

## SECTION 09972

# PAINTING FOR STRUCTURAL STEEL

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Prepare and paint all surfaces except where indicated otherwise.

#### 1.2 REFERENCES

- A. ASTM E 11: Wire Cloth and Sieves for Testing Purposes
- B. Federal Standard No. 595: Color
- C. The Society for Protective Coatings (SSPC) Guidelines

#### 1.3 SUBMITTALS

- A. Detailed plan for approval for protection methods that includes Environmental Protection.
- B. Source and gradation of the sandblast abrasive.
- C. Type and source of solvent, if required.
- D. Manufacturer's information regarding the specified coating materials, including:
  - 1. Required wet- and dry-film thickness
  - 2. Project safety data
  - 3. Thinning recommendations
  - 4. Temperature requirements
  - 5. Profile recommendations
  - 6. Mixing and application procedures
  - 7. Required equipment
- E. Test samples as required.

## **1.4 SAMPLES**

- A. Department tests samples from each batch or lot of paint using infrared and gas chromatography techniques prior to use.
  - 1. Submit samples to UDOT's Central Chemistry Lab.
  - 2. Paints must match the spectrum samples on file in the UDOT Central Laboratory.
- B. Reject paint that does not match the standard.

## **1.5 PAINTER AND SANDBLASTER QUALIFICATIONS**

- A. Responsible Parties:
  - 1. Contractors and subcontractors performing surface preparation or coatings applications in the field:
    - a. Certification required prior to contract award by The Society for Protective Coatings to the requirements of SSPC QP 1.
    - b. Remain certified for the duration of the project.
  - 2. Contractors, subcontractors and/or fabricators performing shop surface preparation or coatings applications:
    - a. Certification required prior to contract award by The Society for Protective Coatings to the requirements of SSPC QP 3 enclosed shop or an AISC category III painting endorsement.
    - b. Remain certified for the duration of the project.
  - 3. Fabricators, painting contractors, and painting subcontractors:
    - a. Do not perform work if certification has expired.
    - b. Requests for time extension for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages applies.
    - c. Notify the Department of any change in certification status.
- B. Disqualification:
  - 1. Engineer may withdraw qualification for questionable performance of the painter, blasting operator, or the equipment.
  - 2. Disqualifications results from inadequate surface preparation, improper profile, runs, sags, overspray, thin film thickness, excessive film build-up, uneven coating, nonuniform color, improper curing, or any other defect in the coating system.

## **1.6 PAYMENT PROCEDURES**

- A. Surface Preparation, or Painting, or both, are included in the contract lump sum price for structural steel.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Select a complete 3-part coating system consisting of a Zinc primer, Epoxy or Urethane intermediate coat and aliphatic Urethane top coat as approved by the New England Protective Coating Specification Criteria (NEPCOAT). Refer to <http://www.udot.utah.gov/index.php/m=c/tid=719> for a link to this list.
- B. Use paint color No. 26293 for the first field coat and No. 26306 for the top coat following Federal Standard 595.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- A. Engineer examines surfaces prior to surface preparation and prior to application of each succeeding coating. Correct any condition that is determined, by the Engineer, to negatively affect a proper coating application.
- B. Provide safe access to permit inspection of the steel before and after painting. Use rubber rollers or other approved protective devices for scaffold fastenings. Do not mar or damage freshly coated surfaces.

### **3.2 PREPARING SURFACES**

- A. Painted steel: Clean surfaces with clean petroleum solvents and then blast clean to a near-white condition following SSPC-SP 10. Use clean oil-free air.
  - 1. Grind off all fins, tears, slivers, and burred or sharp edges present on any steel member, or those that result from the blasting operation.
    - a. Reblast where needed.
    - b. Remove all mill scale.
    - c. Do not scar metal.
    - d. Produce a 0.5 - 2 mils uniform profile.
  - 2. Remove all abrasive and paint residue using either a commercial vacuum cleaner or by double blowing.
    - a. Equip commercial vacuum cleaner with a brush-type cleaning tool.
    - b. Double blowing: vacuum the top surfaces of all structural steel, including top and bottom flanges, longitudinal stiffeners, splice plates, hangers, etc., after the double-blowing operations are completed.

3. Keep the steel dust-free and prime within 24 hours after cleaning. Reblast to a near-white condition if any rust is visible before priming.
  4. Protect freshly coated surfaces from subsequent blast-cleaning operations.
    - a. Repair surface if damaged.
    - b. Mask all areas requiring field welding before shop painting.
  5. Have the surfaces inspected and approved by Engineer or Construction and Materials Division representative of Department before applying shop coat.
  6. Apply the shop coat at the fabrication site.
  7. Apply Mist Coat to the top flange after shear studs have been attached.
- B. Field painting:
1. Repair all damage to shop coat that occurs during shipping, handling, and erection.
  2. Power wash steel without the field coat to remove contaminants or other foreign matter from the primed surface.
  3. Blast clean any rusted areas to a near-white finish. Thoroughly clean the coating surrounding the blasted area and re-prime using an organic zinc from the same paint manufacturer and the same dry-film thickness specified for the shop coat. (SSPC-SP 10)
  4. Remove all concrete drippings, abrasive, and paint residue. If using double blowing, vacuum the top and bottom flanges, splice plates, longitudinal stiffeners, hangers, etc., after completing double-blowing operations.
  5. Allow the touch-up coat to dry according to manufacturer's recommendation as listed on the paint data sheet.
- C. Weathering steel:
1. Construct so that erection marks on the steel are not visible after the structure is completed.
  2. Commercially sandblast all faying surfaces according to the specification standards. Meet SSPC-SP 6.
  3. Blast clean the following surfaces after the deck concrete is placed to specified surface finish:
    - a. Underside of the exterior portion of the top flange, and underside of all bottom flanges.
    - b. The exterior portion of web.
    - c. Top side and outside edge of the exterior portion of the bottom flange.

### **3.3 PREPARING PAINT MATERIALS**

- A. Mix and thin paint materials per manufacturer's product data sheets for both shop and field painting. If weather conditions require paint thinning, follow manufacturer's recommendations.

- B. Mix the paint to a lump-free consistency with a high shear mixer (such as a Jiffy mixer), according to the producer's directions.
  - 1. Do not use paddle mixers or paint shakers.
  - 2. Keep paint in the original containers
  - 3. Mix until all the metallic powder or pigment is suspended, and until all paint solids that may have settled to the bottom of the container are thoroughly dispersed.
- C. Strain the paint through a screen having openings no larger than those specified for a No. 50 sieve per the material standard. ASTM E 11.
- D. After straining, continuously agitate the mixed material up to and during the time of application.

### **3.4 APPLYING PAINT**

- A. Apply each coat at proper consistency and thickness, and in accordance with the manufacturer's recommendations, including field coating. When using spray nozzles, use pressures recommended by the producer of the coating system.
- B. Produce a uniform, even coating that bonds to the underlying surface. Follow SSPC-PA1.
- C. Apply field coats at the construction site after steel erection work is completed.
  - 1. Do not apply field coats until Engineer approves the surface.
  - 2. Dry-film thickness of the first field coat should be greater than 4 mils.
  - 3. Keep the dry-film thickness of the top coat greater than 2 mils.
- D. Weather:
  - 1. If weather conditions require paint thinning, follow the manufacturer's recommendations.
  - 2. Temperature of the air and the steel must be above 40 degrees F, but not so hot as to cause the paint to blister.
  - 3. Relative humidity must be less than 85 percent or the combination of temperature, and humidity conditions must inhibit surface condensation.
  - 4. Test humidity by applying a thin film of water to a small area. If the film evaporates with 15 minutes, the surface may be painted.
- E. Remove any shop coat that shows any indication of "mud-cracking" or adds more than 7 mils to a soundly bonded coating or bare steel.
- F. Thoroughly clean areas having deficient primer thickness to remove all dirt.

- G. Apply an immediate top coat to any surface at the fabrication site that will be inaccessible for painting after field erection.
- H. Do not load material for shipment until shop paint is dry to the touch and until the UDOT inspection sticker is placed on the member by the inspector. Remove the sticker before painting field coats.

### **3.5 PROTECTION**

- A. Suspend work if protection is unsatisfactory.
- B. Protect pedestrian and vehicular traffic.
- C. Protect from splatter, splashes and overspray all portions of the structures that are not to be painted including superstructure, substructure, slope, and highway appurtenances. Protect where other damage during painting and blast cleaning operations could occur.
- D. Use barriers during any blast-cleaning operations to protect pedestrians and vehicles, and to prevent spreading or falling of abrasive materials and debris on the traveled portions of the pavement. Remove any abrasive materials and debris on pavement, shoulders, or slope paving before reopening work areas to traffic.
- E. Provide employees performing the blast-cleaning operations air-supplied sandblasting hoods approved by the US Bureau of Mines.
- F. Minimum requirements for the air supply system:
  - 1. Airline filter, pressure-reducing valve with gauge, and pressure release valve.
  - 2. Do not allow the air supply to be contaminated with harmful materials or elements.

### **3.6 FIELD QUALITY ASSURANCE**

- A. Minimum Coating Thickness: Apply two or more coats if the required film thickness cannot be obtained by one coat without producing runs, bubbles, or sags.

END OF SECTION