this section.

PART 2 - MATERIALS

2.1 SYSTEM TABLES:

A. System tables for interior and exterior coatings are included within this specification to indicate the degree of preparation, methods of application, finish thickness, manufacturer names and product numbers. This specification addresses coatings for components and materials for the fuel systems.

2.2 IDENTIFICATION OF EQUIPMENT:

A. Provide identification tags with minimum 1/2" high lettering, corresponding to the valve or device label indicated on the Contract Drawings. Tags shall be made of stainless steel 1/32- inch thick with contrasting color for the engraved color. Locate tag so it is easily visible.

B. For service pits containing dual high or low point piping connections, identify the fuel main associated with each valve (east line, west line, etc.). Secure tags to the components using a metal chain. Similar identification shall be provided for valves located within valve vault access covers.

C. Provide tags for the following equipment: Isolation Valves, High Point Vents and Low Point Drains.

PART 3 - EXECUTION

3.1 INTERNAL COATING OF PIPING, FITTINGS, TANKS AND EQUIPMENT:

A. Reference System 1 of the attached tables.

B. This section shall apply to both **shop and field** applied epoxy internal coatings for piping, fittings, above ground tanks, components, exterior of piping and pipe supports that are installed internal to the tank, and equipment.

C. All fuel contact surfaces shall receive the epoxy coating and shall be free of holidays according to NACE SP0188 Discontinuity (Holiday) inspection standard. Epoxy coating shall also be qualified to EI Standard 1541, Second Edition. AMPP inspector shall inspect 100% interior of tanks and 10% of interior of piping.

D. Clean surfaces of new metal to be coated by removing rust, loose mill scale, welding slag, dirt, oil, grease, and other foreign substances. The surfaces to be painted shall be abrasive blasted immediately before applying the prime coat. Remove all surface irregularities such as burrs, weld splatter, etc., to Condition D of NACE SP0178 before proceeding with blasting. Blasting shall be in strict accordance with Society for Protective Coatings Surface Preparation Specification. Care shall be taken to prevent grease, oil, or other organic matter (including boot marks and perspiration) from contacting the blasted surface prior to application of the prime coat. Blasting shall be coordinated with primer application, which shall be applied as soon as possible after blasting. If the blasted surface does not meet the specified standard prior to primer application, it shall be re-blasted. If the blasted surface remains uncoated overnight, it

shall be re-blasted. Remove all traces of blast products from surfaces, pockets, and corners to be painted by brushing with clean brushes, by blowing with clean dry air, or by vacuum cleaning. Contractor assumes all risk by extending the primer application with the use of de-humidification.

E. Coatings shall be a two (2) coat system of epoxy paint, and be applied in accordance with the manufacturer's written instructions and SSPC PA-1. Paint shall be applied to the full internal and external length of pipe and fittings. The total dry film thickness of the paint shall be within the range recommended by the manufacturer. The ends of the pipe and fittings shall have the paint wiped back 2" with cloth or other approved absorbent material. Masking the ends will not be acceptable. The temperature of the blasted steel shall be a minimum of 5 degrees F (3 degrees C) above the dew point. Surface temperatures shall not be below 50 degrees F (10 degrees C) unless otherwise specified by manufacturer's data sheet and the relative humidity shall be no greater than 85 percent during coating application measured according to ASTM E-337. Provide heaters and dehumidification as required by conditions to maintain coating schedule.

F. Dry film thickness shall be spot checked per SSPC PA-2 at a Restriction Level 3 on the coated surfaces after each coat has been applied and has cured. For internal pipe readings, a minimum of three spot checks shall be performed at each pipe end. Exterior pipe reading procedure shall follow SSPC PA-2 Appendix 7. If film thickness is not found to be uniform and to specification by the Inspector, the Contractor shall be required to apply additional coats at no cost to the Owner until the specified film thickness has been obtained. If the dry film thickness exceeds the maximum allowable film thickness per the manufacturer, the Contractor shall remove and reapply the coating in those areas at no cost to the Owner. Dry film thickness is to be checked by the Contractor at his expense by a third-party AMPP certified coating inspector according to SSPC PA-2.

G. After the paint has dried to its maximum hardness, the ends of all pipes are to be closed with plastic cap seals manufactured for this purpose.

H. If, in the opinion of the Engineer or NACE inspector the coatings show ridges, waves, runs, orange peeling, or holidays indicating uneven coverage or improper application, the Contractor shall be required to remove and re-apply the coating at no cost to the Owner.

3.2 EXTERNAL COATING OF BELOW GROUND PIPING:

A. Reference System 4 of the attached tables.

B. External coating of below ground pipe shall be factory or mill applied in the pipe manufacturer's shop or in the mill of the custom external coater.

C. The pipe coating shall be a Fusion Bonded Epoxy (FBE) coating. For piping to be installed by bore and jack operations or directional drilling, a top coat shall be applied as specified in the tables. Coating shall be held back from the ends of the pipe 4" to facilitate field welding.

D. Holiday test all coatings and repair. All holidays shall be patched prior to shipment of pipe to the jobsite. All below ground piping shall be holiday tested on site prior to pipe burial according to NACE SP 0188. Coating shall be repaired per System 5.

E. Application, testing and inspection shall be in accordance with manufacturer's recommendations.

3.3 EXTERNAL COATING OF BELOW GROUND PIPING JOINTS, REPAIRS, AND FITTINGS:

A. Reference System 5 of the attached tables.

B. Joint coatings for piping to be pressure tested shall be applied after testing and acceptance.

C. All below ground piping shall be holiday tested on site prior to pipe burial according to NACE SP0188. Coating shall be repaired per System 5.

D. Application shall be in accordance with manufacturer's published instructions.

E. Coating of pipe to be buried, shall include welded joint connections.

3.4 EXTERNAL COATING OF VAULT AND PIT PIPING:

A. Reference System 6 of the attached tables.

B. All pipe, fittings and equipment which are installed in belowground vaults and pits shall be given a protective covering applied with equipment especially designed for this purpose. Before the coating is applied, the surface of the pipe, fittings and equipment shall be thoroughly cleaned of all rust, scale, oil, grease, and other matter that will interfere with the proper adhesion of the primer coat. Those pieces of equipment, valves, actuators, etc. that have been shop primed or delivered to the site with a finish coat shall be properly prepared for application of the coating. Contractor shall coordinate with the equipment suppliers and the coating manufacturer on the proper preparation and application of the coating. Provide certification from coating supplier that the systems are compatible.

C. The surfaces to be painted shall be abrasive blasted immediately before applying the prime coat. Remove all surface irregularities such as burrs, weld splatter, etc., before proceeding with blasting. Blasting shall be in strict accordance with The Society for Protective Coatings Surface Preparation Specification. Care shall be taken to prevent grease, oil, or other organic matter from contacting the blasted surface prior to application of the prime coat. Blasting shall be coordinated with primer application, which shall be applied as soon as possible after blasting. If the blasted surface does not meet the specified standard prior to primer application, it shall be re-blasted. If the blasted surface remains uncoated overnight, it shall be reblasted. Remove all traces of blast products from surfaces, pockets, and corners to be painted by brushing with clean brushes, by blowing with clean dry air, or by vacuum cleaning.

D. External welds shall be spot blasted to the original specified standard with a profile suitable to manufacturer's recommendation for product used. A stripe coat shall be applied on the second coat.

E. All fieldwork shall be done in a manner and with materials that will produce a covering equal in effectiveness to that of the factory applied coating.

F. Prepare the surface as specified, defined, and remove any loose rust, scale, dust, or dirt. Oil and grease are to be removed with suitable solvent. All field-applied coatings shall conform to the contour of the pipe or fitting leaving no moisture traps between or under the coating.

G. Due to the close proximity of vehicle and aircraft parking, the external coating shall be applied with rollers and brushes. Spray application is only allowed with Engineer approved work plan.

H. **ALL** equipment labels, data plates, control tubing, pressure gauges, etc., shall be masked prior to painting adjacent piping. If these items are painted, the Contractor shall clean them to the satisfaction of the Owner or replace them at no cost to the Owner.

I. Coatings shall be a two (2) coat system of epoxy paint applied in accordance with the manufacturer's written instructions and SSPC PA-1. The total dry film thickness of the paint shall be within the range recommended by the manufacturer. The temperature of the blasted steel shall be a minimum of 5 degrees F (3 degrees C) above the dew point. Surface temperatures shall not be below 50 degrees F (10 degrees C) unless otherwise specified by manufacturer's data sheet and the relative humidity shall be no greater than 85 percent during coating application measured according to ASTM E-337. Provide heaters and dehumidification as required by conditions to maintain coating schedule. For those surfaces that are shop primed only and then constructed, the recoat window time will have elapsed. Contractor shall brush blast the previously primed surfaces and apply an additional prime coat prior to the top coat.

J. Dry film thickness shall be spot checked per SSPC PA-2 at a Restriction Level 3 on the coated surfaces after each coat has been applied and has cured. Pipe reading procedure shall follow SSPC PA-2 Appendix 7. If film thickness is not found to be uniform and to specification by the Inspector, the Contractor shall be required to apply additional coats at no cost to the Owner until the specified film thickness has been obtained. If the dry film thickness exceeds the maximum allowable film thickness per the manufacturer, the Contractor shall remove and reapply the coating in those areas at no cost to the Owner. Dry film thickness is to be checked by the Contractor at his expense by a third-party AMPP certified coating inspector according to SSPC PA-2.

K. If, in the opinion of the Engineer or AMPP inspector the coatings show ridges, waves, runs, orange peeling, or holidays indicating uneven coverage or improper application, the Contractor shall be required to remove and re-apply the coating at no cost to the Owner.

3.5 PROTECTION:

A. Cover and protect all surfaces that are not to be painted which are in close proximity to the painting operation. Remove all protective materials when appropriate and before materials such as masking tape becomes difficult to remove.

B. Provide signs to indicate fresh paint areas.

C. Mask, remove, or otherwise protect finish hardware, control tubing, pressure gauges, control devices, and equipment nameplates as necessary. Provide cover to prevent paints from entering orifices in electrical or mechanical equipment.

D. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, rags, thinners, etc. Dispose of leftover containers, thinners, rags, brushes, rollers, etc. in accordance with applicable regulations.

3.6 CLEANING:

A. Touch up and restore damaged finishes to original condition as required. Remove all masking tape residue and glues that may be left on surfaces.

B. Remove spilled, dripped, or splattered paint from all surfaces.

3.7 COATING REPAIRS:

A. Repair all damages to pipe coating systems before the piping is holiday tested. This includes all cuts, breaks, voids, bruised or scarred spots, or other damage caused prior to delivery, or resulting from handling or installation of the pipe, or from any cause whatsoever.

B. Included also are damaged coatings where new connections are made to existing coated pipes or where existing coated pipes are uncovered or exposed for any reason.

C. Also repair the coating where welds are made and where damaged or broken by the installation of instrumentation or other accessories or appurtenances.

D. Repair all holidays detected during inspection of coatings. Use the same coatings for repair as was used for the base coating.

1. Below ground piping shall use system 5 for repairs.

3.8 INSPECTION:

A. Contractor shall employ the services of a third-party AMPP certified coating inspector. Inspector shall provide daily reports of environmental conditions including ambient temperature, substrate temperature, relative humidity, and wind speed direction.

B. Surface profile shall be tested using ASTM D4417 Replica tape. Ensure correct mil range tape is used. Include with daily reports.

C. Prior to coating but post blasting, ensure all dust is removed. Use clear cellophane tape to determine the amount of dust from abrasive blasting and other sources has not been removed. Press the tape on the surface, peel off, and visually observe the amount of dust that sticks to the tape. Clean the test area with acetone or alcohol to remove tape adhesive from prepared surface. The test tape showing the dust particles shall be documented by applying it to the daily inspection report.

D. Use wet film gauges to check each application per ISO 2808 at a maximum interval of 15 minutes in order to correct low or heavy film build immediately.

E. Use dry film gauge to check each coat when dry, and the total system when completed in accordance with SPCC PA-2.

F. Use holiday or pinhole detector to detect and correct voids when indicated on system sheet according to NACE SP0188.

COATING DAILY INSPECTION REPORT					1 of 2
Project:				Date:	
Feature:				Report By:	
Contract No:			Paint Contractor:		
SPECIFICATIONS	Tabulation No: _____		Item to be Coated: _____		
Coating Category: _____	Total DFT (min.): _____ mils		Tab Surface Prep. Method: _____		
Coat No.	Material Manufacturer		Product Name		DFT Range
Primer:					
Intermediate:					
Topcoat:					
WEATHER	Reading Time:				
1. Substrate Temperature (degrees F):					
2. Ambient (Dry Bulb) Temp. (degrees F):					
3. Wet Bulb Temperature (degrees F):					
4. Relative Humidity (percentage):					
5. Dew Point Temperature (degrees F):					
6. Item (1) minus (2) (in degrees F):					
7. Wind (mph) and Direction:					
Comments:					
SURFACE PREPARATION	Surface Preparation Method Used:		SSPC-SP _____ / NACE No. _____		
Abrasives: Manufacturer: _____		Product Name: _____		Class A, Type _____	
Contaminants (ASTM D 4940):	Fines __ yes / __ no; Oil __ yes / __ no; pH ____; Conductivity_____				
Chloride Specific Ion:	Test Method Used _____; Results _____				
Compressor Air:	Type: _____	_____ CFM	Passes ASTM D 4285: ___ yes / ___ no		
Surface Profile (NACE RP 0287):	No. Measurements Taken _____; Averaged Measured _____ mils				
Cleanliness:	Chloride Specific Ion:	Test Method Used _____ _; Results _____			
Visual Standards (SSPC/NACE):	VIS 1 __ yes / __ no; VIS 2 __ yes / __ no; VIS 4 (I) __ yes / __ no				

COATING DAILY INSPECTION REPORT 2 of 2
APPLICATION AND MATERIALS
Manufacturer Product Name Batch Number Gal Color Thinner Product Gal/Oz %
Environmental Control: Heaters ___ yes / ___ no; Dehumidification ___ yes / ___ no, Unit Size _____
Material Mixing: Power Mixing Time _____ minutes; Induction Time ___ yes / ___ no, _____ minutes
Stripe Coats Applied: ___ yes / ___ no; Method: ___ Bush/Roller ___ Spray
Application Method: ___ Brush; ___ Roller; ___ Airless; ___ Conventional; ___ Plural; ___ Electrostatic
Applied Within Recoat Window: Primer __ yes /__ no; Intermediate __ yes /__ no; Topcoat __ yes /__ no
Wet Film Thickness (WFT): Primer _____ mils; Intermediate _____ mils; Topcoat _____ mils
Comments:
TESTING OF HARDENED COATING
Dry Film Thickness (DFT) by SSPC-SP PA2:
Area Inspected: ___ less than 300 ft^2; ___ less than 1,000 ft^2; ___ equal to or greater than 1,000 ft^2
Number of 5 Spot Measurement Groups Taken Within Above Inspected Area: _____ at _____ 100 ft^2 areas
Average of 5 Spot Measurement Groups _____ mils; Conform to Specifications ___yes /___no
Discontinuity (Holiday) Testing by NACE RP 0188
Tester Used: _____ Low Voltage (Sponge) _____ High Voltage
Set at _____ volts; Number of Defects Found _____; Defects Repaired ___ yes / ___ no
Comments:

3.9 COATING TABLES

FUEL SYSTEM COATINGS SYSTEM - 1

SERVICE: Internal Coating of Piping, Fittings, Tanks, and Equipment.

Surface Preparation: SSPC-SP 10 to a profile depth recommended by product manufacturer.

First Coat: Multi-purpose, jet-fuel resistant, epoxy coating. Apply at a rate to meet the manufacturer's recommended dry film thickness. Do not exceed the maximum dry film thickness as published by the manufacturer. Wipe coating 2" from end of pipe.

Second Coat: Same as first coat except color shall be different that first coat to distinguish between coats. Second coat shall be white, light gray, or beige for light reflectance and to facilitate inspection. Wipe coating 2" from end of pipe.

Third Coat: Not required.

System Total: System total shall meet the recommended dry film thickness.

Volatile Organic Content: Shall meet all state and local regulations.

Manufacturer	First Coat	Touch Up	Second Coat	Third Coat
International Paint LLC.	Interline 850	N/A	Interline 850	N/A
Tnemec	Tneme-Liner Series 61	N/A	Tneme-Liner Series 61	N/A
US Coatings	GripLine 6520	N/A	GripLine 6520	N/A
PPG	Amercoat 240	N/A	Amercoat 240	N/A

Notes:

1. Upon completion, check for voids with a suitable electric holiday detection operating at the proper voltage as recommended by the manufacturer. Repair all holidays.
2. Stainless steel valves, piping, fittings, etc. shall not be coated.

FUEL SYSTEM COATINGS SYSTEM - 4

SERVICE: External Coating of Below Ground Piping

Surface Preparation: SSPC-SP 10 to a profile depth recommended by product manufacturer.

First Coat: Shop applied, fusion bonded epoxy powder. Apply at manufacturer's recommended minimum dry film thickness. Wipe back the coating 2" from the end of the piping.

Second Coat: Only required for piping used in directional drill or bore and jack installations.

Third Coat: Not required.

System Total: manufacturer's recommended minimum dry film thickness.

Touch Up: Field applied, two component catalyzed epoxy as recommended by the manufacturer.

Manufacturer	First Coat	Touch Up	Second Coat	Third Coat
3M	Skotch-Kote 6233	Skotch-Kote 226P Hot Melt Patch Compound	Skotch-Kote 6352	N/A
Lily Coatings	PipeClad 2000	PipeClad Patch Compound	Pipeclad 2040 ARO	N/A

Notes:

1. Shop coated pipe shall have specification, grade, and heat number stenciled on the coating.

FUEL SYSTEM COATINGS SYSTEM - 5

SERVICE: External Coating of Below Ground Piping Joints, Repairs, and Fittings

Surface Preparation: Cleanliness: Near White; Standards: SSPC-SP 10. Sweep blasting is required if the maximum recoat window is exceeded. Holiday repairs shall be sanded with 80 grit carborundum cloth. All dust from sanding or blast roughening shall be removed from the surface prior to the application of coating.
Profile: 2.5 mils minimum to 5.0 mils maximum.

First Coat: Apply Brush Grade with brush or roller. Apply without runs, drips or sags.

Second Coat: Not Required.

Third Coat: Not required.

System Total: 20 mils minimum to 50 mils maximum (single coat).

Inspection: Check for voids with an electronic holiday detector.

Manufacturer	First Coat	Touch Up	Second Coat	Third Coat
Special Polymer Coatings	SP-2888	N/A	N/A	N/A
Denso (see note 1)	Protal 7200	N/A	N/A	N/A
Chase Corporation	TC 7100	N/A	N/A	N/A
3M	Skotchkote 323+	N/A	N/A	N/A
PPG	Amercoat 240	N/A	N/A	N/A

Notes:

1. Denso may only be used when abrasive blasting is not allowed. Contractor shall receive written approval from the Owner prior to submitting Denso product. Contractor shall perform surface preparation to SP-11 Power Tool Cleaning to Bare Metal. Profile roughness shall be a minimum of 1.0 mil as measured in accordance with Method C of ASTM D4417.

FUEL SYSTEM COATINGS SYSTEM - 6

SERVICE: External Coating of Vault Piping, Hydrant Valve Pit, High Point Vent and Low Point Drain Pit Piping

Surface Preparation: SSPC-SP 10 to a profile depth recommended by product manufacturer.

First Coat: High build, high solids epoxy. Apply at a rate to meet the manufacturer's recommended dry film thickness. Do not exceed the maximum dry film thickness as published by the manufacturer.

Second Coat: High build, high solids epoxy. Apply at a rate to meet the manufacturer's recommended dry film thickness. Do not exceed the maximum dry film thickness as published by the manufacturer.

Third Coat: Not required.

System Total: System total shall meet the recommended dry film thickness.
Volatile Organic Content: Shall meet all state and local regulations.

Manufacturer	First Coat	Touch Up	Second Coat	Third Coat
PPG	Amerlock 2/400 (Note 4)	Same as first coat	Amerlock 2/400 (Note 4)	N/A
Tnemec	Series V69	Same as first coat	Series V69	N/A
Sherwin Williams	Macropoxy 646	Same as first coat	Macropoxy 646	N/A

Notes:
1. Gloss or high gloss will not be acceptable.
2. Top color shall be white for all piping, equipment, and tanks. For all carbon steel manual (butterfly, ball, check, plug, etc.) and control valves, the top color shall be black for Jet-A service and shall be royal blue for Avgas service per EI 1542. Fire pipe shall be red.
3. Stainless steel valves, piping, fittings, etc. shall not be coated. All electrical equipment and conduit shall not be coated.
4. For application during colder weather, down to 32F, Amerlock 2 should be used. For application during warm weather, Amerlock 400 should be used. Adhere to coating manufacturer's requirements.

END OF SECTION 09 97 13.00