

## **ITEM 570.9201XX25 - COATING SYSTEM FOR NEW STRUCTURAL STEEL (SHOP APPLICATION)**

### **1. DESCRIPTION:**

1.01 This work shall consist of near white blast cleaning and applying a three coat paint system to structural steel parts and a finish coat to the exposed face and bottom flange of the fascia. All painting work, except field touch up and bolt painting, shall be done in the shop.

#### **1.02 DEFINITIONS:**

- A. **Painting** shall include the surface preparation and application of coatings to metal surfaces.
- B. **Blast Cleaning** shall mean the preparation of all surfaces to be painted in accordance with standards and specifications for "Near White Blast Cleaning" as published by the Society for Protective Coatings. (SSPC-SP10)
- C. **Paint** shall be as specified in the contract documents.
- D. **Surface Preparation** shall mean the cleaning and/or pretreating of surfaces to be painted as specified in the contract documents and shall include the removal of all debris.
- E. **Repainting** shall mean the removal of the entire existing coating, preparing the surface, and recoating all steel.
- F. **SSPC - Surface Preparation (SP)**. Specifications referred to herein, may be obtained through SSPC, 40 24<sup>th</sup> Street, Pittsburgh, Penn. 15222.
- G. **Environmental Protection** shall mean the containment, collection and removal of old paint chips, corrosion residues, spent abrasives and newly applied paint (herein after referred to as waste materials) that result from blasting and other cleaning and coating operations performed in the field.
- H. **Inaccessibility** shall mean the inability to use a standard application method because of restrictions such as reduced clearance, insufficient hand space or too narrow an opening. It shall not mean that the element is too high or that the rigging or scaffolding will be difficult. The Engineer will make a final determination as to what will be deemed inaccessible.

### **2. MATERIALS:**

- 2.01 All equipment used for cleaning and painting shall meet the requirements as specified in the contract documents.
- 2.02 All coatings shall be as specified in the contract documents and shall be applied according to same, or the manufacturer's recommendations, whichever is more restrictive. **Particular attention shall be paid to recoat requirements.**
- 2.03 The abrasive selected shall be identified by the Contractor and approved by the Engineer prior to use. The abrasive shall be certified to be of fine to extra fine gradation. The abrasive shall have a sharp, hard cutting surface and shall be dry and free of oil or soluble salt containments. Silica sand and/or steel shot shall not be used. If blast cleaning is done by steel abrasive, the abrasive mix shall contain steel grit. The periodic replenishing mix shall consist of at least 50% steel grit.

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### **2. MATERIALS:** (cont'd)

- 2.04 Material for prime coat shall be a self curing, inorganic zinc. The material shall be selected from the "Prequalified Coating Material List".
- 2.05 Material for the second and third coat shall be a polyamide epoxy selected from the "Pre Qualified Coating Material List". The color of the third coat shall be sage green unless otherwise indicated in the contract documents.
- 2.06 Material for the finish coat shall be a aliphatic polyurethane selected from the "Prequalified Coating Material List". The color shall be sage green unless otherwise indicated in the contract documents.
- 2.07 The inorganic zinc primer and second coat of epoxy shall be a different color from each other. The color of the primer and second coat, will be the Contractor's option. However, they shall contrast with the underlying substrate. **The third coat shall be pigmented sage green.** 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.
- 2.08 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.
- 2.09 All material shall be delivered to the site in sealed, original, labeled containers and stored in accordance with the manufacturers recommendations. At no time shall the shelf life of the coating material be exceeded.
- 2.10 The Contractor shall provide Material Safety Data Sheets to the Engineer for all materials used at the job site. The Contractor shall also supply the Engineer with the manufacturer's current technical data for the paint furnished.

### **3. CONSTRUCTION DETAILS:**

- 3.01 At least 5 working days prior to the start of work, the Contractor shall provide the Engineer with a painting schedule fully delineating a schedule of operations and one copy of the paint manufacturer's current technical data for the paint furnished. In addition, the contractor will 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 manufacturers application and recoat recommendations.
- 3.02 No changes to the coating schedule or system will be permitted without the express written approval of the Chief Engineer, Engineering Services.

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### **3. CONSTRUCTION DETAILS:** (cont'd)

- 3.03 **Surface Preparation:** Abrasive materials for blast cleaning operations may be selected by the Contractor, except that they shall be approved by the Engineer before the start of work. All abrasives shall be free of corrosion producing contaminants and also free of oil, grease, soluble salts or other deleterious contaminants. Silica sand and/or steel shot will not be allowed for blast cleaning purposes.

All blast profiles shall be 1-3 mils or as recommended by the coating manufacturer. The profile depth shall be determined by gauging the profile as transferred onto the appropriate replica tape. Visually, the blast cleaned surface shall conform reasonably to the Keane Tator surface profile comparator for the abrasive utilized.

All metal surfaces to be coated shall receive Near White Blast Cleaning as defined in SSPC-SP-10. The blast cleaned surfaces shall conform of SSPC Vis 1.

Where oil and grease are present, these shall be removed in accordance with SSPC-SP1 "Solvent Cleaning". This cleaning shall be performed prior to blasting. If contamination remains after blasting, the surface shall be recleaned with solvent.

All cleaned steel surfaces shall be inspected by and approved by the Engineer or Inspector prior to the application of coatings. Surfaces which 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 and are approved by the Engineer or Inspector.

- 3.04 **Mixing 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. The zinc-rich primer mixture shall be strained through a 30-60 mesh screen to remove large particles.

- 3.05 **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 requirements.

Unauthorized thinning/reducing 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.

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### **3. CONSTRUCTION DETAILS:** (cont'd)

- 3.06 **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, drips, ridges or other defects. Paint may be applied by brushes, or spray, or a combination of these methods as specified in the contract documents or as approved by the Engineer. Spraying shall be required for the application of the inorganic zinc primer. Rolling shall not be allowed.

**Hand Brushing.** The coating, when applied with brushes shall be so manipulated by the brush as to produce a uniform, even coating. When applying a coating to a previously coated surface, strokes should be made perpendicular to those of the receiving surface to insure adequate anchorage. 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.

On those areas which are inaccessible to brushes, the coating shall be applied by the use of spray equipment, or daubers, or sheepskins, as approved 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. Paint containers for spray applications shall be equipped with a mechanical agitator so the mixture is in motion throughout the application period.

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.

- 3.07 **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 required 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. 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)

- 3.08 **Stripe Painting**. Stripe painting over the cured inorganic zinc primer with epoxy will be required on the entire surface of the following items: all welds, rivets, bolts, nuts, and edges of plates, angles, lattice pieces or other shapes and corners and crevices. These surfaces shall be "striped" before the full coat is applied. Surfaces to be "striped" should be coated after the steel has been cleaned and accepted. All stripe painting will be performed using a brush only. No other method of paint application will be allowed for stripe painting. The paint shall be worked into all joints and open spaces. Care shall be taken to ensure that the coating remains properly mixed/agitated during striping operations.

Where it is felt that a long drying period of the stripe coating is necessary, the full coat of epoxy shall be applied, allowed to dry, and the stripe coat then applied. Tinting of the stripe coat is required to promote contrast.

- 3.09 No coating shall begin until cleaned steel surfaces have been inspected and approved by the Engineer or Inspector.
- 3.10 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. Any tarps or shrouds deemed necessary by the Engineer for environmental ground or water protection shall be supplied and paid for under this item.
  - The protection against disfigurement of all portions of bridges and other structures as well as highway appurtenances. Disfigurement which 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.
- 3.11 The application of subsequent coatings 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 and priming, and before application of a subsequent coat of paint should 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.
- 3.12 Metal surfaces to which unauthorized coatings have been applied and those surfaces not coated in accordance with the contract documents shall be recleaned of those unauthorized coatings and recoated in accordance with these specifications and to the satisfaction of the Engineer.
- 3.13 On surfaces coated with primer, the subsequent coats shall be applied according to these specifications. Steel surfaces not so coated shall be recleaned and recoated at the contractor's expense.

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### **3. CONSTRUCTION DETAILS: (cont'd)**

- 3.14 Coating requirements for structural steel members embedded in, partially embedded in, or in contact with: cast-in-place, or pneumatically projected concrete are as follows:
- A. Fully embedded steel, defined as a steel member completely surrounded by concrete, shall not have a second, third or finish coat applied.
  - B. Partially embedded steel, defined as a steel member with a portion fully surrounded by concrete, shall have its exposed surfaces coated as required by the contract documents.
  - C. A steel member, or portion of a steel member, neither fully, nor partially embedded, but still in contact with concrete shall have all its surfaces coated unless otherwise required by the contract documents.
- 3.15 The following items shall not receive a prime coat. Bolts, nuts and washers to be used for field erection.
- 3.16 Metal to metal contact surfaces shall be prime coated only. The primer used shall provide a minimum slip coefficient of 0.50 (AASHTO Class B Coating).
- 3.17 Machine finished surfaces shall be protectively treated in accordance with subsection 1304, Protective Coating for Machined Surfaces, of the New York State Steel Construction Manual.
- 3.18 Structural steel which is to be welded, shall not be coated until all welding is complete. If welding is to be done in the shop the welds shall be cleaned then coated as required by the contract documents. Steel which is to be field welded shall be left uncoated for a minimum of three inches from the weld area, except for the top flanges of all stringers to be embedded in concrete which shall have a mist coat of 0.75 – 1.0 mils of primer applied.
- 3.19 After the Engineer has approved the preparation in each area, all coatings shall be applied without runs, sags or other objectionable properties to that prepared steel surface.

Prior to application of the polyamide epoxy coating to the inorganic zinc primer, a mist coat (2-3 mils WFT) of the second epoxy coat which has been thinned 10-30% shall be applied. The solvent from this mist coat shall be allowed to flash off prior to application of the full build epoxy second coat.

The total dry film thickness of all coating applications shall be as indicated below.

Inorganic Zinc Primer	2 – 3 mils
Epoxy Second Coat	4 – 6 mils
Epoxy Third Coat (Sage Green)	4 – 6 mils
Polyurethane Finish Coat (Sage Green)	3 – 6 mils

On surfaces receiving a polyurethane finish coat, the total dry film thickness shall not be less than 13 mils or exceed 21 mils. On surfaces not receiving a finish coat, the total dry film thickness shall not be less than 10 mils or exceed 15 mils.

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### **3. CONSTRUCTION DETAILS:** (cont'd)

#### 3.19 (cont'd)

The dry film thickness specified above will be achieved prior to acceptance of the work, regardless of the number of applications required.

The shop application of coatings except the stripe coats shall be applied by spraying. Field touch up work and bolt painting shall be by brush only, except in areas where spraying 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 shrouding scheme in determining whether spray equipment may be used. **Under no circumstances will spraying be allowed over roadways.** When spray equipment is used shrouding will be required. When in the judgment of the Engineer, the Contractor does not adequately provide for the protection of traffic, environment and property, spray application will not be allowed.

Any primer applied to an area where the preparation has not been approved shall be removed by Blast Cleaning in accordance with SSPC-SP-10 and when the cleaning is accepted it shall be reapplied in accordance with the specification at no additional cost to the Authority.

The inorganic zinc shall be applied and overcoated in accordance with all manufacturer's recommendations, including temperature and humidity.

The polyamide epoxy shall not be applied when the air or steel temperature is below 50°F or expected to drop below 50°F. The coatings shall not be applied when the relative humidity is above 85%, or when the steel temperature is less than 5°F above the dew point.

- 3.20 After the final coat of polyamide epoxy has cured and the specified minimum dry film thickness has been achieved, a finish coat of aliphatic polyurethane shall be applied to specific areas as designated in the Contract Documents. This finish coat shall be applied yielding a dry film of not less than 3 mils.
- 3.21 The finish coat of polyurethane shall not be applied when the air or steel temperature is below 50°F or expected to drop below 50°F before recoat. The polyurethane shall not be applied when the relative humidity is above 85%, or when the steel temperature is less than 5°F above the dew point. The finish coat shall be applied within 7 days of the last polyamide epoxy coat.
- 3.22 All coat(s) of paint shall be applied to the receiving surface in conformance with the manufacturers recommended schedule for recoating. If the manufacturer's recoating recommendations are not complied with, solvent wipe, brush off blasting in accordance with SSPC-SP1 or SSPC-SP7 will be required.
- 3.23 **Field Painting:** The only field work allowed to be done under this item is touch-up work after all steel erection and all concrete placement has been completed.

The party responsible for shop painting shall supply the Contractor with an adequate amount of sage green epoxy and polyurethane to be used for field touch-up. This shall be from the same batch as that applied to the steel members.

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### **3. CONSTRUCTION DETAILS:** (cont'd)

#### **3.23 Field Painting** (cont'd)

**Abrasive Metering Valves.** Prior to the start of abrasive blasting, the Contractor shall demonstrate to the satisfaction of the Engineer that on each operating nozzle, a working metering valve is in place and is functioning properly. During blasting operations, each valve shall be adjusted to produce the minimum amount of abrasive and dust.

All the requirements of this specification shall apply to field painted material with the following modifications:

- A. Bolt heads, washers, nuts, bolt thread extensions, and other miscellaneous steel surfaces not painted in the shop (such as splice plates, gusset plates, etc.), shall be cleaned and painted after the bolts have been installed and accepted.
- B. Cleaning shall be done in accordance with the requirements of SSPC-SP1, Solvent Cleaning, and SSPC-SP2 Hand Tool Cleaning.
- C. Hand tool cleaning will be limited to hand wire brushing, hand abrading, or other similar non-impact methods.
- D. No field touch up with inorganic zinc primer shall be required, however, the second and third coat of polyamide epoxy and finish coat of polyurethane (where required) shall be applied.
- E. All waste materials shall be disposed of in accordance with all applicable local, state or federal law, regulation or codes.

Application shall be made by brush only, except in areas where spraying may be used with prior approval of the Engineer. Dry film thickness requirements of this item shall apply.

All damage to the paint system shall be corrected by the Contractor in accordance with the requirements of this specification and to the satisfaction of the Engineer at no additional cost to the Authority.

Upon completion of all coating operations, the Contractor is required to stencil on the inside fascia girder, at the beginning approach span, near the abutment, in six inch high block letters, the month and year that the structure was painted.

(This may be done in the shop.)

- 3.24 Whenever a structure spans over a railroad, covers shall be placed and maintained in accordance with NYSDOT Standard Specification 105-09, Work Affecting Railroads.

### **4. METHOD OF MEASUREMENT:**

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



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**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:
- A. Eighty percent (80%) of the lump sum price will be authorized for payment upon delivery and storage of properly painted structural steel to the project site. Shop painted steel will be considered properly painted only if accompanied by the Thruway inspector's written certification that the steel delivered as part of any single delivery was painted in accordance with the requirements of this item.
  - B. Ten percent (10%) of the lump sum price will be authorized for payment upon the completion of cleaning and painting all bolt heads, washers, nuts, and bolt thread extensions.
  - C. The remainder will be authorized for payment after all touch-up work is completed.

Progress payments may 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.

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 each area.

Access to the structure for inspection purposes must be maintained by the Contractor until acceptance. Dry film thickness determinations will be made by the Engineer or Inspector in accordance with SSPC-PA2, 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 recoated 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 recoat, including recleaning if necessary, at his own expense.

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**MATERIAL SPECIFICATION**  
**PREQUALIFIED COATING MATERIAL LIST**

Self-curing inorganic zinc, polyamid epoxy, aliphatic polyurethane coating system

- |    |  |  |
|----|--|--|
| 1) | Carbo Zinc 11HS (Primer)<br>Carboguard 890 (Epoxy)<br>Carbothane 133 LH (Urethane)   | Manufactured by<br>Carboline Co.<br>St. Louis, Mo    |
| 2) | Zinc Clad II HS (Primer)<br>Epolon II Multi-Mil (Epoxy)<br>Acrolon 218 HS (Urethane) | Manufactured by<br>Sherwin Williams<br>Cleveland, OH |
| 3) | Dimetcote 9HS (Primer)<br>Amercoat 385 (Epoxy)<br>Amercoat 450H (Urethane)           | Manufactured by<br>PPG<br>Pittsburgh, PA             |
| 4) | Interzinc 22HS (Primer)<br>Intergard 475HS (Epoxy)<br>Interthane 990HS (Urethane)    | Manufactured by<br>International<br>Houston, TX      |

**Note:** Only products from the same manufacturer including thinners and solvents which are certified to be compatible shall be used on the structure. The third coat of polyamide epoxy and the finish coat of polyurethane shall be pigmented to match Munsell Notation Number 7.5GY5/4, Sage Green. Field tinting will not be permitted.