

ITEM 570.9540XX25 - MAINTENANCE COATING OF STRUCTURAL STEEL

1. DESCRIPTION:

- 1.01 This work shall consist of power tool cleaning to bare metal and applying an epoxy prime coat to selected areas as well as pressure washing the entire structure, removal of surface salt contamination as necessary, and applying an intermediate and finish coat to the entire structure.
- 1.02 Volumes 1 and 2 of the Steel Structures Painting Manual published by the SSPC shall be included as part of this specification.

2. MATERIALS:

- 2.01 All equipment used for cleaning and repainting shall meet the requirements as specified in the Contract Documents.
- 2.02 Pressure washing equipment shall achieve a minimum pressure of 5,000 psi at the nozzle and have a zero degree oscillating tip.
- 2.03 All coatings shall be as specified and shall be applied in accordance with this specification or the manufacturer's recommendations, whichever is more restrictive. **Particular attention shall be paid to re-coat requirements.**
- 2.04 Material for the prime coat shall be a high-volume solid, two-component epoxy penetrating sealer. Material for the second coat shall be a compatible low-viscosity clear epoxy sealer. Material for the finish coat shall be an aliphatic urethane. The material shall be delivered to the site in sealed, original, labeled containers and stored in accordance with the manufacturer's recommendations. At no time shall the shelf life of the coating material be exceeded.

Only products from the same manufacturer that are certified as being compatible shall be used. Should the manufacturer, based on field conditions, deem substitution(s) for the intermediate (tie) coat necessary, the substitution shall be submitted for approval to the owner prior to use and shall be made at no additional cost. The following coating materials, or approved equal, shall be used. No substitutions will be entertained after the letting:

Sherwin-Williams, Cleveland, Ohio

Spot/Prime Coat	Macropoxy 646 Fast Cure Epoxy
Intermediate (Tie) Coat	Macropoxy 920 Pre-Prime
Finish Coat	Acrolon 218 HS

Tnemec Company, Kansas City, Missouri

Spot/Prime Coat	Series N69 Hi-Build Epoxoline II
Intermediate (Tie) Coat	Series 27 FC Typoxy
Finish Coat	Series 1075 Endura-Shield Polyurethane

Carboline Company, St. Louis, Missouri

Spot/Prime Coat	Carboline 954 Series
Intermediate (Tie) Coat	Rust Bond Series
Finish Coat	Carbothane 133 LH

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2. MATERIALS: (cont'd)

2.04 (cont'd)

Devoe Coatings, Rahway, New Jersey

Spot/Prime Coat	Bar-Rust 236H
Intermediate (Tie) Coat	Devoe 167 Pre-Prime
Finish Coat	Devoe Devthane 379

PPG Industries, Pittsburgh, PA

Spot/Prime Coat	Amerlock 400
Intermediate (Tie) Coat	Amerlock Sealer
Finish Coat	Amercoat 450H

Mercury Paint Corp., Brooklyn, NY

Spot/Prime Coat	Merma 100 CW Aluminum Epoxy
Intermediate (Tie) Coat	Merco Pre-Primer Epoxy 150
Finish Coat	Merthane 300 CW Urethane Topcoat

M.A.B. Paints, Philadelphia, PA

Spot/Prime Coat	Ply-Mastic Epoxy
Intermediate (Tie) Coat	Ply-Tile Rust Seal
Finish Coat	Ply-Thane 890HS

Insl-x Industrial Coatings, Montvale, NJ

Spot/Prime Coat	Mastic Shield Epoxy
Intermediate (Tie) Coat	Insl-Tile 100% Solids Epoxy
Finish Coat	Insl-Tron Acrylic Aliphatic Polyurethane

2.05 The color of the polyurethane finish coat and epoxy second coat shall be sage green, unless indicated otherwise in the Contract Documents. The color change between subsequent coats shall be as approved by the Engineer prior to ordering the material. The coating colors shall be such that they can be completely hidden by a single application, applied at the minimum specified dry film thickness. Field tinting shall not be allowed.

2.06 All material and equipment used for environmental protection shall be approved by the Engineer. Any material or equipment that is determined to be deficient or that becomes damaged to the extent that it no longer fulfills the requirements of this specification shall be replaced or repaired to the satisfaction of the Engineer, at the Contractor's expense, with the replacement material and/or equipment meeting the requirements of the Contract Documents.

2.07 Paint Delivery, Storage, and Handling:

- A. Paint materials shall be delivered to the project in sealed, labeled containers bearing the manufacturer's name, type of material, brand name, color designation, shelf life, batch number, and instructions for mixing and thinning. All containers of paint shall remain unopened until required for use.

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2. MATERIALS: (cont'd)

2.07 Paint Delivery, Storage, and Handling: (cont'd)

- B. Paint, thinners, and solvents shall be stored in accordance with OSHA regulations and the requirements of the paint manufacturer. Paint shall be stored under cover out of direct sunlight, and the temperature maintained between 40°F and 90°F. Only a reasonable amount of thinner necessary to thin the paint shall be transported to the mixing area.

2.08 Containment and Protection of Surfaces Not to be Coated:

- A. Protective coverings, shields, or masking shall be used to protect items not being painted from impact or damage from surface preparation or the painting work.
 - 1. Protective coverings shall be installed on nameplates, identification plates, or other items designated by the NYSTA Project Engineer to prevent damage created by the surface preparation or painting work of the Contractor.
 - 2. All protective coverings shall be maintained by the Contractor during the entire period the work is being performed, and all coverings shall be removed by the Contractor upon completion of the work.

3. CONSTRUCTION DETAILS:

3.01 Construction sequence is as follows:

- A. Pressure wash all surfaces to be coated.
- B. Solvent wipe using aromatic solvent any metal surfaces with remaining deposits of oil, grease or other contaminants.
- C. Reduce chlorides at areas of pitted corrosion to a minimum level of 5 microgram/cm², using an acceptable method.
- D. Power tool clean rusted areas and other areas designated in the Contract Documents to bare metal, in accordance with SSPC-SP11. Clean, solvent-wipe, and prime bare metal.
- E. Apply Coatings. (1 Spot Prime coat and stripe coat where required, 1 full intermediate coat and 1 finish coat).

3.02 At least five (5) working days prior to the start of work, the Contractor shall provide the Engineer with a fully detailed cleaning/painting schedule of operations and one (1) copy of the paint manufacturer's current technical data and material safety data sheets for the paint furnished.

In addition, the Contractor shall provide the Engineer with a written statement from the paint supplier identifying recoat requirements. Instructions, suggestions and precautions contained in the data sheets shall be followed. If the manufacturer's technical data contradicts the provisions of these specifications, the Engineer will be notified by the Contractor and the Engineer will issue a determination on the procedures to follow. The schedule shall be in accordance with these specifications and the manufacturer's application and re-coat recommendations.

3.03 No changes to the cleaning/painting schedule or coating system will be permitted without the express written approval of the Director of Engineering Services.

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3. CONSTRUCTION DETAILS: (cont'd)

- 3.04 All surfaces shall be high pressure water cleaned at a minimum pressure of 5,000 psi using a zero degree rotating head at a distance of six (6) inches from the steel surfaces. The cleaning shall remove all loose rust, loose mill scale, loose paint and debris. Before priming, all surfaces shall conform at a minimum of SSPC-SP12 WJ4, as per SSPC Vis 4, "Guide and Reference Photographs for Steel Cleaned by Water Jetting." All surfaces shall be dry prior to priming.
- 3.05 Any remaining asphaltic cement, oil, grease, diesel fuel deposits or other contaminants shall be removed by solvent cleaning in accordance with SSPC-SP1.
- 3.06 No pressure washing shall take place unless the temperature is at least 40°F and rising.
- 3.07 Remaining areas of loose or delaminated, blistered paint shall be hand and/or power tool cleaned in accordance with SSPC-SP2 and SSPC-SP3.
- 3.08 The Contractor shall prevent the bridge debris, dust, dirt or the water used to clean the bridge from becoming a hazard to the traveling public. This may require the use of protective screens, tarpaulins, or canvas covers as approved by the Engineer.
- 3.09 All equipment and methods to be used shall be subject to the approval of the Engineer prior to actual use. Compressed air shall not be used for cleaning surfaces by the blow down method.
- 3.10 The Contractor is directed to the requirements of Subsection 1926.62 of the OSHA standards and all local health guidelines to perform the work. Adherence to this subsection, as well as all other applicable sections, is required. In addition, all employees engaged in the cleaning activity shall wear appropriate protective gear.
- 3.11 **Remediation of Chloride:**
 - A. The Contractor shall propose surface preparation procedures that will remove chloride salts from the surface.
 - B. Methods of chloride removal may include, but are not limited to, steam cleaning after power tool cleaning, high pressure washing, or vacuum blast cleaning with blends of fine and coarse abrasives (e.g., 50/50 blend of G25 and G80 grit). When remediation methods include water with salt reducing additives, the Contractor will be required to provide evidence that the additive will not be detrimental to the coating system.
 - C. Upon completion of the surface preparation, use the Bresle cell kit, or approved equal, to test representative surfaces which were previously rusted (i.e., pitted steel) for the presence of remaining salts. A minimum of three (3) such tests shall be used in each representative area.
 - B. If chlorides are detected at levels greater than 5 micrograms/cm², continue to clean the affected areas until acceptable results are achieved.
 - C. Following successful salt testing reclean the surface to achieve the required surface preparation criteria.
- 3.12 Surfaces that exhibit any rusting shall be cleaned to bare metal in accordance with SSPC-SP 11. All cleaned areas shall have their edges feathered prior to priming.

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3. CONSTRUCTION DETAILS: (cont'd)

- 3.13 All cleaned steel surfaces shall be inspected and approved by the Engineer or their representative prior to the application of coatings. Surfaces that do not meet these specification requirements as determined by the Engineer or Inspector shall be recleaned at the Contractor's expense until the surfaces meet the specification requirements.
- 3.14 **Mixed Coatings.** All coatings shall be thoroughly mixed prior to application. Mechanical mixers shall be used to thoroughly disperse any settled pigment or solids. Hand Mixing or Boxing shall not be allowed.
- 3.15 **Solvent Restrictions.** No reducing or thinning of coatings, by the use of solvents or other material shall be allowed unless all of the following are met:
- recommended by the manufacturer
 - done in strict compliance with the manufacturer's instructions
 - approved by the Engineer
 - mixed in the presence of the Engineer or Inspector.

Only the type and quantity of thinner/reducer recommended by the manufacturer shall be used. Painters shall not carry, or in any other way possess or have access to, containers of solvent when painting.

The quantity of solvent permitted on the job site shall be only the reasonable amount necessary for cleaning equipment, wiping dirt and grease from surfaces to be coated and for cleaning spatters.

All solvents used for cleaning operations shall conform to all applicable Federal, State and local laws, regulations or codes. Special attention shall be paid to Volatile Organic Compound regulations.

Unauthorized use of solvents shall result in rejection and the coating shall be removed and the surface repainted in conformance with the specifications and to the satisfaction of the Engineer, at the Contractor's expense.

- 3.16 **Coating Application Methods:** All coatings shall be applied in a neat and workmanlike manner. Coatings shall be applied uniformly and shall be free of runs, sags, rips, ridges or other defects. Paint may be applied by brushes or rollers. Paint may be applied by spray only when approved by the Engineer.

Hand Brushing. The coating, when applied by brushes shall be even and uniform. Subsequent coats shall be applied perpendicular to previous coats. Brushes shall be of good quality and the length of the exposed bristle shall be equal to or greater than the width of the brush. Brushes shall be cleaned and dried daily.

On those areas that are inaccessible to brushes, the coating shall be applied by the use of rollers, spray equipment, daubers or sheepskins, as approved by the Engineer.

Rolling. Rollers for the application of coatings shall be of such a quality to produce a smooth uniform coating.

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3. CONSTRUCTION DETAILS: (cont'd)

3.16 Coating Application Methods: (cont'd)

The roller cover shall be uniformly loaded with paint by rolling on the slanted surface of a tray, framed screen wire or other suitable device. Roller application shall be done at such a pace that no spinning of the roller or throwing off of paint occurs when the roller is lifted from the surface. The paint shall be applied by rolling from a dry to a wet area while varying the direction of the stroke. The paint shall be feathered out by using light pressure at the end of the stroke to promote uniformity.

On those areas that are inaccessible to roller application, the coating shall be applied by brushes, spray equipment, daubers or sheepskins, as ordered by the Engineer.

Spraying. Spray equipment shall be capable of applying paint in a fine, even spray so as to produce a uniform film. Spray equipment shall be as recommended by the coating manufacturer.

Spray coating shall be done by experienced and qualified painters. Painters shall apply material in a manner that promotes uniform coverage and prevents discontinuity of the applied coating film. The spray gun shall be moved uniformly across and perpendicular to the receiving surface. To insure a uniform coating, each spray pass should lap the other by 50%. Any sags, drips, airholes or other film defects shall be immediately corrected by hand brushing.

On those areas that are inaccessible to spray application, the paint shall be applied by brushes, rollers, daubers or sheepskins, as approved by the Engineer.

3.17 Termination of Coating Operations: The Engineer is empowered to terminate coating operations, temporarily or permanently, if the Engineer determines that any of the following conditions exist:

- A. Satisfactory results are not being obtained.
- B. The measured dry film thickness is not within the specified range.
- C. Areas not specifically designated to be coated are likely to be or are being affected by the application method.
- D. The application method is causing damage to public or private property.

If the Engineer permanently terminates coating operations, he may do so by verbal order, but he shall notify the Contractor in writing of his reasons for termination within 48 hours of termination. The Engineer may temporarily terminate coating operations by verbal orders. Coating operations which are terminated due to damage to public or private property shall not be resumed until the Contractor

takes appropriate measures to protect such property and demonstrates to the Engineer's satisfaction that such property damage will not reoccur. If a particular method of coating operation is permanently terminated, the Contractor may apply the coating in accordance with another approved method. No extra compensation will be paid for the substitution of another method of application.

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3. CONSTRUCTION DETAILS: (cont'd)

- 3.18 **Spot Painting and Stripe Painting:** Spot painting with primer will be required on the entire surface of all steel that has been cleaned to bare metal. The following areas cleaned to bare metal shall receive a stripe coat in addition to the spot prime coat prior to application of the full intermediate coat; edges, corners, bolts, nuts, rivets, welds and pitted surfaces. Surfaces to be spot painted should be coated within the same day the steel has been cleaned and accepted. All spot painting and striping will be performed using a brush only. No other method of paint application will be allowed. The paint shall be worked into all joints and open spaces. The spot painted areas shall be fully cured before applying the prime coat.
- 3.19 No coating shall begin until cleaned steel surfaces have been inspected and approved by the Engineer or Inspector.
- 3.20 All structural steel members, railings, fascia, downspouts, and other miscellaneous steel items which have been previously coated shall be cleaned and coated in accordance with these specifications unless specifically excluded by the plans, or specifications, or by the Engineer.
- 3.21 The coating of metal surfaces shall include, but not be limited to the following:
- The proper preparation of all surfaces.
 - The application, protection and curing of the coatings.
 - The protection from spatter or spillage of pedestrian, vehicular, marine or other traffic upon, beneath or adjacent to the coated surfaces. Payment for this service will be made under the item Environmental Ground Protection and/or Environmental Waterway Protection.
 - The protection against disfigurement of all portions of bridges and other structures as well as highway appurtenances. Disfigurement may be caused by abrading, scoring, spattering, overspraying, splashing and smirching of coatings or cleaning materials.
 - The prevention of spillage of any pollutants into any waterway or body of water.
 - The supplying of all equipment, tools, tackle, scaffolding, labor and materials necessary to complete the entire work.
- 3.22 The application of subsequent coat(s) shall not begin until the receiving surfaces have been cleaned and primed. All receiving surfaces shall be clean and dry. If, after the original cleaning, striping, and priming, the receiving surfaces become dirty in any manner, they shall be cleaned again by a method allowed by the Contract Documents. The actual method to be used shall be approved by the Engineer.
- 3.23 All surfaces to which unauthorized coatings have been applied and those surfaces not coated in accordance with the Contract Documents shall be cleaned of those unauthorized coatings and recoated in accordance with these specifications and to the satisfaction of the Engineer.
- 3.24 Structural steel that is to be welded shall not be coated until all welding is complete. If welding is to be done in the shop only, the welds shall be cleaned, "striped" and then coated in the shop with one coat of primer. Steel that is to be field welded shall be left uncoated for a minimum of three (3) inches from the weld area.
- 3.25 After the Engineer has approved the preparation in each area, all coating shall be applied without runs, sags or other objectionable properties to that prepared steel surface.

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3. CONSTRUCTION DETAILS: (cont'd)

3.25 (cont'd)

The total dry film thicknesses of all coating applications shall be as indicated below:

Spot Primer (epoxy)	3 – 5 mils
Full Clear Epoxy Second Coat	1.5 – 2.5 mils
Polyurethane Finish Coat	3 – 5 mils

The dry film thickness specified above will be achieved prior to acceptance of the work, regardless of the number of applications required. Sage green pigmentation of the epoxy second and polyurethane finish coats, if required, shall match Munsell Notation #7.5 GY5/4.

Application shall be by brush or roller **only** except in areas where spray may be used with prior approval of the Engineer.

The Engineer will take into consideration the location of painting operations, traffic volume, direction and velocity of wind, and adequacy of the Contractor's containment scheme in determining whether spray equipment may be used. Spray application will not be allowed, if in the judgement of the Engineer, the Contractor does not adequately provide for the protection of traffic, environment or property. **Under no circumstances will spray application be allowed over roadways.**

Any coating applied to an area where the preparation has not been approved shall be removed by Power Tool Cleaning in accordance with SSPC-SP 11 and when the cleaning is accepted it shall be reapplied in accordance with the specification at no additional cost to the Authority.

Coatings shall be applied when the surface and air temperatures are between 50°F and 110°F, or in accordance with the coating manufacturer's written recommendations. No paint shall be applied unless the receiving surface is absolutely dry. The coatings shall not be applied when the relative humidity is above 85%, or when the steel temperature is less than 5° above the dew point. The finish coat shall be applied within seven (7) days of the last epoxy coat.

3.26 **Schedule:** The prime coat shall be applied before flash rusting occurs to the cleaned surface.

The subsequent coat(s) of paint shall be applied to the receiving surface in conformance with the manufacturers recommended schedule for re-coating, or 21 days, whichever is more restrictive, except as noted above. If the manufacturer's re-coating recommendations are not complied with, solvent wipe in accordance with SSPC-SP 1, brush off blasting in accordance with SSPC-SP 7 or other acceptable corrective measures as recommended to the Engineer, will be required.

Upon completion of all coating operations, the Contractor is required to stencil on the inside fascia girder at one location near each abutment, in six (6) inch high letters, the month and year that the structure was painted and the contract number. At Thruway overpasses, the stenciled information shall be located so it can be seen from the right shoulder when looking in the direction of travel.

3.27 After installation of any new steel, all areas where paint has become damaged or deteriorated shall be thoroughly cleaned and "touched-up" or recoated in accordance with this Specification.

3.28 Whenever a structure spans over a railroad, ballast and tracks shall be protected in accordance with NYSDOT Standard Specification 105-09, Work Affecting Railroads.

4. METHOD OF MEASUREMENT:

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4.01 Payment will be made at the lump sum price bid.

5. BASIS OF PAYMENT:

5.01 The lump sum price bid shall include the cost of all labor, materials and equipment necessary to complete the work. All work shall be done in a manner satisfactory to the Engineer.

5.02 For the purpose of progress payments, the lump sum price bid for the item shall be apportioned as noted below:

Payments will be made for each stage satisfactorily completed in accordance with this Specification as follows:

- A. **Stage 1, Spot Cleaning, Priming and Striping:** Thirty (30) percent of the lump sum price bid will be paid for satisfactorily cleaning, priming, and stripping selected areas as well as pressure washing, solvent wiping and chloride remediation of the entire surfaces.
- B. **Stage 2, Intermediate Coat.** Thirty (30) percent of the lump sum price bid will be paid for satisfactorily applying the epoxy second coat to the entire structure.
- C. **Stage 3, Finish Coat.** Forty (40) percent of the lump sum price bid will be paid for satisfactorily applying the polyurethane finish coat to the structure.

Progress payments will be made within each stage and shall be computed as the ratio of the length of structure satisfactorily completed to the entire structure. Under no circumstances will the percentage payment for any stage exceed the payment percentages noted above.

5.03 **Basis of Acceptance:** The Contractor shall delineate each area to be cleaned and coated during each day's work. The Engineer shall approve the cleaning operations in this area prior to application of each coat. Any residue beyond that allowed by the pictorial standards shall be cause for rejection of the cleaning. Any areas cleaned outside the designated area shall be recleaned when the area is delineated for cleaning, regardless of elapsed time or surface condition. Once the appropriate protective coating is applied, the Engineer shall determine the dry film thickness, prior to acceptance of the area.

The Contractor must maintain access to the structure for inspection purposes until acceptance. Dry film thickness determinations will be made by the Engineer or Inspector in accordance with SSPC-PA 2, paint application Specification No. 2 measurement of dry paint thickness with magnetic gages. Where determined necessary by the Engineer or Inspector, a Tooke destructive test instrument may be used. If a Tooke Gage is used, the test area shall be re-coated to the satisfaction of the Engineer. Any evidence of less than the specified thickness shall be cause for rejection in which case the Contractor shall re-coat, including recleaning if necessary, at his own expense.