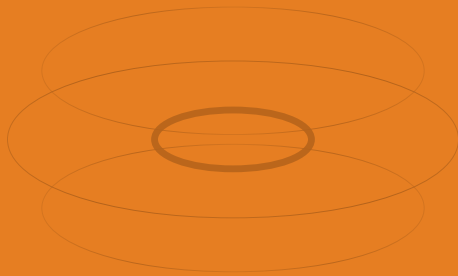


OWNER

Above-Ground Painting

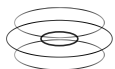


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TORUS

[REDACTED] [REDACTED], [REDACTED] County, [REDACTED]

ISSUE SUMMARY AND APPROVAL

This page records each issue of SPC-SPC-010. The preparer, reviewer and approver sign for each revision.

Rev.	Date	Issue purpose	Description
A	2026-09-29	Issued for Review	First issue

Contributors

Rev.	Discipline	Prepared by	Reviewed by	Approved by
A	Specifications			

SECTION PC-SPC-010 ABOVE-GROUND PAINTING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes the surface preparation, application, inspection and repair of protective coatings on above-grade carbon steel at the :
1. Above-grade carbon steel process (A6), fuel gas (A1) and drain (D1) piping, fittings, flanges and valve bodies, both field-painted items and shop-primed items finished in the field.
 2. Pipe supports, pipe shoes, structural steel that is not hot-dip galvanized, the SK-110 canopy framing where delivered unpainted, and platforms and stair stringers that are not galvanized.
 3. Field touch-up of shop-painted equipment (V-101, H-101, PR-101, SK-110, FG-101 and the T-101 exterior) after setting and hook-up, using the vendor's system or a compatible system approved by the EOR.
 4. Pipe marking, flow arrows and line identification to ASME A13.1, and safety color coding.
 5. Shop painting of Contractor-furnished spools and steel, where the Contractor elects to shop paint.
- B. The following shall not be painted, except for touch-up of factory finishes with the manufacturer's kit: stainless steel, including all class S1 vent and blowdown piping (lines 1070 to 1077, 1160, 1161, 1170 and the vent laterals), the orifice downstream flanges and vent stack VS-101 with its strakes, T1 tubing and analyzer sample systems; aluminum; galvanized surfaces; the fiberglass shelter B-101; the prefabricated B-102 exterior; nameplates, gauge faces, valve stems, machined and gasket faces; insulating joint bodies; instrument and actuator housings with factory finish; cable tray, conduit and electrical enclosures. Galvanized items shall not be painted unless the drawings call for a duplex coating.
- C. Related sections: SPC-SPC-004, Structural Steel, Canopy and Pipe Supports (galvanizing); SPC-SPC-006, Piping Fabrication and Installation; SPC-SPC-009, External Coating of Buried Pipe and Field Joints (soil-to-air transitions, which the paint system overlaps by 6 in); SPC-SPC-019, Inspection and Test Plan.

1.02 REFERENCES

- A. Codes and standards:
1. 49 CFR 192.479, Atmospheric corrosion control: general.
 2. SSPC-SP 1, SP 2, SP 3, SP 6, SP 10, SP 11 and SP 16; SSPC-PA 1 and PA 2; SSPC-VIS 1 and VIS 3; SSPC Paint 20 and Paint 36.

3. ASTM A780 (repair of galvanized coatings), D3359, D4285, D4414, D4417, D4541, D4752, D5162, D7091 and E337.
4. ISO 8502-3, 8502-6 and 8502-9.
5. ASME A13.1-2020, Scheme for the Identification of Piping Systems; ANSI Z535.1, Safety Colors.
6. AMPP SP0198, Control of Corrosion Under Thermal Insulation and Fireproofing Materials.

B. Project documents: GEN-DB-001, Basis of Design (three-coat system of zinc-rich epoxy, epoxy and polyurethane); MEC-LST-001, Line List; MEC-LST-002, Mechanical Equipment List (vendor paint systems); PIP-SPC-001, Piping Material Specification; PIP-DWG-001 to PIP-DWG-003, Piping General Arrangement; PIP-DWG-006, Typical Pipe Support Details; MEC-CAL-005, Pipe Support Spans and Support Loads; PRO-CAL-004, Line Heater H-101 Sizing.

1.03 DEFINITIONS

- A. System A: the three-coat system for carbon steel piping and non-galvanized steel (2.02).
- B. System B: touch-up of vendor-painted equipment with the vendor's system (2.04).
- C. System C: a surface-tolerant repair system for use where blasting is not permitted (2.05).
- D. Spot: the average of three gauge readings within a 1.5 in circle, per SSPC-PA 2.
- E. DFT: dry film thickness.

1.04 SUBMITTALS

- A. The Contractor shall submit the items in Table 1-1 for the action shown.

Table 1-1: Submittal Schedule

No.	Submittal	Timing	Action
10-S1	Painting procedure: surface preparation, equipment, ambient controls, application, recoat windows, inspection, repair, containment and waste handling	21 days before painting	EOR and Owner approval
10-S2	Product data sheets and safety data sheets for every coat, with confirmation that all coats are from one manufacturer	With 10-S1	Review
10-S3	Color schedule and pipe-marking legend (3.07)	With 10-S1	Owner approval
10-S4	Coating inspector certification (AMPP CIP Level 2 minimum) and instrument calibration certificates	14 days before painting	Review
10-S5	Shop painting records for Contractor shop-painted spools and steel	With delivery	Review
10-S6	Daily painting reports QF-10-01 and DFT records QF-10-02	Daily	Review
10-S7	Waste characterization and disposal records for spent abrasive and paint waste	Monthly and at completion	Review

1.05 QUALITY ASSURANCE

- A. Painting shall be inspected by a Contractor coating inspector certified at AMPP CIP Level 2 or higher.
- B. Hold and witness points shall be as listed in 3.08 and in SPC-SPC-019.

1.06 MEASUREMENT AND PAYMENT

- A. Pay item 10.01, Above-ground painting and touch-up, including soil-to-air transitions: lump sum. The price shall include surface preparation, all coats, masking, shop painting of Contractor-furnished spools and steel, touch-up of vendor-painted Owner-furnished equipment for damage in shipping or installation (up to 2 % of the painted surface of each item), pipe marking, color coding, waste disposal, inspection and records. The soil-to-air transition wrap itself is paid under pay item 09.01.
- B. Damage to vendor finishes beyond 2 % of an item's surface, and defective vendor finish reported on receipt, shall be paid as force-account work under pay item 01.06.
- C. Rework to meet the acceptance criteria shall be at the Contractor's cost.

PART 2 PRODUCTS

2.01 GENERAL

- A. All paint materials shall be Contractor-furnished, and all coats of a system shall be from one manufacturer so that intercoat compatibility is the manufacturer's responsibility. Primers containing lead, chromates or coal tar shall not be used.

2.02 SYSTEM A: CARBON STEEL PIPING AND NON-GALVANIZED STEEL

- A. System A shall be used for service from -20 to 150 °F and shall meet Table 2-1.

Table 2-1: System A

Coat	Generic type	DFT, mils	Notes
Primer	Organic zinc-rich epoxy, at least 77 % zinc by weight in the dry film (SSPC Paint 20 Type II, Level 2 or better)	3.0 to 5.0	Applied within 4 hours of blasting
Intermediate	High-build polyamide or polyamine epoxy	4.0 to 6.0	Color contrasting with primer and topcoat
Topcoat	Two-component aliphatic acrylic polyurethane, gloss retention for UV service (SSPC Paint 36, Level 3)	2.0 to 3.0	Color per 3.07
Total		9.0 to 14.0	

2.03 SYSTEM A-HT: HEATER PIPING ABOVE 150 °F

- A. Where the line list shows a design temperature above 150 °F (the H-101 coil connections and line 12"-G-1022-A6 near the heater outlet), an inorganic zinc primer of 3.0 to 4.0 mils shall be used, with two coats of silicone-acrylic topcoat rated to 400 °F at 1.0 to 1.5 mils per coat, or the heater vendor's system. The extent shall be confirmed against PRO-CAL-004, because polyurethane topcoats degrade above about 200 °F.

2.04 SYSTEM B: VENDOR-PAINTED EQUIPMENT

- A. Vendor-painted equipment shall be touched up with the vendor's specified materials. Where the vendor system is unknown or incompatible, System C shall be used.

2.05 SYSTEM C: SURFACE-TOLERANT REPAIR

- A. System C shall be an aluminum-pigmented surface-tolerant epoxy mastic primer at 5.0 to 7.0 mils, with an aliphatic polyurethane topcoat at 2.0 to 3.0 mils.

2.06 ABRASIVE

- A. Abrasive shall be dry, clean and angular: coal slag, garnet, aluminum oxide or steel grit, free of oil, with chloride content under 25 ppm on the supplier's certificate. Silica sand, and any abrasive with more than 1 % free crystalline silica, shall not be used.

PART 3 EXECUTION

3.01 PROTECTION OF THE WORK

- A. Gasket and flange faces, valve stems, nameplates, instrument connections, tube fittings, insulating joints, the ultrasonic meter transducer ports and bodies of FE-111 and FE-121, thermowells, actuator housings and all stainless surfaces shall be masked.
- B. No blasting shall take place within 50 ft of meter skid transducers, analyzers or electrical equipment unless they are enclosed and sealed.
- C. After gas-in under SPC-SPC-012, blasting and power-tool work on live piping shall require a hot work permit under CON-RPT-003. System C with hand or power tool preparation (SSPC-SP 2 or SP 3) shall be preferred on live systems.

3.02 SURFACE PREPARATION

- A. Surfaces shall be solvent cleaned to SSPC-SP 1.
- B. Sharp edges shall be ground to a 1/16 in radius minimum, and weld spatter and laminations removed, with weld seams smooth.
- C. Surfaces for System A shall be blasted to SSPC-SP 10 (near-white). SSPC-SP 6 (commercial) shall be accepted only on support steel not in contact with pipe, and only with the EOR's written approval.

- D. Anchor profile shall be 1.5 to 3.0 mils, or the zinc primer manufacturer's range, angular, measured by replica tape (ASTM D4417 Method C).
- E. Soluble chlorides shall not exceed $5 \mu\text{g}/\text{cm}^2$ (Bresle), tested once per 200 ft² or per spool with at least three tests per shift.
- F. Dust shall be removed to ISO 8502-3 rating 2 or better.
- G. Primer shall be applied within 4 hours of blasting and before visible rust bloom. Surfaces with rust bloom shall be re-blasted.

3.03 AMBIENT CONDITIONS

- A. Painting shall not take place outside the limits in Table 3-1.

Table 3-1: Ambient Limits

Parameter	Limit
Steel temperature above dewpoint	5 °F minimum
Relative humidity	85 % maximum; zinc-rich epoxy may need a minimum humidity for cure, per the product data sheet
Steel temperature	50 to 120 °F, or the product range if narrower
Wind	No spray application above 15 mph unless shrouded

3.04 APPLICATION

- A. Coatings shall be applied by airless spray, brush or roller as the product data sheet allows. All welds, edges, bolts, nuts and crevices shall be stripe coated by brush with the intermediate coat before the full intermediate coat, because film thickness pulls away from edges.
- B. Wet film thickness shall be measured during application (ASTM D4414) to control DFT.
- C. Minimum and maximum recoat windows shall be observed. Where the maximum is exceeded, the surface shall be abraded and solvent cleaned before the next coat.
- D. Flange outside diameters and bolt holes shall be painted before bolt-up. After bolt-up and pressure testing, the flange rim shall be touched up and the topcoat applied over studs and nuts, unless the bolting is PTFE or zinc-nickel coated. Torque marks shall not be painted over until the joint is accepted under SPC-SPC-006.
- E. Field welds shall be left bare for 3 in on each side until NDE and pressure test acceptance, then prepared and painted with System A. SSPC-SP 11 preparation in place shall be acceptable for field welds with the EOR's approval; otherwise System C shall be used.

3.05 CORROSION AT SUPPORTS

- A. Pipe at supports shall have a factory-welded wear pad or saddle, or a non-metallic isolation pad (FRP half-round or composite), per PIP-DWG-006 and MEC-CAL-005. The paint system shall be complete and cured on the pipe before the pipe is set on the support.
- B. Pipe shall not be set directly on unpainted or galvanized steel. A dielectric isolation pad shall be used between pipe and structural steel at every support on cathodically protected piping near grade, and wherever the drawings show one.
- C. U-bolts shall be plastic coated or fitted with a non-metallic sleeve.
- D. Insulated meter tubes and any other insulated piping shall be coated with System A, or with an immersion-grade epoxy phenolic per AMPP SP0198 where the insulation vendor recommends it, before insulating, and the jacket shall be sealed against water ingress.

3.06 GALVANIZED AND STAINLESS STEEL

- A. Damaged galvanizing shall be touched up with zinc-rich paint to ASTM A780, with at least 95 % zinc in the dry film, to 1.5 times the adjacent galvanizing thickness.
- B. Stainless steel, including all S1 piping and VS-101, shall not be painted unless PIP-SPC-001 calls for a coating (for example under insulation or at a buried transition), in which case only a chloride-free system approved by the EOR shall be used. Stainless shall be protected from contact with carbon steel tools, grit and chlorides, and only stainless wire brushes shall be used on it.
- C. No zinc-rich or zinc-containing coating, and no chloride-containing coating, primer, touch-up, marking paint, tape adhesive or cleaner, shall be applied to or oversprayed onto stainless steel. Zinc on austenitic stainless steel can cause liquid metal embrittlement if the surface is later heated by welding or fire, and chlorides cause pitting and stress corrosion cracking. S1 piping and VS-101 shall be masked when adjacent carbon steel is painted, and any overspray shall be removed with a chloride-free solvent and a stainless or non-metallic pad and reported on QF-10-01.
- D. S1 piping shall be marked with chloride-free, low-halogen markers (halogens 200 ppm maximum) or with stainless tags on stainless wire.
- E. Where S1 piping rests on or is clamped to painted or galvanized carbon steel, a non-metallic isolation pad or sleeve shall be provided under SPC-SPC-004, so that painted or galvanized surfaces do not touch the stainless.

3.07 COLOR SCHEDULE AND MARKING

- A. Final colors shall be approved by the Owner (submittal 10-S3). The default schedule is Table 3-2.

Table 3-2: Default Color Schedule

Item	Topcoat color	Basis
Natural gas process piping (A6) and valve bodies	Yellow, or Owner standard; markers black on yellow	ASME A13.1, flammable fluid
Fuel gas piping (F lines)	Yellow, with "FUEL GAS" markers	ASME A13.1, flammable fluid
Vent and blowdown piping (V lines, stainless, unpainted)	Markers only: "VENT GAS", black on yellow	ASME A13.1, flammable fluid
Liquid drains (L lines) to T-101	Markers "HYDROCARBON LIQUID", white on brown	ASME A13.1, combustible fluid
SDV-101, SDV-102 and SDV-103 handwheels and actuator identification	Red identification band	ANSI Z535.1
Pipe supports and structural steel, if painted	Gray	Owner standard
Equipment (V-101, PR-101, FG-101, T-101)	Vendor finish, Owner-approved color	
Fire extinguisher stands and ESD pushbutton posts HS-201 to HS-204	Red	ANSI Z535.1
Bollards and trip hazards	Safety yellow	ANSI Z535.1

B. Pipe markers with legend and flow arrow shall be placed at every valve, branch, change of direction and wall penetration, and at no more than 25 ft intervals on straight runs, visible from the normal operator position, with letter height and marker length per ASME A13.1 for the pipe OD.

C. Line numbers from MEC-LST-001 shall be stenciled on each line at the tie-points and at each end of each line.

3.08 FIELD QUALITY CONTROL

A. Inspection instruments shall be verified as Table 3-3 shows.

Table 3-3: Inspection Instruments

Instrument	Standard	Verification
Type 2 electronic DFT gauge	SSPC-PA 2, ASTM D7091	On certified shims bracketing the target DFT at the start of each shift; annual calibration
Wet film gauge	ASTM D4414	Visual check
Replica tape and spring micrometer	ASTM D4417 Method C	Micrometer zero check at each use
Psychrometer or electronic dewpoint meter	ASTM E337	Annual calibration
Surface thermometer		Annual calibration
Bresle kit and conductivity meter	ISO 8502-6 and 8502-9	Calibration solution each shift

Instrument	Standard	Verification
Pull-off adhesion tester, self-aligning	ASTM D4541 Method D or E	Annual calibration

B. Inspection frequency shall be as Table 3-4 shows.

Table 3-4: Inspection Frequency

Check	Frequency
Ambient conditions	Start of each shift and every 2 hours
Surface cleanliness	100 %, visual against SSPC-VIS 1
Profile	3 readings per 100 ft ² or per spool, at least 3 per shift
DFT per coat	SSPC-PA 2 Level 3 (restricted) for piping; for NPS 12 and smaller, 5 spots per 10 linear ft, at least 5 spots per spool or item
Pull-off adhesion	3 dollies on the first spool painted by each crew, then one test area per 500 ft ² , with all test sites repaired
Final visual	100 %

C. The Contractor shall record the work on QF-10-01 (daily painting report), QF-10-02 (DFT record), QF-10-03 (adhesion test) and QF-10-04 (final punch list), all turnover records under SPC-SPC-020.

D. The hold and witness points in Table 3-5 apply. Party codes: C Contractor, O Owner, E EOR, W receiving pipeline operator; H hold, W witness, R review, S surveillance, P perform.

Table 3-5: Hold and Witness Points

ID	Activity	C	O	E	W	Record
HP-10-01	Painting procedure and products approved (10-S1, 10-S2) before any painting	P	R	H	-	Approved procedure
HP-10-02	Surface preparation accepted (cleanliness, profile, salts) before primer, on the first spool of each crew and each shop	P	H	-	-	QF-10-01
WP-10-01	Routine surface preparation, one item in ten	P	W	-	-	QF-10-01
WP-10-02	Routine DFT of each coat	P	W	-	-	QF-10-02
WP-10-03	Pull-off adhesion test on the first spool of each crew	P	W	-	-	QF-10-03
WP-10-04	Stainless walk-down: S1 piping and VS-101 unpainted, free of zinc and chloride contamination, isolated from carbon steel	P	W	-	-	QF-10-01
HP-10-03	Final coating acceptance before mechanical completion, including pipe marking and color schedule	P	H	-	-	QF-10-04

3.09 ACCEPTANCE

A. Painting is accepted when it meets every criterion in Table 3-6.

Table 3-6: Acceptance Criteria

Parameter	Criterion	Method
Cleanliness	SSPC-SP 10 for System A	Visual against SSPC-VIS 1
Profile	1.5 to 3.0 mils, or the product range	Replica tape, ASTM D4417
Soluble chlorides	5 µg/cm ² maximum	Bresle patch
Primer DFT	3.0 to 5.0 mils; spots no lower than 80 % of 3.0 or higher than 120 % of 5.0 mils; area average within range	Type 2 gauge, SSPC-PA 2
Intermediate DFT	4.0 to 6.0 mils, same rule	Type 2 gauge, SSPC-PA 2
Total DFT, System A	9.0 to 14.0 mils; no spot below 8.0 or above 16.0 mils	Type 2 gauge, SSPC-PA 2
Adhesion	Pull-off at least 500 psi for the System A total, with no adhesive failure at the primer-to-steel interface below 500 psi; tape test 4A or better (ASTM D3359 Method A) where pull-off is impractical	ASTM D4541, D3359
Cure	Solvent rub rating 4 or better on zinc-rich primer before topcoating, where the product requires	ASTM D4752
Appearance	Uniform color and gloss; no runs, sags, pinholes, holidays, dry spray, overspray on excluded items or primer mud cracking	Visual
Stainless steel	Unpainted; no zinc, overspray or chloride-bearing marking; isolated from carbon steel supports	100 % walk-down before the S1 pressure test and before mechanical completion
Marking	Legend, color and arrows per the approved schedule at all required locations	Visual, ASME A13.1
Supports	Isolation or wear pad at every support shown; no bare steel contact	Visual

END OF SECTION