

**SPECIAL PROVISION**

**AMENDMENT TO SECTION 708 -- PAINTS**

**Galvanize and Paint Metal Products**

**Add** to 708:

**708.06** This amendment specifies hot-dip galvanizing and shop-applied paint for steel components of metal products (e.g. steel bridge rail, guardrail, overhead sign structures, luminaires, etc. as shown on the plans or as directed) in accordance with ASTM D 6386, Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting, and as stated herein. The application and handling requirements for, and the color and material properties of, the paint system shall conform to Item 550, as stated herein, or as approved otherwise.

**Paint applicator certification.** Applicators of paint over galvanizing shall be certified with the AISC Sophisticated Paint Endorsement (SPE), or the SSPC Standard Procedure for Evaluating Qualifications of Shop Painting Contractors (QP3), or the SSPC Painting Contractor Certification Program (PCCP) SSPC (QP1).

**Painting requirements.** The requirements for painting shall conform to the requirements of Item 550, including application, handling, color, and material properties, and as stated herein.

**Paint system.** The paint system for this metal product shall be the same system as used for material painted under Item 550, Structural Steel, if both items apply to the same bridge. The Design-Builder shall coordinate suppliers to achieve this requirement.

**708.06.1 Coating System.**

**708.06.1.1** The coating system shall consist of the following generic type at the minimum coating thicknesses shown:

<b>Coating</b>	<b>Description</b>	<b>Thickness (min.)</b>
Galvanized:	Hot-dip galvanizing	per AASHTO
Pre-treatment:	*Tri-sodium phosphate power wash and water rinse (*req'd when painting is more than 12 hrs after galvanizing) SP1 Solvent Cleaning; and SP7 Brush-Off Blast Cleaning	
Intermediate (force-cure):	708-NH 3.21, High build epoxy polyamide, or 708-NH 2.40 Single-component moisture-cure aromatic polyurethane with micaceous iron oxide	3 mils (75 microns) DFT
Finish (force-cure):	708-NH 3.81, Aliphatic polyurethane, or 708-NH 3.43 Single-component moisture-cure aliphatic polyurethane	3 mils (75 microns) DFT

**708.06.1.2** Hot-dip galvanizing shall conform to AASHTO M 111 (ASTM A 123) and utilizing the dry kettle process in a bath of molten zinc. Hardware shall be hot-dip galvanized in conformance with AASHTO M 232 (ASTM A 153) or mechanically galvanized in conformance with AASHTO M 298 (ASTM B 695) Class 50.

**708.06.1.3** Phosphating, when required as described below, shall consist of a power wash using water soluble biodegradable non-phosphate tri-sodium phosphate (TSP-PF) followed by a clear warm water rinse, and shall be applied according to the manufacturer's recommendations.

**708.06.1.4 Color.** Each coat of paint shall be separately colored to contrast with other coats and to insure complete coverage. The previous coat shall be hidden by a single application of each coat. The final color of the painted product shall be BLACK (semi-gloss) Federal Standard 595 #27038.

## **708.06.2 Painting over Galvanized Steel.**

**708.06.2.1 Scope of Work.** All steel components shall be galvanized, pre-treated, and shop painted, except as noted. For bridge rail, anchor plates and stainless steel studs shall not be painted. The heads of rail-to-post through-bolts shall be shop painted, otherwise, hardware exposed to view after installation, such as bolt ends, nuts and washers, shall be field painted according to section 708.06.2.6, Touch-up and Repairs, using paint from the same batch run as used for the shop-applied coats and supplied by the shop applicator.

**708.06.2.2 Pre-approval.** Two approximate 3-inch by 6-inch (75 x 150 mm) samples of material to be used in the work shall be galvanized and painted as specified herein and submitted to the Department (Bureau of Materials & Research, Tel. 603-271-1660) for approval of surface texture and color prior to full production galvanizing and painting. The fabricator of the material shall provide the galvanizer with samples taken from the same material to be used in the work.

**708.06.2.2.1** When the tri-sodium phosphate wash and water rinse is required, the applicator shall document in writing that the pre-treatment procedure is acceptable to the galvanizer and coating manufacturer prior to performing the work.

**708.06.2.3 Design-Builder coordination.** The fabricator shall send the drawings to the galvanizer for review to note considerations particular to the galvanizing process and to coordinate any proposed modifications to the fabricated material, prior to submission of shop drawings to the Department for approval.

**708.06.2.3.1** The fabricator shall notify the galvanizer if the chemical composition of the steel to be galvanized exceeds the following limits, in order to determine its suitability for processing: 0.26% carbon, 0.24% silicon, 0.05% phosphorous, and 1.35% manganese.

## **708.06.2.4 Pre-treatment and paint application.**

**708.06.2.4.1 General.** Paint coatings shall be shop applied to the galvanized product within 15 days of galvanizing. Painting shall be performed inside a controlled environment meeting applicable atmospheric requirements as recommended by the coatings manufacturer. Prior to pre-treatment, rough areas of galvanizing shall be ground smooth to achieve a uniform galvanized surface to accept paint.

**708.06.2.4.2 Pre-treatment.** Prior to painting, the galvanized surface shall receive pre-treatment consisting of SSPC-SP1, Solvent Cleaning to remove detrimental contaminants, and SSPC-SP7, Brush-Off Blast Cleaning, or abraded by approved mechanical means, to thoroughly roughen the entire surface and produce a maximum anchor profile of 1 mil (25 microns). The required thickness of the zinc coating shall be maintained and checked prior to painting. The pre-treatment shall meet the paint manufacturer's requirements. An additional pre-treatment or tie coat may be considered if required by the paint manufacturer and approved by the Department.

**708.06.2.4.2.1** Blast cleaning shall be performed prior to the formation of "white rust" on the galvanized surface. If any "white rust" is detected by visual means, the galvanizing shall be stripped off and the steel re-galvanized in conformance with these specifications. "White rust" shall be as defined in the Inspection of Products Hot Dip Galvanized After Fabrication, Table IV, by the American Galvanizers Association.

**708.06.2.4.3** The galvanized steel product shall be pre-treated and painted by one of the following methods.

**Method 1** (under 12 hrs). The galvanized steel shall be pre-treated as per 708.06.2.4.2. The first coat of paint shall be applied within twelve hours of galvanizing and within eight hours of blast cleaning (or surface abrasion by approved mechanical means).

**Method 2** (over 12 hrs). When the galvanized steel is to be painted more than 12 hours after galvanizing, the steel shall be pre-treated with a power wash containing TSP and clear water rinse as per 708.06.1.3 followed within twelve hours by the pre-treatment as per 708.06.2.4.2. The first coat of paint shall be applied within eight hours of blast cleaning (or surface abrasion by approved mechanical means).

**Note 1.** Galvanized products shipped prior to painting shall be covered with a tarp during shipment between the galvanizer and the painter to reduce exposure to diesel exhaust fumes, a surface contaminant that is difficult to remove.

**Note 2.** Prior to painting galvanized products shall not be nested, stacked or stored with adjacent surfaces touching but shall be separated with suitable blocking to permit the circulation of air between products. Galvanized products shall be kept as dry as possible.

**708.06.2.4.4** The intermediate and finish coats shall be shop applied under atmospheric conditions meeting the following minimum requirements: air and steel temperature of 50° F. (10° C.) and steel temperature 5° F (2.7° C.) above the dew point. The finish coat shall be spray applied.

**708.06.2.4.5 Force Cure.** The intermediate and finish paint coats shall each be maintained in a protected environment at a minimum temperature of 75° F. (24° C) for the duration of the cure-to-recoat cycle listed by the coating manufacturer on the product data sheet.

**708.06.2.5 Handling.** The finished shop-coated material shall be handled with care using nylon slings, padded cables, etc. as required to protect the finished coating. The paint applicator shall be responsible for the condition of the finished coating until the material arrives at the job site.

**708.06.2.6 Field Touch-up and repairs.**

**708.06.2.6.1** Repair damaged galvanizing and bare steel surfaces in accordance with ASTM A 780, Standard Practice for Repair of Damaged Hot-Dipped Galvanized Coatings, Annex A2. Thoroughly clean damaged areas with a power sanding disk (e.g. 3M Scotch-Brite™ Clean and Strip disk) to produce a clean, bare and dry bright metal surface. Brush apply an approved organic zinc-rich repair paint containing 94 percent (min.) zinc by weight in the dry film, according to the manufacturer's recommendations, in two coats to a thickness equivalent to the surrounding galvanizing (min. 4 mils DFT). The total repair area shall be less than 3% of the area of the member, or the member shall be regalvanized. Touch up shall not be permitted using aerosol spray, silver paint, brite paint, or aluminum paint. Approved repair paints include ZiRP™ by Duncan Galvanizing (617-389-8440) and ZRC® Cold Galvanizing Compound (781-319-0400).

**708.06.2.6.2** Damaged shop-applied paint shall be repaired in conformance with the solvent cleaning and abrasion pre-treatment requirements of 708.06.2.4.2 and the paint manufacturer's recommendations, to a minimum thickness of the original system. Touch-ups shall be such that the repair is not noticeably visible from a distance of six feet.

**708.06.2.7 One-year inspection.** Should the coating system fail within one year after the project has been accepted, the coating shall be repaired by the Design-Builder at no cost to the State. The method of repair must be acceptable to the Department. A coating failure shall mean any visible corrosion, blistering, checking, or delamination (peeling) of the paint.

**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, 3.5 max. Lb./Gal. (420 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, 3.5 max. Lb./Gal. (420 g/L)

**3. Color.**

Color: See 708.06.1.4

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. Ameron International Protective Coatings ([www.ameroncoatings.com](http://www.ameroncoatings.com))  
 201 North Berry Street, Brea, California 92622-1026, (800) 926-3766  
 Local contact: C. G. Edwards & Co. (617) 268-4111  
  
 Primer: Dimetcote 9 HS Inorganic zinc  
 Intermediate: Amercoat 385 Multi-purpose epoxy  
 Finish: Amercoat 450 HS Aliphatic polyurethane
  
2. Carboline Company ([www.carboline.com](http://www.carboline.com))  
 350 Hanley Industrial Court, St. Louis, MO 63144-1599 (800) 848-4645  
 Local contact: Charles Vaillant (603) 642-5809  
  
 Primer: Carbozinc 11 HS Inorganic Zinc Rich  
 Intermediate: Carboline 893 High Build Epoxy  
 Finish: Carboline 133 HB Aliphatic Polyurethane

**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 combined)

VOC content, 3.5 max. Lb./Gal. (420 g/L)

**3. Color.**

The color when dry shall Contrast with primer & finish coat

**NH 3.81 Aliphatic Polyurethane Finish**

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

**2. Composition.**

VOC content, 3.5 max. Lb./Gal. (420 g/L)

**3. Color.**

Color: See 708.06.1.4

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](http://www.carboline.com))  
 350 Hanley Industrial Court, St. Louis, MO 63144-1599 (800) 848-4645  
 Local contact: Charles Vaillant (603) 642-5809  
  
 Primer: Carboline 859 Organic Zinc Rich  
 Intermediate: Carboline 888 High-Build Epoxy  
 Finish: Carboline 133 HB Aliphatic Polyurethane
  
2. M.A.B. Industrial Paints ([www.mabpaints.com](http://www.mabpaints.com))  
 600 Reed Road, Broomall, PA 19008 (610) 353-5100  
 Local contact: Jim Sheridan (732) 251-1312  
  
 Primer: Ply-Tile Epoxy Organic Primer  
 Intermediate: Ply-Mastic Epoxy  
 Finish: Ply-Thane 890 HS
  
3. Sherwin Williams Company ([www.sherwin-williams.com](http://www.sherwin-williams.com))  
 101 Prospect Ave, N.W. Cleveland, OH 44115 (216) 566-2000  
 Local contact: Scott DeVinney (207) 781-5995  
  
 Primer: Zinc Clad III HS  
 Intermediate: Macropoxy 646  
 Finish: Acrolon 218 Acrylic

**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 lb./gal (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 SC MC aromatic polyurethane with MIO intermediate**

Generic type:	MIO, single-component, moisture-cure aromatic polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	60% minimum
Pigment type:	3.0 lb./gal (360 g/L) 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 SC MC aliphatic polyurethane with MIO finish**

Generic type:	Single-component, moisture-cure aliphatic polyurethane
Vehicle type:	Moisture-cure polyurethane
Volume solids:	53% minimum
Pigment type:	3.0 lb./gal (360 g/L) micaceous iron oxide
Weight per gallon:	12-14 lb./gal. (1.4-1.68 kg/L) minimum
VOC:	3.5 lb./gal maximum
Recoat time:	4 hours minimum
Color:	See 708.06.1.4
Finish:	Semi-gloss

**Finish #2 - NH 3.43 SC MC 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 lb./gal (1.3-1.4 kg/L) minimum
VOC:	3.5 lb./gal (420 g/L) maximum
Recoat time:	4 hours minimum
Color:	See 708.06.1.4
Finish:	Semi-gloss
Color:	See 708.06.1.4

**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 and approved by NEPCOAT.

1. Ameron International Protective Coatings ([www.ameroncoatings.com](http://www.ameroncoatings.com))
 

	201 North Berry Street, Brea, California 92622-1026,	(800) 926-3766
	Local contact: C. G. Edwards & Co.	(617) 268-4111
Primer:	Amercoat 430 Moisture Cured ZR Polyurethane Primer	
Intermediate:	Amercoat 433 MC Polyurethane Intermediate w/ MIO	
Finish #1:	Amercoat 434 MC Aliphatic PU Topcoat w/ MIO	
Finish #2:		
  
2. Xymax Coatings Incorporated

	1130 Republic Drive, Unit C, Addison, IL 60101	(800)-332-3136
	Contact: Jack Bracco	(724) 339-1442
	Local contact: Chuck Moran	(781)-424-6743
Primer:	Xymax MonoZinc ME III	
Intermediate:	Xymax MonoFerro PUR	
Finish #1:	Xymax Bridge Finish	
Finish #2:	Xymax MaxCoat HB	