

## SECTION 09991

# CLEANING AND REPAINTING OR OVERCOATING STRUCTURAL STEEL

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Cleaning and repainting or overcoating existing structural steel surfaces including all bearing units.
- B. Removal of existing paint from existing structural steel surfaces.
- C. Preparation of existing steel surface for repainting or overcoating and painting the cleaned structural steel surfaces.

#### 1.2 RELATED SECTIONS **Not Used**

#### 1.3 REFERENCES

- A. ASTM D 3359: Measuring Adhesion by Tape Test
- B. ASTM D 4285: Indicating Oil or Water in Compressed Air
- C. ASTM D 4417: Field Measurement of Surface Profile of Blast Cleaned Steel
- D. ASTM D 4541: Pull-Off Strength of Coatings Using Portable Adhesion Testers
- E. ASTM E 11: Wire Cloth and Sieves For Testing Purposes
- F. Code of Federal Regulations (CFR)
- G. Federal Standards
- H. Northeast Protective Coatings Committee (NEPCOAT)
- I. The Society for Protective Coatings (SSPC)

## 1.4 DEFINITIONS

- A. Overcoating – Spot paint areas with bare steel followed by two coats of paint over the entire surface of each structural steel member.

## 1.5 SUBMITTALS

- A. Materials
  - 1. Source and gradation of the blast abrasive.
  - 2. Type and source of solvent if required.
  - 3. Manufacturer's information regarding the specified coating materials, including:
    - a. Required wet and dry film thickness
    - b. Project safety data
    - c. Thinning recommendations
    - d. Temperature requirements
    - e. Profile recommendations
    - f. Mixing and application procedures
    - g. Required equipment
    - h. Method of application
  - 4. Test samples
    - a. Cleaning operation samples, disposal evaluation results, and disposal certificates. Refer to this Section, article 3.2 paragraph C.
    - b. Samples to the Department and an independent accredited Materials Testing Lab for composition and disposal evaluation. Refer to this Section, article 1.6.
    - c. Paint composition and disposal evaluation results from the independent materials testing lab.
      - 1) Disposition will be given to the contractor within 30 days.
    - d. Disposal certificates for all waste paint.
- B. Qualifications, methods, and documentation for information.
  - 1. Certifications before the preconstruction meeting. Refer to this Section, article 1.7.
  - 2. Detailed plan of protection methods that includes Environmental Protection for approval.
  - 3. Quality Control Plan that contains at a minimum procedures and verification of the following:
    - a. Compression air check
    - b. Dry film thickness – Refer to SSPC-PA 2
    - c. Air temperature
    - d. Humidity and dew point
    - e. Surface temperature

- f. Abrasive cleanliness check – Refer to SSPC-AB 2
  - g. Degree of cleanliness achieved
  - h. Surface profile – Refer to ASTM D 4417 method C
  - i. Batch number and amount of thinner used
  - j. Batch number of paint used
  - k. Mixing procedures
  - l. Paint repair procedures for scratches, gouges, holidays, mud cracking, runs, and sags
4. Written site specific compliance program documenting the equipment, training, containment, and monitoring system to comply with OSHA's standard on lead exposure in construction as published in Federal Register, Section 29 CFR 1926.62, May 4, 1993.
- a. Worker Health and Safety Program
  - b. Environmental Protection and Monitoring Program
  - c. Hazardous Waste Handling and Reporting of Release Program
  - d. Refer to SSPC Guide 6 – Guide for Containing Surface Preparation Debris
5. Daily reports upon request.
- a. Submit no later than 24 hours following the completion of work.

## **1.6 TEST SAMPLES**

- A. Department will test paint samples from each batch or lot before use.
- 1. Submit samples to the Engineer.
  - 2. Paints must match the spectrum samples on file with the Department.

## **1.7 PAINTER AND BLASTER QUALIFICATIONS**

- A. The entity performing surface preparation or coatings applications in the field:
- 1. Must have SSPC-QP 2 Category A certification before the preconstruction meeting.
  - 2. Remain certified for the duration of the project.
    - a. Do not perform work if certification has expired.
  - 3. Notify the Engineer of any changes in certification status.

## **PART 2 PRODUCTS**

### **2.1 SOLVENT**

- A. Solvent – Recommended by the paint system manufacturer.

### **2.2 COATING SYSTEM**

- A. Select a complete three-part coating system consisting of a zinc primer, epoxy or urethane intermediate coat, and aliphatic urethane top coat from the NEPCOAT Qualified Products List. Refer to <http://www.udot.utah.gov/go/standardsreferences> for a link to this list.
- B. Paint Color – Federal Standard 595.
  - 1. Intermediate coat                      Color No. 26293
  - 2. Top coat                                      Color No. 26306 or as specified

## **PART 3 EXECUTION**

### **3.1 GENERAL**

- A. Use manufacturer's information regarding the specified coating materials, including required wet and dry film thickness, project safety data, thinning recommendations, temperature requirements, profile recommendations, mixing and application procedures, and required equipment.

### **3.2 PREPARATION – GENERAL**

- A. Meet soluble salts requirements of SSPC-Guide 15 and the coatings manufacturer.
- B. Protection
  - 1. Fully contain all material resulting from surface preparation and paint overspray.
  - 2. Enclosure system must withstand extreme high winds.
  - 3. Protect all portions of the structure that will not be painted.
  - 4. Protect pedestrian and vehicular traffic. 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.

- C. Recover a minimum of 95 percent of debris from cleaning operation.
  - 1. Sample debris from cleaning operation.
  - 2. Place reclaimed waste paint in EPA-USDOT approved containment. Store at the project site.
  - 3. Dispose of waste paint as determined by the Engineer.

### **3.3 PREPARATION – REPAINTING STRUCTURAL STEEL**

- A. Clean surfaces including bearing units of all oil, grease, and dirt with clean petroleum solvents or steam cleaning before blasting operation.
- B. Blast surfaces clean to near white with 0.5 to 2 mil profile. Refer to SSPC-SP 10.
- C. Discoloration, light shadows, or slight streaks caused by stains of rust is not allowed on more than 5 percent of surface area.
- D. Define acceptable surface preparation using SSPC-Vis 1.
- E. Use SSPC-SP 11 to clean areas such as backside of base plates and corners that cannot otherwise be cleaned.
- F. Prime the surface within 8 hours after blasting.
- G. Do not prime the surface if rust has started to form. Clean the surface again before applying the prime coat.

### **3.4 PREPARATION – OVERCOATING STRUCTURAL STEEL**

- A. Clean designated surfaces of all oil, grease, debris, and dirt with clean petroleum solvents. Follow with high-pressure wash (SSPC-SP 1).
- B. Remove all corrosion and all paint that shows peeling, brittleness, checking, scaling, or general disintegration including bearing units.
  - 1. Use vacuum shrouded power tool cleaning (SSPC-SP 3).
  - 2. Remove paint from the area and beyond the edges of the area so that remaining paint system shows no rusting or blistering underneath and adheres tightly to the surface. Remaining paint system should have sufficient adhesion that cannot be lifted as a layer by inserting a blade or putty knife under it. Meet requirements of ASTM D 3359 and D 4541.
  - 3. Feather the edges of the remaining paint system around the cleaned areas so the repainted surface appears smooth.

### 3.5 PREPARE PAINT MATERIALS

- A. Mix the paint to a lump-free consistency with a high shear mixer according to the manufacturer's directions.
  - 1. Do not use paddle mixers or paint shakers.
  - 2. Keep paint in the original containers and mix until all the metallic powder or pigment is suspended.
  - 3. Continue mixing until all solids or pigments that may have settled to the bottom of the container are thoroughly dispersed.
- B. Strain the paint through a screen with openings no larger than those specified for a No. 50 sieve. Refer to ASTM E 11.
- C. Strain and continuously agitate the mixed material up to and during application.

### 3.6 APPLY PAINT – GENERAL

- A. Field Inspection
  - 1. Do not apply paint until the Engineer verifies the prepared surface.
  - 2. Use rubber rollers or other approved protective devices on scaffold fastenings.
  - 3. Do not use metal rollers, clamps, and other types of fastenings that mar or damage freshly coated surfaces.
- B. Consult with the manufacturer's technical representative for answers to technical questions related to the application of the specified coating materials.
- C. Project Conditions/Weather Limitations
  - 1. Follow the manufacturer's recommendations if weather conditions require paint thinning.
  - 2. Apply paint only when the following weather conditions exist:
    - a. The temperature of the air and the steel are above 40 degrees F but not so hot as to cause the paint to blister.
    - b. The relative humidity is less than 85 percent or such that the combination of temperature and humidity conditions inhibits surface condensation.
    - c. Apply a thin film of water to a small area to test humidity. The surface may be painted if the film evaporates within 15 minutes.
    - d. The steel temperature is a minimum of 5 degrees F above dew point.

- D. Use necessary equipment for proper application of the specified coating. Observe safety practices found in SSPC-PA Guide 10, Guide to Safety and Health Requirements.
- E. Apply paint with spray nozzles at pressures recommended by the manufacturer of the coating system.
- F. Use wet and dry film thickness gauges for testing the coating thickness during and after application. Refer to SSPC-PA 2. Use equipment capable of taking dry film thickness readings on all portions including nuts and bolts.
- G. Apply two or more coats if the required film thickness could not be obtained by one coat without producing runs, bubbles, or sags.
- H. Apply paint to produce a uniform, even coating that bonds to the underlying surface. Refer to SSPC-PA 1.

### **3.7 APPLY PAINT – REPAINTING STRUCTURAL STEEL**

- A. Prime Coat
  1. Maintain the dry film thickness of the prime coat between 2.5 and 6.0 mils.
  2. Blast clean any coat that produces “mud-cracking” or adds more than 7.0 mils to a soundly bonded coating on bare steel. Refer to SSPC-SP 10. Re-coat the surface.
  3. Thoroughly clean areas that have deficient primer thickness with power washing equipment to remove all dirt. Wire-brush, vacuum, and re-coat the area.
- B. Intermediate Coat
  1. Use the coating type and minimum dry film thickness specified.
  2. Produce a dry-film thickness of the intermediate coat greater than 4 mils.
- C. Top coat – Keep the dry film thickness greater than 2 mils.

### **3.8 APPLY PAINT – OVERCOATING STRUCTURAL STEEL**

- A. Intermediate Coat
  1. Spot paint any areas with bare steel, followed by another full intermediate coat over the entire steel surface.
  2. Apply a minimum dry film thickness of 3 mils for the spot coat and a minimum of 2 mils for the full intermediate coat.

- B. Top Coat
1. Apply top coat to entire steel surface.
  2. Keep the dry film thickness at 2 mils or greater.

END OF SECTION