

Revised:
 10/24/07, 10/24/08, 9/25/09, 2/11/10, 4/19/10,
 5/4/11 (see List of Revisions in Part I)

**HARTS LOCATION
 16396A**

April 26, 2012

SPECIAL PROVISION

AMENDMENT TO SECTION 550 -- STRUCTURAL STEEL

PART I of III -- PROJECT-SPECIFIC REQUIREMENTS

This special provision amends Section 550 and applies to the coating of new structural steel as shown on the plans or otherwise specified to be painted. This special provision consists of three parts. Part I amends the general requirements of Part II with project-specific requirements. Part III contains Section 708, Paints.

Amend 550.3.13.1.2 to read:

1.2 DESCRIPTION OF BRIDGE(S)

1.2.1 The description of newly fabricated structural steel to be painted is stated herein. All descriptions regarding the bridge(s) and surface area(s) are intended to be generally, but not guaranteed to be precisely, accurate.

1.1.2.1

DESCRIPTION OF BRIDGES - SUMMARY TABLE 1.2.1				
Town	Br. No.	Route	over	structure type
Harts Location	235/059	US Rte 302	Sawyer River	steel I-beam

Amend 550.3.13.1.3 to read:

1.3 SCOPE OF WORK

SCOPE OF WORK - SUMMARY TABLE 1.3				
Item No.	Surfaces to be painted	Surface Preparation	Required Paint System	Final Color
550.1	All structural steel within 10 feet of CL of bearing at abutments A and B, except not on fascias surfaces of fascia beams	SSPC-SP10 & SC 2	3-coat system A, B, or C (with Finish #1)	Dark Brown Fed # 20062

1.3.1 Surfaces to be painted. All new steel surfaces, including beams, connection plates, diaphragms, cross frames, and bearings within ten feet of the center line of bearings, shall be cleaned and painted, including the portion encased in concrete (if applicable), except the fascia surfaces of fascia beams, as shown on the plans or as described herein for the applicable item. See Table 1.3.

1.3.1.1 Finished bearing surfaces. When bearings are to be painted, the surface preparation and painting shall include the machined finish for rolling (but not for sliding) surfaces. All surfaces shall

receive the full paint system except steel-to-steel contact surfaces shall be primed only. The bottom surface of masonry plates shall receive the full paint system. Areas to be field welded shall be masked off, welded, and then cleaned and painted with the full paint system.

1.3.2 Required Surface Preparation. All steel surfaces to be painted shall be cleaned in conformance to SSPC-SP10 and the chloride level remediated to SC 2 (see Section 3.2.6.7).

1.3.3 Required Paint System

1.3.3.1 The complete paint system shall be shop applied to the structural steel as described in Table 1.3 and shown on the plans, except for areas masked for field welding or bolted connections (see Section 3.4.12), or as directed. Field bolted connections shall receive one application of primer prior to installation of the member, and the remaining coats of the system after installation. New top flange surfaces to be embedded in deck concrete shall receive a light rust preventative dust coat of 0.5 to 1.5 mils (13-38 microns) of primer only in the length of beam to be painted. Beam ends to be encased in back wall concrete (if applicable) shall receive the full paint system.

1.3.3.1.1 Steel surfaces with a non-skid finish shall meet the requirements of 2.1.1 and 3.4.13.

1.3.3.2 The finish color and paint system for Items 550.xxx SHALL BE THE SAME AS FOR ITEM 556, Painting Existing Structural Steel. See Table 1.3. It is the Contractor's responsibility to coordinate suppliers to achieve this requirement.

1.3.3.3 The finish color shall be as shown in Table 1.3.

Add to 550.1.7.3 the following:

Batch samples for testing are not required. Provide to the Materials Lab a certificate of conformance from the coating manufacturer including a batch analysis for each production lot for each coating.

Add the following to 2.2. Coatings:

10. Coatings containing lead or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.
11. A dry film sample of each coat (e.g. primer, intermediate, and finish) shall be tested by a laboratory certified by AIHA or A2LA under the ELLAP program (Environmental Lead Laboratory Accreditation Program) to determine its total lead content. The analytical test method shall be sufficient to provide a minimum detection limit no greater than 100 ppm. Acceptable test methods include: ASTM D 3335 (Atomic Absorption Spectroscopy), AOAC 974.02 (Lead in Paint), and ASTM E1613 (Inductively Coupled Plasma (ICP) spectroscopy).
12. The percentage of total lead in each coating shall be reported to the Department and shall not exceed 0.01 percent (100 ppm).
13. A written certificate of conformance shall be submitted to the Department for the coatings supplied stating that the paint is "lead-free".

Revision date	LIST OF REVISIONS (generally stated - see specification for actual wording)
04/26/12	<ul style="list-style-type: none"> • Update Part III - Section 708 approved paint systems.
05/04/11	<ul style="list-style-type: none"> • Update Part III - Section 708 approved paint systems.
11/18/10	<ul style="list-style-type: none"> • Update Part III - Section 708 approved paint systems.
4/19/10	<ul style="list-style-type: none"> • 2.2 - Reduce maximum total lead content from 600 ppm to 100 ppm;
2/11/10	<ul style="list-style-type: none"> • 2.2.9 - Change color number for dark brown to 20062. • Update Part III - Section 708 approved paint systems.
9/25/09	<ul style="list-style-type: none"> • 2.2 - Add requirement coatings with more than trace amounts of lead and chromium are not permitted; • 2.2 - Add requirement to test for lead, report results to the Department, limit total lead content to 600 ppm max., and submit "lead-free" certificate of conformance for coatings;
10/24/08	<ul style="list-style-type: none"> • Update Part III - Section 708 approved paint systems.
10/24/07	<ul style="list-style-type: none"> • 3.1.1 - add requirement for acceptable final appearance • 3.1.4 - add wording that quality control be performed daily and per SSPC-QP1 • 3.6.1 - update form reference • 3.6.2 - add requirement to provide lighting for inspectors • 4.1.2 (4) - add requirement for neat and uniform final appearance
6/8/07	<ul style="list-style-type: none"> • 4.1.2 (3) - add requirement to clean off concrete spatter and drippings • 2.2.3 - add VOC max limit of 2.8 lb/gal (340 g/L) for intermediate and topcoats.
10/5/06	<ul style="list-style-type: none"> • Update Part III - Section 708 approved paint systems
1/13/06	<ul style="list-style-type: none"> • 3.2.6.3a- Remove proprietary reference to 3M Scotch-Brite™ Clean and Strip discs • 3.5.3- Remove proprietary reference to 3M Scotch-Brite™ Clean and Strip discs • 4.2.2- Remove proprietary reference to 3M Scotch-Brite™ Clean and Strip discs
4/11/05	<ul style="list-style-type: none"> • 2.1.2 - add requirements for non-skid grain • 2.2 - add Paint System E • 3.4.11 (2) - reword the number of DFT readings to be taken by QA inspection • 3.4.13 - add requirements for a non-skid walking surface finish • 4.5 - extend the warranty to 3 years and clarify the definition of coating failure. • Update Part III - Section 708 approved paint systems.

PART II of III -- GENERAL REQUIREMENTS

Part II states general requirements for painting new structural steel as amended by project specific requirements of Part I.

Amend 3.2.3 to read:

3.2.3.1 Shop painting certification. Fabricators supplying shop applied painted or metalized steel products shall be certified with the American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement (SPE), or with the Society for Protective Coatings (SSPC) Quality Procedure 3 “Standard Procedure for Evaluating Qualifications of Shop Painting Contractors (QP3).

3.2.3.2 Field painting contractor certification. Painting contractors and subcontractors shall be certified by the Society for Protective Coatings (SSPC) Painting Contractor Certification Program (PCCP) to the requirements of SSPC-QP1 for all field painting work, and to the requirements of SSPC-QP2 for work involving the removal or overcoating of lead-based paint.

Amend 3.13 to read:

3.13 PAINTING NEW STRUCTURAL STEEL

OUTLINE OF SECTION 550.3.13

- | | |
|-----|-----------------------------------|
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Note: The sections of this specification to follow are numbered in the manner of the outline above without the prefix “550.3.13”, which is implied.

DESCRIPTION

1.1 GENERAL

1.1.1 General Description. This work shall consist of the cleaning, surface preparation, and painting of new structural steel, including the proper preparation of the steel surfaces, the application, drying, cure, and protection of coatings, both in the shop and in the field, and worker and environmental protection, as described herein or as directed.

1.2. DESCRIPTION OF BRIDGE

(See Section 550 Part I)

1.3 SCOPE OF WORK

(See Section 550 Part I)

1.4 REGULATORY COMPLIANCE

1.4.1 Comply with the requirements of this Item and all applicable Federal, State and local laws, codes, and regulations, including, but not limited to the regulations of the United States Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and the New Hampshire Department of Environmental Services (NHDES) in conformance to Section 107.

1.4.2 Identification of the items below which are of specific interest to NHDOT in no way relieves the Contractor of the responsibility to comply with all OSHA and EPA requirements, nor should it be construed that the NHDOT, the EPA, NHDES, or other State and City regulators are only interested in these items. If a Federal, State, or City regulation is more restrictive than the requirements of this Item, follow the more restrictive requirements.

1.5 CONTRACTOR RESPONSIBILITY. The Contractor is responsible for performing the requirements stated herein, whether the specification wording states this explicitly (e.g. "The Contractor shall conduct all operations...") or implicitly (e.g. "Conduct all operations..."), unless the wording specifically names a different party (e.g. 3.6.1 "The Department will inspect...").

1.6 REFERENCE STANDARDS

1.6.1 The latest edition of the following standards and regulations in effect at the time of the Bid form a part of this Specification. A copy of the reference standards applicable to the work shall be available at the shop painting facility and in the field.

1.6.2 American Society for Testing and Materials (ASTM)

1. ASTM D1400, Standard Test Method for Non-Destructive Measurement of Dry Film Thickness of Non-Conductive Coatings Applied to a Non-ferrous Metal Base
2. ASTM D3335, Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
3. ASTM D3359, Standard Test Methods for Measuring Adhesion by Tape Test
4. ASTM D4138, Standard Test Method for Measurement of Dry Paint Thickness of Protective Coating Systems by Destructive Means

5. ASTM D4285, Standard Test Method for Indicating Oil or Water in Compressed Air
6. ASTM D4414, Standard Practice for Measurement of Wet Film Thickness by Notch Gages
7. ASTM D4417, Standard Test Methods for field Measurement of Surface Profile of Blast Cleaned Steel
8. ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
9. ASTM E1613, Standard Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques.

1.6.3 Society for Protective Coatings (SSPC)

1. SSPC-SP 1, Solvent Cleaning
2. SSPC-SP 2, Hand Tool Cleaning
3. SSPC-SP 3, Power Tool Cleaning
4. SSPC-SP 5 / NACE No. 1, White Metal Blast Cleaning
5. SSPC-SP 7 / NACE No. 4, Brush Off Blast Cleaning
6. SSPC-SP 10 / NACE No. 2, Near-White Metal Blast Cleaning
7. SSPC-SP 11, Power Tool Cleaning to Bare Metal
8. SSPC-SP 12 / NACE No. 5, Surface Preparation and Cleaning of Steel and Other Hard Metals by High- and Ultrahigh- Pressure Water Jetting Prior to Recoating
9. SSPC-AB 1, Mineral and Slag Abrasives
10. SSPC-AB 2, Specification for Cleanliness of Recycled Ferrous Metallic Abrasives.
11. SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasives
12. SSPC-PA 1, Shop, Field, and Maintenance Painting
13. SSPC-PA 2, Measurement of Dry Film Thickness with Magnetic Gages
14. SSPC-SP COM, Surface Preparation and Abrasives Commentary, SSPC Painting Manual, Vol. 2, "Systems and Specifications"
15. SSPC-TU4, Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.
16. SSPC-VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blasting
17. SSPC-VIS 3, Visual Standard for Power- and Hand- Tool Cleaned Steel
18. SSPC QP1, "Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Industrial Structures)", August 1, 1998
19. SSPC QP2, "Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint", August 1, 1995
20. SSPC-QP3, Standard Procedure for Evaluating Qualifications of Shop Painting Contractors

1.6.4 American Association of State and Highway Transportation Officials (AASHTO)

1. AASHTO Standard Specification for Highway Bridges, Division II Construction, Section 13, Painting
2. AASHTO/NSBA Steel Bridge Collaboration, S8.1-2001, Standard Specification for Coating Systems with Inorganic Zinc-Rich Primer, November 2001

1.6.5 American Institute for Steel Construction (AISC)

1. Sophisticated Paint Endorsement (SPE)

1.6.6 Research Council on Structural Connections (RCSC)

1. Specification for Structural Joints Using ASTM A325 or A490 Bolts, Section 5(b), endorsed by the Research Council on Structural Connections

1.7 SUBMITTALS

1.7.1 Surface Preparation/Painting Plan. Provide the following surface preparation / painting plan to the Department for documentation in conformance to 105.02.

1. Provide written procedures covering such items as the paint manufacturer, wet and dry film thickness, cure time between coatings, protection and treatment of faying surfaces, repair of typical damage and defects in the coating, and other information needed to successfully apply all coats of paint in the shop.

1.7.2 Coating Material Documentation

1. Identify the coating materials to be applied. Include the manufacturer's name, product names, and product numbers. Provide material product data sheets, volatile organic compound (VOC) levels, MSD sheets, and written application instructions including mixing requirements, specified thinners, and thinner amounts.
2. The finish coat color shall be as shown in Section 550 Part I as per Federal Standard 595 (see 2.2.(9)). Provide a 3 x 6 inch (75 x 150 mm) panel coated with the finish color to the Department for approval prior to application.
3. Submit documentation that the complete system meets the specified standard of 708 and a Certificate of Compliance for the paint material, in conformance to the requirements of 106.04.
4. In the event of a conflict between the manufacturer's technical data and the requirements of this Item, comply with this Item unless the requirements of the manufacturer are more restrictive. In these cases, advise the Department of the discrepancies in writing, and comply with the Department's written resolution.

1.7.3 Coating Samples for Testing

1. If required, submit one sample of each initial coating material batch to the NHDOT Bureau of Materials and Research lab for testing and acceptance (Stickney Ave., Concord, NH 03301 Tel. 603-271-1660).
2. Provide original, unopened, one-pint (0.47 L) samples directly from the manufacturer, or 5-gallon (18.9 L) containers directly from the jobsite. Mark all samples with the job-specific project name and number.
3. Submit the samples a minimum of ten (10) days prior to the commencement of field painting operations.
4. Provide samples of subsequent batches as directed by the Department throughout the course of the project.

5. When samples are requested, paint from the respective batches cannot be used until authorized by the Department.

MATERIALS

2.1 ABRASIVES

1. Provide abrasives that are dry and free of oil, grease, and corrosion producing, or other deleterious contaminants. Only recyclable metal (steel or aluminum oxide) abrasives shall be used for dry abrasive blast cleaning and shall be tested daily (or as otherwise approved) to meet the cleanliness standards of SSPC-AB2 or AB3.
2. Provide an abrasive mixture of shot and grit that is sized to produce a sharp, angular, uniform anchor pattern profile height of 1.0 to 3.0 mils (25 to 75 microns), unless the requirements of the coating manufacturer are more restrictive.
3. Provide the abrasives to the jobsite in original packaging or in bulk, and store in a clean, dry environment.

2.1.2 Non-skid grain. Grains when required for non-skid walking surfaces shall be aluminum oxide granules passing No. 18 screen having sharp and angular surfaces similar to metal grit abrasive. The coating manufacturer in writing shall approve the non-skid grain or recommend a comparable substitute.

2.2 COATINGS

1. Provide the type and quantity of coating materials, thinners, and cleaning solvents needed to paint all surfaces as required (1.1.3.1). A listing of pre-approved coating systems is found in Section 556 Part III, 708 Paint.

TABLE 2.2 - COATING AND FILM THICKNESS

Coat	Material	Film thickness (mils)	Film thickness (microns)
PAINT SYSTEM A:			
Primer:	708-NH 1.70 Inorganic zinc rich	3-5 mils DFT	(75-125 microns)
Intermediate:	708-NH 3.21 High build epoxy polyamide	4-6 mils DFT	(100-150 microns)
Stripe coat:	(Intermediate coat)	Uniform Coat	Uniform Coat
Finish:	708-NH 3.81 Aliphatic polyurethane	2-4 mils DFT	(50-100 microns)
	Total system thickness	9-15 mils DFT	(225-375 microns)
PAINT SYSTEM B:			
Primer:	708-NH 1.20 Organic zinc rich primer	3-5 mils DFT	(75-125 microns)
Intermediate:	708-NH 3.21 High build epoxy polyamide	4-6 mils DFT	(100-150 microns)
Stripe coat:	(Intermediate coat)	Uniform Coat	Uniform Coat
Finish:	708-NH 3.81 Aliphatic polyurethane	2-4 mils DFT	(50-100 microns)

		Total system thickness	9-15 mils DFT	(225-375 microns)
PAINT SYSTEM C:				
Primer:	708-NH 1.40	Single-component moisture-cure zinc-rich polyurethane	3-5 mils DFT	(75-125 microns)
Intermediate:	708-NH 2.40	Single-component moisture-cure aromatic polyurethane with micaceous iron oxide	3-5 mils DFT	(75-125 microns)
Stripe coat:	(Intermediate coat)		Uniform Coat	Uniform Coat
Finish #1:	708-NH 3.41	Single-component moisture-cure aliphatic polyurethane with micaceous iron oxide	2-4 mils DFT	(50-100 microns)
Finish #2:	708-NH 3.43	Single-component moisture-cure aliphatic polyurethane	2-4 mils DFT	(50-100 microns)
		Total system thickness	8-14 mils DFT	(225-325 microns)
PAINT SYSTEM E:				
Primer:	708-NH 1.43	Single-component moisture-cure micaceous iron oxide zinc-rich polyurethane	3-5 mils DFT	(75-125 microns)
Intermediate:	708-NH 2.42	Single-component moisture-cure refined coal tar aromatic polyurethane with micaceous iron oxide	4-6 mils DFT	(100-150 microns)
Stripe coat:	(Intermediate coat)		Uniform Coat	Uniform Coat
Finish:	708-NH 3.42	Single-component moisture-cure refined coal tar aromatic polyurethane with micaceous iron oxide	4-6 mils DFT	(100-150 microns)
		Total system thickness	11-17 mils DFT	(275-425 microns)

2. Film thicknesses shall be as shown in Table 2.2 unless the coating manufacturer’s recommended thickness range differs. In such cases, the manufacturer shall provide written documentation that the range cited satisfies the Department’s performance requirements.
3. Use coatings that are compliant with Federal and State VOC regulations at the time of application. The maximum VOC limit for the State of NH is 3.5 Lb./Gal. (420 g/L) at the time of application for zinc-rich primers and 2.8 Lb./Gal. (340 g/L) for all other coats. (See Section 550 Part III, 708 Paint). This includes the use of any required thinners.
4. Use the same manufacturer for all coats on a given structure, including thinners and additives. Do not co-mix coating products or components produced by different manufacturers under any circumstances.
5. Provide each coat of paint in sufficiently contrasting color to facilitate proper coverage and to distinguish it from cleaned steel and previously applied coatings.
6. Order all paint, thinner, and cleaning materials well in advance of intended use. Maintain an adequate supply of all materials on site at all times so as to not delay the work.
7. Provide all paint materials in sealed, original, containers that are properly marked and labeled to allow verification with applicable material safety data sheets, application precautions, and instructions. Verify that the labeling includes the manufacturer’s name,

type of material, brand name, color designation, shelf life, contract or order number under which the material has been ordered, lot and batch numbers, and quantity.

8. Provide a 3 x 6 inch (75 x 150 mm) panel coated with the finish color with the submittals.
9. The finish color, as specified in Section 550 Part I, shall match the required Federal Standard 595 Color number as follows:

SAGE GREEN	Federal Color #	24227
LIGHT (ODOT) GREEN		24272
DARK (DARTMOUTH) GREEN		24109
DARK BROWN		20062
ALUMINUM		27178
BLACK		27038

2.3 EQUIPMENT

2.3.1 Surface Preparation and Painting Equipment.

1. Provide all brushes, discs, wheels, scrapers, descalers, blast cleaning, and other surface preparation equipment to conduct the work as specified in this Item.
2. Use equipment and materials that are clean and sized properly to accomplish the work, including the required surface profile and finish as required by this Item.
3. Provide paint brushes, rollers, daubers, and spray equipment to conduct the work as specified in this Item.

2.3.2 Personal Protective Equipment.

1. Provide all of the necessary personal protective equipment (PPE), such as respirators, for workers to assure protection from hazards during surface preparation, coating application, and clean-up activities. Make the equipment available for use by one Department Representatives per shift
2. Repair or replace PPE as required to assure that it continues to provide its intended purpose.

2.3.3 Inspection Equipment

1. Provide all of the inspection and testing equipment needed, for use in the shop or in the field, to verify the quality of the entire surface preparation and painting process, including mirrors to inspect hard to reach areas.
2. Make the equipment available for use by the Department.

SHOP PAINTING

3.1 GENERAL

3.1.1 Provide all materials, apparatus, and labor necessary to perform the scope of work whether or not the material or apparatus is specifically identified in this Item. Conduct all surface preparation and painting operations in a neat and workmanlike manner to the satisfaction of the Department. At the completion of the work painted surfaces shall be clean, undamaged, and present an acceptable appearance to the Department.

3.1.2 Specifications. The work shall be performed in conformance to the Contract requirements, the reference standards (1.6), and the coating manufacturer's instruction, respectively.

3.1.3 Safety. Conduct all work in strict conformance to the relevant OSHA regulations and the safety and protection requirements stipulated by equipment and material manufacturers.

3.1.4 Quality Control. The applicator (i.e. fabricator or field painting contractor) is required to conduct and document quality control inspection of the cleaning and painting operations on a daily basis by an individual meeting the requirements of SSPC QP1, including at a minimum, all measurements required by SSPC QP1 and those specified in 3.6, including ambient conditions, surface profile, surface cleanliness, dry film coating thickness, and visual inspection for coating defects.

3.1.5 Technical representation by coating manufacturer

3.1.5.1 Arrange for a technical representative (not a sales representative) of the coating manufacturer to make one visit of the work at the project startup if necessary to inspect the work in the shop and in the field to verify that the quality of surface preparation and cleaning are satisfactory for the coating system, that the mixing and application are satisfactory, and that the coating system will perform as expected.

3.1.5.2 Have the manufacturer summarize the results of the inspection in writing, together with recommendations. Provide the report to the Department within one week of the representative's visit.

3.2 SURFACE PREPARATION

3.2.1 Surface Preparation Plans. Prepare all surfaces in conformance to the requirements of this Item, and the approved Surface Preparation/Painting Plan provided under 1.7, Submittals.

3.2.2 Grinding.

3.2.2.1 Corners. All corners of sheared or flame cut edges of members to be painted shall be blunted or flattened, i.e. chamfered to a small 45° chamfer (approximately 1/16 inch (2 mm), by passing a grinder or other suitable device along the corner, normally in a single pass, prior to blast cleaning.

3.2.2.2 Flame-cut edge surfaces. All flame-cut edge surfaces of members to be painted shall be conditioned before blasting to achieve the proper profile by grinding to bright metal to remove the hardened flame cut surface. Light grinding is generally sufficient to remove this hardened material and is only necessary if the hardness interferes with achieving the desired profile during blast cleaning.

3.2.3 Steel defects and weld irregularities. All visually evident detrimental surface imperfections (e.g. fins, tears, scabs, projections, slivers, and weld spatter) that are present on any steel member shall be

removed by grinding to produce an acceptable surface. When surface imperfections discovered after blast cleaning are removed, the profile of the repair area shall be restored by blast cleaning or by mechanical tools in conformance to SSPC-SP11. The cost shall be subsidiary to Item 550.

3.2.4 Compressed Air Cleanliness

1. Provide compressed air that is free from moisture and oil contamination.
2. Conduct a white blotter test in conformance to ASTM D 4285 to verify the cleanliness of the compressed air. Conduct the test at least once per shift for each compressor system. Sufficient freedom from oil and moisture is confirmed if soiling or discoloration is not visible on the paper.
3. If air contamination is evidenced, change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air.

3.2.5 Ambient Conditions. Do not conduct final surface preparation which exposes bare steel under damp environmental conditions, or when the surface temperature is less than 5°F above the dew point temperature of the surrounding air, except as permitted otherwise by the coating manufacturer. See 3.4.5(3).

3.2.6 Surface Cleaning Requirements - Steel Substrates. Section 550, Part I, identifies the degree of cleaning required for the project. Definitions for the specified degree(s) of cleaning are provided below:

1. SSPC-SP 1 Solvent Cleaning

- a) Remove all visible oil, grease, dust, soil, drawing and cutting compounds, and other soluble contaminants from the surface in conformance to SSPC-SP 1, Method 4.1.1 only, prior to coating removal (with emphasis on using clean rags or brushes).
- b) Only use solvents or detergents that are acceptable to the coating manufacturer in writing and the Department.

2. SSPC-SP 2 Hand Tool Cleaning

- a) Upon approval of the Department, use scrapers, putty knives, wire brushes, chipping hammers and other similar tools to thoroughly clean any surfaces that cannot be adequately addressed using abrasive blasting or power tool cleaning. Comply with the requirements of SSPC-SP 2 to remove all loose mill scale, loose rust, loose paint, and other loose foreign matter on a best effort basis.
- b) It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered to be adherent if they cannot be removed by lifting with a dull putty knife.
- c) SSPC-VIS 3 may be used as an aid in determining the quality of cleaning.

3. SSPC-SP 3 Power Tool Cleaning

- a) Use power assisted hand tools such as sanding discs or non-woven open-web abrasive rotary discs, wire brushes, needle guns, or similar tools to thoroughly clean corrosion and disbonded coating on surfaces specified in 1.1.3, Scope of Work, and Section 556 Part I. Comply with the requirements of SSPC-SP 3 to remove all loose mill scale, loose rust, loose paint, and other loose foreign matter.
- b) It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered adherent if they cannot be removed by lifting with a dull putty knife.
- c) Feather the coating surrounding each prepared area to provide a smooth tapered transition into the surrounding existing intact coating. Verify that the edges of the coating around the periphery of the prepared areas are tight and intact by probing with a putty knife in conformance to the requirements of SSPC-SP3.
- d) SSPC-VIS 3 may be used as an aid in determining the quality of cleaning.

4. SSPC-SP 7 Brush-off Blast Cleaning

- a) When abrasive blast cleaning preparation of the newly applied coating is required for the purposes of overcoating or repair, thoroughly clean all surfaces designated by the Department. Comply with the requirements of SSPC-SP 7 to remove all loose paint, loose rust, loose mill scale, and other foreign matter. Verify that the surfaces have been exposed to the abrasive and that the surfaces are densely and uniformly roughened.
- b) It is not intended that adherent paint be removed by this process. Paint is considered to be adherent if it cannot be removed by lifting with a dull putty knife. Verify that the edges remaining paint are feathered.
- c) Unless restricted otherwise by the Department, accomplish the SP 7 degree of cleaning using any of the following: dry blast cleaning with recyclable abrasives, wet abrasive blast cleaning, water jetting with abrasive injection, or vacuum blast cleaning.
- d) SSPC-VIS 1 may be used as an aid in determining the quality of cleaning.

5. SSPC-SP 11 Power Tool Cleaning to Bare Metal

- a) Use power assisted hand tools such as needle guns, Roto peening equipment, or similar tools to thoroughly clean all surfaces specified in Section 550, Part I. Comply with the requirements of SSPC-SP 11 to remove all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted.
- b) Provide a minimum surface profile of 1 mil (25 microns) on all prepared surfaces or a profile of greater depth if required by the coating manufacturer or the Department. Measure the surface profile using the Testex Replica Tape in conformance to ASTM D4417.
- c) SSPC-VIS 3 may be used as an aid in determining the quality of cleaning.

6. SSPC-SP 10 Near-White Blast Cleaning

- a) Thoroughly blast clean all surfaces specified in 1.3, Scope of Work. Comply with the requirements of SSPC-SP 10 to remove all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining.
- b) Provide a sharp, angular, uniform surface profile of 1.0 to 3.0 mils (25 to 75 microns) for abrasive blast cleaning unless the requirements of the coating manufacturer are more restrictive. Measure the surface profile using extra course Testex Replica Tape in conformance to ASTM D4417, Method C, at least once per shift, and when the abrasive mixture is changed.
- c) Allow staining to remain on no more than 5 percent of each nine square inch increment of surface area. Acceptable staining is limited to light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied paint.
- d) Accomplish the SP 10 degree of cleaning using dry blast cleaning with recyclable metal abrasives. Allow the surface to thoroughly dry prior to painting, and apply the primer before any visible rusting occurs.
- e) SSPC-VIS 1 shall be used as an aid in determining the quality of cleaning.

7. Remediation of Chlorides

- a) Verify that residual chloride levels on the structural steel (e.g. in previously rusted areas as well as unruled areas) are remediated to a surface cleanliness condition of SC-2 ($7 \mu\text{g}/\text{cm}^2$) in accordance with SSPC-SP12, as determined by the Chlor*Test™, manufactured by Chlor*Rid International Inc. (Tel. 800-422-3217).
- b) Methods of chloride removal may include, but are not limited to, steam cleaning or pressure washing and scrubbing, reblasting, or blast cleaning with blends of fine and course abrasives. Describe the proposed method(s) of chloride remediation in the submitted Surface Preparation/Painting Plan.
- c) Test for chlorides at a minimum frequency of two representative locations per project. Test locations are to be determined by the Department.
- d) If unacceptable levels of chlorides remain, test at a greater frequency, and reclean the affected areas until acceptable results are achieved.

3.3 PAINT STORAGE, MIXING, AND HANDLING

3.3.1 Paint Storage

1. Store all paint, thinners, and solvents in conformance to OSHA regulations and the requirements of the paint manufacturer. Store the paint and solvents under cover, out of direct sunlight, and protected from vandalism.

2. Maintain the storage temperature between 40°F and 90°F (5°C and 33°C), unless the requirements of the manufacturer are more restrictive.
3. Maintain MSD sheets for all materials.

3.3.2 Mixing and Thinning of Coating Materials

1. Verify that the paint to be mixed has not exceeded its shelf life. When required by the manufacturer, warm paints stored at less than 50°F (10°C) to above 50°F (10°C) prior to mixing.
2. Utilize proper ventilation in the mixing area to prevent injury to workmen or the accumulation of volatile gases.
3. Mix all coatings in conformance to the requirements of the coating manufacturer using mechanical equipment such as a Jiffy mixer. Do not create a vortex when using the power mixer.
4. Do not thin any paints unless approved in writing by the paint manufacturer and the Department. If thinning is required and authorized, use only those types, brands, and amounts of thinner stipulated by the coating manufacturer. Carefully measure the amount of thinner added. Do not “eye ball.”
5. Strain materials after mixing to remove agglomerations.

3.4 COATING APPLICATION

3.4.1 Painting Plans. Apply all coatings in conformance to the requirements of this Item, the coating manufacturer’s instructions, and the approved Surface Preparation/Painting Plan provided under 1.7, Submittals.

3.4.2 Applicator Proficiency. Unless directed otherwise by the Department, have each applicator demonstrate his or her proficiency in applying the coating system to test areas prior to commencing the production application.

3.4.3 Quality of Surface Preparation Prior to Painting

1. Verify that the surface exhibits the specified degree of hand, power tool, or abrasive blast cleaning immediately prior to painting.
2. Apply the first coat before rusting or degradation of the surface occurs, but in no case allow the prepared surface to stand for more than 24 hours in the shop prior to painting. Reclean rusted or degraded surfaces, or those surfaces that have stood for more than 24 hours prior to painting. In the field the maximum time limit is 8 hours.

3.4.4 Surface Cleanliness Prior to Painting and Between Coats

1. Thoroughly clean the surface of each coat prior to the application of the next to remove spent abrasive, dirt, dust, cement spatter, and other interference material.

2. If grease or oil have become deposited on the bare steel or on the surface of any of the applied coats, remove by solvent cleaning in conformance to SSPC-SP1 prior to the application of the next coat. Use solvents that are compatible with the coating being cleaned. Upon completion of the cleaning, verify that the grease and oil have been removed by wiping the surface with a clean, white cloth and inspecting the cloth for residue. If a residue is visible on the cloth, conduct additional cleaning.
3. Prior to applying a spot prime coat to areas of hand or power tool surface preparation, verify that the existing coatings have been thoroughly cleaned in the overlap areas, and that pockets are dry and free of mud, dirt, and other accumulations.

3.4.5 Ambient Conditions during Coating Application. Apply coatings under the following conditions unless the requirements of the coating manufacturer are more restrictive. Do not apply coatings under less restrictive conditions without written approval of the coating manufacturer, and specific written authorization from the Department.

1. Surface and Air Temperatures – Between 40°F (5°C) and 100°F (38°C). For coating system C the low temperature is 35°F (2°C).
2. Relative Humidity – Less than 85%. For coating system C, R.H. less than 98%.
3. Dew Point – Surface temperature above the dew point. Normal dew point restrictions apply (i.e. 5 °F (2.7°C) spread). For coating system C the restriction is 2°F (1°C), and do not apply the coating to surfaces that are visibly damp.
4. Frost/Rain - Do not apply coatings to surfaces containing frost or free standing water, or during rain, fog, or similar detrimental weather conditions, but only to surfaces that are thoroughly dry.
5. Remove and replace any paint that is exposed to unacceptable conditions (e.g. rain) prior to adequate curing.

3.4.6 Methods of Application - Apply all coats by the methods shown below, unless the methods recommended by the paint manufacturer are more restrictive.

1. Brush application. Use round or oval brushes. Use flat brushes only on large plate surfaces between connections, and only upon approval of the Department. Brush apply the paint using a series of small circles to thoroughly fill in all surface irregularities, and end with a series of parallel strokes to smooth the finish.
2. Roller application. Use rollers only on large plate surfaces between connections, and only upon approval of the Department. Select a nap size and roller quality that will properly wet the substrate and produce a smooth, uniform film. Apply the coating in a such a manner as to achieve complete and thorough coverage of the surface and all irregularities. Back-roll the surface after application to create a smooth, uniform finish.
3. Daubers. On metal surfaces that are inaccessible for paint brushes, use sheepskins or daubers especially constructed for the purpose.

4. Airless or conventional spray application. If conventional spray is approved for use, verify that the compressed air supply is clean and dry as determined by the blotter test in conformance to ASTM D 4285. When spraying, use extreme care and appropriate containment to avoid contamination of surrounding areas or property by overspray.

3.4.7 Recoat Times

1. Apply each coat only after the previous coat has been allowed to dry as required by the manufacturer's written instructions, but as soon as possible to minimize the length of time that the coating is exposed to dust and contamination.
2. Do not allow any coat to remain exposed for longer than 14 days prior to overcoating.
3. If a coat is exposed over the winter months prior to the application of the next coat, or the applied coat(s) exceed the manufacturer's maximum recoat times or 14 days for any reason, remove and replace the coating. As an alternative, provide written instructions from the coating manufacturer for the specialized preparation that can be undertaken (e.g. scarifying the surface) to properly prepare the surface to receive the next coat. The specialized steps can be undertaken only if approved by the Department. Perform the specialized cleaning or removal and replacement of the coatings at no additional cost to the Department.

3.4.8 Coverage, Continuity, and Stripe Coating

1. Apply each coat in a neat and workmanlike manner to assure thorough wetting of the substrate or underlying coat, and to achieve a smooth, streamline surface relatively free of dryspray, overspray, and orange peel. Shadow-through, pinholes, bubbles, skips, misses, lap marks between applications, or other visible discontinuities in any coat are unacceptable. Runs or sags may be brushed out while the material remains wet.
2. Remove dryspray and overspray (e.g. by sanding) prior to the application of the next coat. When present on the finish, remove as directed by the Department and apply another coat of finish to the area. Remove all other defective coating to sound material and reapply.
3. Thoroughly coat all surfaces with special attention to hard-to-reach areas, and irregular surfaces such as lacing bars and rivets. When coating configurations such as bolts, apply the material from multiple directions to assure complete coverage.
4. Apply a stripe coat using the intermediate coating material by brush, roll or spray to all edges and outside corners, and by brush to all welds, snipes, crevices, rivets, bolt nuts and threads, bolt heads, and other surface irregularities prior to the application of the full intermediate coat. Apply the stripe coat to ensure complete and uniform coverage, and to build up the thickness of the coating on the irregular surfaces.

3.4.9 Coating Adhesion

1. Apply all coats in such a manner to assure that they are well adherent to each other and to the substrate. If the application of any coat causes lifting of an underlying coat, or there is poor adhesion between coats or to the substrate, remove the coating in the affected area to adjacent sound, adherent, coating, and reapply the material.

2. If adhesion is suspect, conduct adhesion tests in conformance to ASTM D 3359 or ASTM D 4541 as directed by the Department, and repair all test areas. The Department and the coating manufacturer will establish the acceptance criteria for the testing. Replace all defective coating that is revealed by the testing, at no cost to the Department.

3.4.10 Wet Film Thickness. Use wet film thickness gages in conformance to ASTM D4414 to verify the thickness of each coat at the time of application.

3.4.11 Dry Film Thickness and Corrective Action for Thickness Deviations

1. Apply each coat to the thicknesses specified in 2.2 to a dry film thickness as measured above the top surface of the substrate profile peaks per SSPC-PA2, Type 2.
2. Measure the thickness of each coat using nondestructive magnetic dry film thickness gages. Comply with SSPC-PA2 for the calibration and use of gages and the minimum frequency of thickness measurements. QA Inspectors will not be limited by the frequency of thickness measurements of PA2 but will take measurements sufficient to assure that proper thickness is achieved on all surfaces as specified.
3. If there are questions regarding the non-destructive measurements of coating thickness, a Tooke Gage (destructive scratch gage) may be used when authorized by the Department. Conduct measurements in conformance to ASTM D 4138, but limit the use of the gage to a minimum of locations. Mark and repair all damage caused by the destructive testing, whether created by the Department or the Contractor at no cost to the Department.
4. Apply additional coating of the same type to areas of insufficient thickness. Use care during application to assure that all repairs blend in with the surrounding material.
5. Unless directed otherwise by the Department in writing, remove excessive coating thickness and reapply the affected coat(s). Coating thickness in excess of that specified, but not exceeding two times the maximum specified thickness, may be acceptable as long as: the coating is free of visible defects prior to applying successive coat; AND the coating manufacturer provides written documentation and test data (if required) to confirm that the thickness will not adversely affect the coating performance for the specific situation.

3.4.12 Bolted Contact Surfaces.

1. Regardless of which paint system is used, the faying surfaces (i.e. contact surfaces internal to the connection) of bolted connections shall be painted with one coat of a zinc-rich primer meeting the AASHTO / RCSC requirements for Class B slip-critical connections. This coat shall not exceed the maximum thickness nor fail to meet the minimum cure time specified on the Certificate of Approval for Class B use.
2. The external surfaces of bolted connections shall be painted with one coat of the primer used on the bridge. Both surfaces of bolted connections shall be masked off within three inches of bolt holes after application of the primer for subsequent coating application.

3.4.13 Non skid walking surfaces.

During the application of the first finish coat the non-skid abrasive shall be immediately broadcast onto the surface over the wet layer of coating to provide a non-slip surface. Vacuum excess granules upon curing of the coating. After the first finish coat has cured, apply one additional encapsulation coat of the finish coat to the non-skid surfaces. The DFT of the encapsulation coat will be 2.5 - 3.5 mils (60-90 microns).

3.5 REPAIR OF FIELD WELDS, DAMAGED AND UNACCEPTABLE NEWLY APPLIED COATINGS

3.5.1 Surface Preparation of Localized Areas

1. Repair field welds, localized handling and erection damage, minor coating defects, corrosion, and unacceptable coatings at no additional cost to the Department.
2. Prepare the surface by solvent cleaning in conformance to SSPC-SP 1 prior to mechanical cleaning.
3. In areas previously blast cleaned, if the damage exposes the substrate, remove all loose material and prepare the steel in conformance to SSPC-SP 11. Follow with solvent cleaning in conformance to SSPC-SP 1 to remove surface contamination.

3.5.2 Surface Preparation of Extensive Areas

1. Repair extensive areas of damage, significant defects, or unacceptable coating only after submitting written repair procedures to the Department for approval and at no additional cost to the Department.
2. The Department will stipulate the degree of cleaning required based on the nature of the defect.
3. Prevent damage to the surrounding coating due to over blast.

3.5.3 Feathering of Repair Areas

1. Feather the existing coating surrounding each repair location for a distance of 1 to 2 inches (25 to 50 mm) to provide a smooth, tapered transition into the surrounding existing intact coating, using a non-woven open-web abrasive rotary discs sander (or equal).
2. Verify that the edges of coating around the periphery of the repair areas are tight and intact by probing with a putty knife in conformance to the requirements of SSPC-SP 3. Roughen the existing coating in the feathered area to assure proper adhesion of the repair coats.

3.5.4 Coating Application in Repair Areas

1. When the bare substrate is exposed in the repair area, apply all coats of the system to the specified thicknesses.
2. When the damage does not extend to the bare substrate, apply only the affected coats.

3. Maintain the thickness of the system in overlap areas within the specified total thickness tolerances.
4. Repairs to the finish coat shall result in an acceptable uniform gloss and color on visible members.

3.6 INSPECTION

3.6.1 Quality Control (QC).

1. The applicator (i.e. fabricator or field painting contractor) is required to conduct and document quality control inspection of the cleaning and painting operations (see 3.1.4). QC inspection shall include the components and at the frequency listed in Tables 5.2, 6.1, 6.2, and 6.3 of the AASHTO/NSBA Collaboration S8.1 Standard Specification, and using Appendix 1 forms, or approved equal.
2. The data shall be recorded in a log maintained at the site and available for the Department's review during working hours.
3. Refer to the internet website for Tables and forms (at <http://www.steelbridge.org/TG8/S8.1>).

3.6.2 Quality Assurance (QA). The Department will perform QA inspection on all phases of the work to verify that it is in conformance to the requirements of this Item.

1. Facilitate QA inspection as required, including proper notification, allowing adequate time for the inspections, and providing lighting and access to the work together with all necessary safety and inspection equipment.
2. QA inspections will include the following minimum hold points to determine specification compliance. Do not proceed with subsequent phases of the work until the preceding phase has been approved by the Department:
 - a) prior to the start of work,
 - b) immediately following surface preparation,
 - c) immediately prior to the application of the first coat,
 - d) prior to the application of each additional coat, and
 - e) after the final coat is applied and dried.
3. The presence or activity of Department QA inspections in no way relieves the Contractor of the responsibility to comply with all requirements of this Item, and to provide adequate inspections of its own to assure compliance with the requirements of this Item.
4. Furnish, until final acceptance of the coating system, all equipment and instrumentation needed to inspect all phases of the work.

3.7 HANDLING

3.7.1 Care shall be exercised in handling coated steel in the shop, during shipping, field erection, and subsequent construction of the bridge. Coated steel shall be insulated from lifting devices and from the scraping and rubbing of parts that would damage the coating by the use of lifting softeners, padded slings, storage pallets, separators, cushioners, tie-downs, and other approved supports.

3.7.2 The fabricator shall be responsible for the condition of the paint until the structural members arrive at the jobsite.

3.7.3 Structural steel material shall not be lifted, placed on supports, or loaded for shipment until the shop coating has been adequately cured and inspected. The steel members will be stamped "Approved" only after the loading has been completed and approved. No structural steel shall be shipped without the prior approval of the Department.

FIELD PAINTING

4.1 GENERAL

4.1.1 All field painting and repairs shall conform to the applicable requirements of this Item for shop painting (including section 3.5 for repairs) and the coating manufacturer's instructions.

4.1.2 Field work shall consist of the following:

1. Repair of damage to the shop applied coats due to handling, shipping, erecting, etc.;
2. The satisfactory cleaning and painting of field welded areas or field bolted connections with appropriate surface preparation and the application of the prime (if required), intermediate, and finish coats to these areas.
3. The finished painted surfaces shall be cleaned of all cement and concrete spatter and drippings to the satisfaction of the Department.
4. At the completion of the work painted surfaces, especially fascia surfaces exposed to public view, shall be clean, neat, undamaged, and present a uniform, acceptable appearance to the satisfaction of the Department.

4.1.3 Contain the surface preparation and painting operations to avoid contamination of surrounding property. Use extreme diligence to assure that vehicles, equipment, hardware, fixtures, surrounding property, and other materials are protected against abrasive impact, paint spillage, overspray, falling objects, and other damage. Make full restitution for damages caused at no additional cost to the Department.

4.1.4 Requirements for containment when removing paints that contain lead or other toxic metals are found in Item 556.

4.1.5 Use protective coverings, shields, or masking as necessary to protect surfaces that are not designated to receive surface preparation or coating, including nameplates, electrical equipment, bridge substructure, highway appurtenances, and slope protection.

4.1.6 Maintain all protective coverings during the entire period the work is being performed, and remove all coverings upon completion of the work.

4.1.7 Erect all scaffolding and staging required for the work and remove it upon project completion. Exercise extreme care in fastening, bracing, and handling the scaffolding and staging to avoid scratching

or damaging bridge surfaces and surrounding property and equipment. Repair any damage created at no cost to the Department.

4.1.8 Structural steel surfaces which will be inaccessible for painting after erection, except for bolted connections, shall be inspected, repaired, and coated prior to erection.

4.2 SURFACE PREPARATION.

4.2.1 Removal of Existing Debris. Remove and properly dispose of accumulated pigeon droppings, cinders, dirt, and debris from all areas to be prepared and painted prior to undertaking any surface cleaning or surface preparation operations.

4.2.2 Surface Cleaning Requirements - Bolts

1. Remove machine oil, lubricant or residuals from the surface of new installed black or galvanized bolts by solvent cleaning in conformance to SSPC-SP 1.
2. Supplement the solvent cleaning of galvanized bolts by hand or power tool cleaning in conformance to SSPC-SP 2 or SSPC-SP 3 as needed to remove insoluble contaminants such as white rust and to thoroughly roughen the entire surface without removing the zinc layer. An additional pre-treatment or tie coat may be required if recommended by the paint manufacturer and approved by the Department. A clean white cloth wipe test may be used to confirm that all lubricant and non-absorbed dye has been removed, leaving only the residual “stain” on the surface.
3. Supplement the solvent cleaning of rusted black bolts by power tool cleaning in conformance to SSPC-SP 3. Use a 2 3/4 inch diameter knot wire cup brush as manufactured by Weiler Corporation and supplied by Grainger Industrial Supply, or using a non-woven open-web abrasive rotary discs sander, unless other methods are approved by the Department.

4.3 HOUSEKEEPING AND WASTE DISPOSAL

4.3.1 Conduct housekeeping daily to maintain the work site in a neat and orderly condition. Do not store any paint or equipment on or below the bridge structure.

4.3.2 Unless directed otherwise by the Department, at the end of each day at a minimum, haul empty paint cans and other debris to the waste storage area.

4.3.3 Remove all paint drips, splashes, and overspray from surfaces not intended to be painted or previously painted work.

4.3.4 Upon project completion, remove all equipment and materials, correct any damage caused by the operation, and leave all surfaces in a clean and acceptable condition, including the revegetation of ground areas defoliated by the work.

4.3.5 Handle, store, transport, and dispose of all hazardous and non-hazardous project waste in strict conformance to Federal and state regulations.

4.4 FINAL ACCEPTANCE

4.4.1 Although the Department's Quality Assurance Inspector may accept the shop painted fabricated items before shipment to the jobsite, final acceptance of the paint system by the Department will occur at the jobsite after erection of the steel, and after all coats and repairs have been completed.

4.5 THREE-YEAR ANNIVERSARY INSPECTION

4.5.1 A three-year anniversary inspection will be conducted after completion of the painting. Participate in this inspection with the Department.

4.5.2 Should the coating system fail within three years after the project has been accepted, the coating shall be repaired by the Contractor at no cost to the State. The extent and method of repair must be acceptable to the Department. System failure does not include damage from external agents, such as scraping from snow removal equipment, vandalism, debris impacts, collisions, etc., or normal loss of gloss and color. Once the coating system has been accepted, a failure shall mean any visible corrosion, blistering, checking, cracking, or delamination (peeling) of the paint resulting from the installation of the product or from the performance of the coating. Perform all repairs in accordance with the requirements of this Item and the coating manufacturer's written instructions.

PART III of III -- SECTION 708 PAINTS

**SECTION 708 - PAINT SYSTEM A
Inorganic zinc rich / Epoxy / Urethane**

NH 1.70 Inorganic Zinc-Rich Primer

1. General. This VOC-compliant inorganic zinc-rich primer is to be used on structural steel cleaned to SP10 and meeting the requirements of NEPCOAT. Water-base systems are not permitted.

(NEPCOAT refers to the qualified products list of coatings approved by the Northeast Protective Coatings Committee and meeting the requirements of the NEPCOAT Specification Criteria for Protective Coatings for Use on New and Bare Existing Steel).

NH 3.21 High-Build Epoxy Polyamide Intermediate

1. General. This specification covers a VOC-compliant epoxy polyamide and is suitable for use on steel surfaces which have been properly cleaned and primed.

2. Composition.

Mixed Epoxy-Polyamide (All parts mixed)

VOC content, 2.8 max. Lb./Gal. (340 g/L)

3. Color.

The color when dry shall Contrast with primer & topcoat

NH 3.81 Aliphatic Polyurethane Finish

1. General. This specification covers a VOC-compliant, polyurethane having good color retention and weathering resistance and suitable for use over an intermediate coat.

2. Composition.

Mixed Aliphatic Polyurethane Enamel (All parts mixed)

VOC content, 2.8 max. Lb./Gal. (340 g/L)

3. Color.

Color: See 2.2 (9)

Finish: Semi-gloss

SECTION 708 - TABLE A
PAINT SYSTEM A - Inorganic zinc rich / Epoxy / Urethane

The following list of paint systems are approved for the painting of structural steel cleaned to SP10. These coatings have been tested and approved by NEPCOAT.

1. Carboline Company (www.carboline.com)
 350 Hanley Industrial Court, St. Louis, MO 63144-1599 (800) 848-4645
 Local contact: Charles Vaillant (603) 329-9691

 Primer: Carbozinc 11 HS Inorganic Zinc Rich
 Intermediate: Carboline 893 High Build Epoxy
 Finish: Carboline 133 LH Aliphatic Polyurethane

2. Sherwin Williams Company (www.sherwin-williams.com)
 101 Prospect Ave, N.W. Cleveland, OH 44115 (216) 566-2000

 Primer: Zinc Clad DOT Inorganic Zinc Rich Primer
 Intermediate: Steel Spec Epoxy Intermediate
 Finish: High Solids Polyurethane

3. International Protective Coatings (www.international-pc.com)
 6001 Antoine, Houston, Texas, 77091, (800) 525-6824 x 1289
 Local contact: Mark Ellis (508) 587-8877

 Primer: Interzinc 22 HS Inorganic Zinc Rich Primer
 Intermediate: Intergard 475 HS Epoxy
 Finish: Interthane 870 UHS

**SECTION 708 - PAINT SYSTEM B
Organic zinc rich / Epoxy / Urethane**

NH 1.20 Organic Zinc-Rich (Epoxy or Urethane) Primer

1. General. This VOC-compliant organic zinc-rich primer is to be used on structural steel cleaned to SP10 and meeting the requirements of NEPCOAT. Water-base systems are not permitted.

(NEPCOAT refers to the qualified products list of coatings approved by the Northeast Protective Coatings Committee and meeting the requirements of the NEPCOAT Specification Criteria for Protective Coatings for Use on New and Bare Existing Steel).

NH 3.21 High-Build Epoxy Polyamide Intermediate

1. General. This specification covers a VOC-compliant epoxy polyamide and is suitable for use on steel surfaces which have been properly cleaned and primed.

2. Composition.

Mixed Epoxy-Polyamide (All parts mixed)

VOC content, 2.8 max. Lb./Gal. (340 g/L)

3. Color.

The color when dry shall Contrast with primer & topcoat

NH 3.81 Aliphatic Polyurethane Finish

1. General. This specification covers a VOC-compliant, polyurethane having good color retention and weathering resistance and suitable for use over an intermediate coat.

2. Composition.

Mixed Aliphatic Polyurethane Enamel (All parts mixed)

VOC content, 2.8 max. Lb./Gal. (340 g/L)

3. Color.

Color: See 2.2 (9)

Finish: Semi-gloss

SECTION 708 - TABLE B
PAINT SYSTEM B - Organic zinc rich / Epoxy / Urethane

The following list of paint systems are approved for the painting of structural steel cleaned to SP10. These coatings have been tested and approved by NEPCOAT.

1. Carboline Company (www.carboline.com)
 350 Hanley Industrial Court, St. Louis, MO 63144-1599 (800) 848-4645
 Local contact: Charles Vaillant (603) 329-9691

 Primer: Carboline 859 Organic Zinc Rich primer
 Intermediate: Carboline 888 Epoxy intermediate
 Finish: Carboline 133 LH Aliphatic Polyurethane
2. Carboline Company (www.carboline.com)
 350 Hanley Industrial Court, St. Louis, MO 63144-1599 (800) 848-4645
 Local contact: Charles Vaillant (603) 329-9691

 Primer: Carboline 859 Organic Zinc Rich primer
 Intermediate: Carboline 893 Epoxy intermediate
 Finish: Carboline 133 LH Aliphatic Polyurethane
3. Carboline Company (www.carboline.com)
 350 Hanley Industrial Court, St. Louis, MO 63144-1599 (800) 848-4645
 Local contact: Charles Vaillant (603) 329-9691

 Primer: Carboline 859 PRIMER Organic Zinc Rich primer
 Intermediate: Carboline 825 Epoxy intermediate
 Finish: Carboline 133 LH Aliphatic Polyurethane
4. International Protective Coatings (www.international-pc.com)
 6001 Antoine, Houston, Texas, 77091 (800) 525-6824 x 1289
 Local contact: Mark Ellis (508) 587-8877

 Primer: Interzinc 315B Epoxy Zinc Rich Primer
 Intermediate: Intergard 475 HS Epoxy
 Finish: Interthane 870 UHS
5. PPG Protective & Marine Coatings (www.ppgamercoatus.ppgpmc.com)
 One PPG Place, Pittsburgh, PA 15272 (412) 434-3131
 Local contact: C. G. Edwards & Co. (617) 268-4111

 Primer: Amercoat 68 HS Zinc Rich Epoxy Primer
 Intermediate: Amercoat 399 Fast Drying Epoxy
 Finish: Amercoat 450H Gloss Aliphatic Polyurethane

6. Sherwin Williams Company (www.sherwin-williams.com)
101 Prospect Ave, N.W. Cleveland, OH 44115 (216) 566-2000
- Primer: Zinc Clad III HS Organic Zinc Rich Epoxy Primer
Intermediate: Macropoxy 646 Fast Cure Epoxy
Finish: Acrolon 218 HS Acrylic Polyurethane
7. Wasser Corporation (www.wassercoatings.com)
4118 B PL NW-Suite B, Auburn, Washington 98001 (800)-627-2968
Local contact: Ben Forde (benforde3@msn.com) (508)-930-0330
- Primer: Wasser MC-Zinc 100 (shop applied) or MC-Miozinc 100 (field applied)
Intermediate: Wasser MC- Miomastic 100 (shop and field applied)
Finish #1: Wasser MC-Ferrox A 100
Finish #3: Wasser MC-Antigraffiti

SECTION 708 - PAINT SYSTEM C
Single-component moisture-cure Zinc urethane / Mio / U

NH 1.40 Single-component moisture-cure zinc-rich polyurethane primer

Generic type:	Zinc-rich, single-component, moisture-cure polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	60% minimum
Pigment type:	83% min. zinc dust in the dry film by weight
Weight per volume:	22 pounds (2.64 kg/L) minimum
VOC:	2.8 lb./gal. (340 g/L) maximum
Recoat time:	4 to 6 hours minimum
Color:	Tinted to contrast with blasted steel

**NH 2.40 Single-component moisture-cure
aromatic polyurethane with micaceous iron oxide (MIO) intermediate**

Generic type:	MIO, single-component, moisture-cure aromatic polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	60% minimum
Pigment type:	3.0 pounds/gallon micaceous iron oxide
Weight per volume:	12-14 lb./gal. (1.4-1.68 kg/L) minimum
VOC:	2.8 lb./gal. (340 g/L) maximum
Recoat time:	6 to 8 hours minimum
Color:	To contrast with primer and finish coat

**Finish #1 - NH 3.41 Single-component moisture-cure
aliphatic polyurethane with micaceous iron oxide (MIO) finish**

Generic type:	Single-component, moisture-cure aliphatic polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	53% minimum
Pigment type:	3.0 pounds/gallon micaceous iron oxide
Weight per gallon:	12-14 pounds/gallon minimum
VOC:	2.8 lb./gal. (340 g/L) maximum
Recoat time:	4 hours minimum
Color:	See 2.2 (9).
Finish:	Semi-gloss

Finish #2 - NH 3.43 Single-component moisture-cure aliphatic polyurethane finish

Generic type:	Single-component, moisture-cure aliphatic polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	53% minimum
Weight per volume:	11-12 pounds/gallon (1.3-1.4 kg/L) minimum
VOC:	2.8 lb./gal. (340 g/L) maximum
Recoat time:	4 hours minimum
Color:	See 2.2 (9).
Finish:	Semi-gloss

SECTION 708 - TABLE C
PAINT SYSTEM C - SC MC Zinc Urethane/ Mio / Urethane

The following list of paint system(s) are approved for the painting of structural steel cleaned to SP10. These coating(s) have been tested by NEPCOAT.

1. Wasser Corporation (www.wassercoatings.com)
 4118 B PL NW-Suite B, Auburn, Washington 98001 (800)-627-2968
 Local contact: Ben Forde (benforde3@msn.com) (508)-930-0330

 Primer: Wasser MC-Zinc (shop applied) or MC-Miozinc (field applied)
 Intermediate: Wasser MC-Ferrox B (shop applied) or MC-Miomastic (field applied)
 Finish #1: Wasser MC-Ferrox A
 Finish #3: Wasser MC-Antigraffiti

2. Xymax Coatings Incorporated
 520 Cure Boivin, Boisbriand, PQ J7G2A7 Canada (450)-430-6780
 Contact: Marc Schondorf

 Primer: Xymax MonoZinc ME III
 Intermediate: Xymax MonoFerro PUR
 Finish #1: Xymax Bridge Finish (or Mono Brite for aluminum color)
 Finish #3: Xymax Maxcoat Clearcoat

SECTION 708 - PAINT SYSTEM E**Single-component moisture-cure micaceous iron oxide zinc rich urethane / Tar / Tar****NH 1.43 Single-component moisture-cure micaceous iron oxide zinc-rich polyurethane primer**

Generic type:	Single-component, moisture-cure micaceous iron oxide- zinc rich polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	60% minimum
Pigment type:	micaceous iron oxide / zinc dust
Weight per volume:	20 pounds (2.40 kg/L) minimum
VOC:	2.8 lb./gal. (340 g/L) maximum
Recoat time:	4 to 6 hours minimum
Color:	Tinted to contrast with blasted steel

NH 2.42 Single-component moisture-cure refined coal tar aromatic polyurethane with micaceous iron oxide (MIO)

Generic type:	Refined coal tar / micaceous iron oxide-filled, single-component, moisture-cure polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	60% minimum
Barrier filler:	3 pounds/gallon micaceous iron oxide
VOC:	2.8 lbs./gallon maximum
Recoat time:	6 minimum
Color:	Red-oxide

NH 3.42 Single-component moisture-cure refined coal tar aromatic polyurethane with micaceous iron oxide (MIO)

Generic type:	Refined coal tar / micaceous iron oxide-filled, single-component, moisture-cure polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	60% minimum
Barrier filler:	3 pounds/gallon micaceous iron oxide
VOC:	2.8 lbs./gallon maximum
Recoat time:	6 minimum
Color:	Black

SECTION 708 - TABLE E
PAINT SYSTEM E - SC MC Zinc Urethane/ Tar / Tar

The following list of paint systems are approved for the painting of structural steel cleaned to SP11 or better:

1. Wasser Corporation (www.wassercoatings.com)
4118 B PL NW-Suite B, Auburn, Washington 98001 (800)-627-2968
Local contact: Ben Forde (benforde3@msn.com) (508)-930-0330

Primer: Wasser MC-Zinc (shop applied) or MC-Miozinc (field applied)
Intermediate: Wasser MC-Tar
Finish: Wasser MC-Tar

2. Xymax Coatings Incorporated
520 Cure Boivin, Boisbriand, PQ J7G2A7 Canada (450)-430-6780
Contact: Marc Schondorf

Primer: Xymax MonoZinc ME III
Intermediate: Xymax MonoGuard
Finish: Xymax MonoGuard