

**ITEM 18573.1010XX M - FIELD CLEANING AND OVERCOATING - SSPC-SP11**  
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**- (SPRAY PROHIBITED)**

**DESCRIPTION**

This work shall consist of pressure washing, power tool and vacuum blast cleaning, touch-up priming, and overcoating structural steel surfaces with two full coats of paint, where indicated by the Contract Documents.

**MATERIALS**

1. **Paint and Thinner.** Paint and thinner shall be selected from the Department's Approved List, "Moisture-Curing Urethane Paint Systems". No substitutions will be allowed.

The shelf life of all paint shall be a maximum of 12 months from the date of manufacture. All acceptances of paint shall expire within 12 months from the date of manufacture.

All paint (primer, intermediate, and finish coats) used on any one structure shall be produced by the same manufacturer.

Each single coat of paint shall be a color different from the others. The color of the primer and the intermediate paints shall be at the contractor's option, and shall provide contrast with the underlying substrate. The color of the finish paint shall be as specified in the Contract Documents, or as ordered by the Engineer.

2. **Water for Washing.** Water for pressure washing shall be clean, fresh water. Cleaners, detergents, or other additives will not be allowed. Salt water will not be allowed.
3. **Abrasive for Blast Cleaning.** Abrasive material for vacuum blast cleaning may be selected by the contractor. All abrasive shall be free of lead and corrosion producing contaminants. The abrasive selected for use shall be designed to leave a profile of approximately 40  $\mu\text{m}$  to 65  $\mu\text{m}$  in a dense, uniform pattern of depressions and ridges. Silica sand and other types of non-metallic abrasive containing more than 1.0% crystalline (free) silica, by weight, will not be allowed.
4. **Basis of Acceptance.** All primer, intermediate, and finish paint, and thinner material, shall be accepted on the basis of the manufacturer's name, and the product name appearing on the Department's Approved List.

Water for washing and abrasive material for vacuum blast cleaning shall be approved by the Engineer.

Only paint and thinner arriving at the work site in new, unopened containers shall be used.

Containers of paint shall be labeled with the manufacturer's name, product name, batch number and date of manufacture. Paint that has not been used within 12 months from the date of manufacture shall be removed from the work site.

## CONSTRUCTION DETAILS

All structural steel members, railings, downspouts, and other miscellaneous steel items as indicated by the Contract Documents shall be prepared and touched-up with primer, and then painted with two full coats of paint, the intermediate coat and the finish coat.

1. **Surface Preparation.** Steel surfaces shall be prepared for painting by a combination of pressure washing, and power tool and vacuum blast cleaning.

Pressure washing to remove dirt and debris shall be performed first. Power tool and vacuum blast cleaning of corroded and deteriorated surfaces shall be performed second.

- a. **Pressure Washing.** All steel surfaces to be painted shall first be pressure washed using equipment operating at a minimum pressure of 21.5 MPa, and with a minimum flow rate of 9.5 L/minute. The pressure washer shall be operated at a distance of 150 mm to 300 mm from the surface. Water may be heated. After washing, the steel surface shall be allowed to dry before subsequent cleaning and painting work is done.

Pressure washing shall be performed to remove all dirt, dust, animal waste, and water soluble contaminants. Clean, fresh water shall be used with sufficient pressure to remove surface contaminants and loose material. Hand scraping and hand scrubbing with a stiff bristled brush will be required as necessary to remove debris. When necessary, oil and grease shall be removed by hand-wiping, using solvents.

After pressure washing, the cleaned surfaces shall be visually free of dust, dirt, oil and grease, animal waste, salts, and other debris.

Pressure washing will only be allowed when ambient air temperatures are greater than 4.5°C and rising. In no case shall pressure washing be performed when in the opinion of the Engineer spent wastewater will freeze on roadway or bridge surfaces, or in any other way create a hazardous situation.

During washing operations, containment shall be suspended around and beneath the work area to contain all paint chips, corrosion residue, and other solid particles that become dislodged by pressure washing (see *Note*<sup>1</sup>). All such solid residue shall be contained, collected, and allowed to air dry for treatment and disposal as hazardous paint removal waste under Item 571.01 M, or as directed by the Engineer. The containment provided shall also prevent all spray and residue from falling on or interfering with traffic, pedestrians, or surrounding property, above or below the structure. Extreme care shall be exercised to ensure that vehicles, pedestrians, and property are not exposed to the cleaning process.

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<sup>1</sup>**Note:** The containment for pressure washing is intended to capture solid paint chips and other solid debris that may become dislodged from washing operations. The containment may be constructed of water permeable or water impermeable materials. Spent washwater will not require collection and will be allowed to fall to the underlying road, ground, or waterway, providing the other requirements of this specification are met. The exception for the collection of spent washwater will be for structures over a public water supply. When a bridge crosses a water supply the spent washwater must be diverted, or collected, and disposed of on the adjoining land mass, at a location away from the waters edge.

All structures over water courses shall be washed during the seasonal periods indicated in the Contract Documents. If no schedule is provided, washing shall occur only when adequate flow in the stream exists to dilute possible contaminants. Operations shall be sequenced so as to clean structures over small bodies of water or small streams in the spring of the year, or in a period when flows are greatest. When washing operations are performed on bridges over a public water supply, e.g., reservoir or on bridges in the watershed area of the New York City water supply, the spent washwater shall be diverted, or collected, and disposed of on the adjoining land mass, at a location away from the waters edge.

To minimize contamination of the washed surfaces, subsequent cleaning, priming and painting work shall be performed within 14 calendar days of the completion of washing work. If more than 14 days pass by, or if the steel surfaces become dirty, they shall be rewashed in accordance with this specification, at no additional cost.

b. Power Tool and Vacuum Blast Cleaning

Surfaces which have become visibly corroded or upon which the existing paint has peeled, flaked, blistered, or otherwise become deteriorated shall be cleaned to bare metal in accordance with SSPC-SP 11, Power Tool Cleaning To Bare Metal.

Rust, paint, and millscale shall be removed using vacuum shrouded power tools and vacuum blasters. Vacuum equipped needle guns and vacuum equipped rotary impact assemblies shall be of a type that is capable of producing a bare metal surface and of producing a surface profile as defined in SSPC-SP11, Power Tool Cleaning to Bare Metal.

The vacuum assembly on all tools shall be capable of containing all visible dust and debris produced by the operation of the cleaning equipment. Air passing through the vacuum assembly shall be exhausted through a HEPA filter. A HEPA filter shall be defined as a filter that is at least 99.97% efficient for particles that are 0.3  $\mu\text{m}$  in diameter, or larger.

The surface of the area power tool cleaned in any one day shall be no greater than the surface area of steel that can be prime coated in the same working day.

For the purpose of this specification, vacuum blast equipment shall be considered a power tool, and shall be used with needle guns and rotary impact flap assemblies to clean rusted and deteriorated surfaces.

The edges of intact paint shall be feathered back and the adjoining paint must be tightly adhered. Ragged edges on adjoining paint will not be allowed. Adherence will only be considered satisfactory if the adjoining paint is smoothly feathered back, and cannot be removed by lifting with a dull putty knife.

Special attention shall be given to the edges of beam flanges, angles and plates, bearings, rivets, the heads of nuts and bolts, and similar surfaces that are marginally accessible and difficult to clean. These surfaces are often difficult to access, and are labor intensive and hard to clean.

In general, heavy deposits of rust and rust scale should be removed using needle guns. Hand pounding, using a hammer to loosen heavy rust and scale prior to needle gun cleaning may be necessary. Rotary impact assemblies should be used to remove pinpoints and spots of rust, on the flat surfaces of webs and flanges, the edges of angles and plates, bearings, and lattice members, etc. With the proper attachments, vacuum blasters can be used to clean larger, flat and uncomplicated surfaces, edges of angles and plates, to remove mill scale, and to remove heavy deposits of rust. Normally, a combination of these methods will be needed to provide the required degree of cleanliness.

After cleaning operations are completed, all residue generated by the cleaning work shall be removed by vacuuming using HEPA filtered vacuums.

Corroded and deteriorated surfaces that have been cleaned to bare metal using power tools shall be accepted by visual comparison to a project prepared standard(s) for each structure. The contractor shall prepare a project standard by power tool cleaning a representative area on the structure that is being prepared for painting. The prepared standard shall generally conform to SSPC VIS3, "Visual Standard for Power- and Hand-Tool Cleaned Steel", Pictorial Standard E SP 11, F SP 11, and G SP 11, as applicable, and shall be approved by the Engineer before the start of general cleaning work. At least one standard shall be prepared for each structure that is being specified for cleaning. More than one standard may be necessary if the cleaned steel differs significantly from the photographic standards due to surface conditions or other factors. Each standard shall be at least 300 mm x 300 mm in size, and shall be located in an area of the structure that is accessible to, and approved by the Engineer. The contractor shall protect the work standard from corrosion and contamination throughout the duration of work by applying a clear coat of polyurethane. At the completion of cleaning work the project standard shall be re-cleaned and painted in accordance with this specification. If in the opinion of the Engineer the project standard becomes deteriorated, or otherwise ineffective, it shall be re-established in accordance with this specification at no additional cost.

2. **Painting.** Painting shall consist of striping, spot-priming all surfaces cleaned to bare metal, and then applying two full coats of paint, the intermediate coat and the finish coat, to all steel surfaces designated for painting.
  - a. **Material Storage.** Paint in storage shall be protected from damage and maintained between 4.5°C and 29.5°C.
  - b. **Specifications and Inspection Equipment.** Prior to the start of and throughout the duration of work the contractor shall supply the Engineer with the following specifications and equipment.. *No work shall begin until these materials have been delivered to, and accepted by the Engineer.*
    1. One bound copy of the Steel Structures Painting Council surface preparation specification, SSPC-SP 11, Power Tool Cleaning To Bare Metal.
    2. One bound copy of the Steel Structures Painting Council pictorial standards, SSPC-VIS 3, Visual Standard For Power- And Hand-Tool

Cleaned Steel.

3. One bound copy of the Steel Structures Painting Council method SSPC-PA2, Paint Application Specification No. 2 - Measurement of Dry Film Thickness With Magnetic Gages.
  4. One Air Thermometer, pocket type,  $-10^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ .
  5. One Surface Thermometer,  $-10^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ .
  6. One Magnetic Dry Film Thickness Gage, Type 2 (fixed probe), with a digital readout display capable of measuring  $0\ \mu\text{m}$  to  $1500\ \mu\text{m}$  in  $1\ \mu\text{m}$  increments..
  7. Two Wet Film Thickness Gages, Prong Type, capable of measuring  $25\ \mu\text{m}$  to  $125\ \mu\text{m}$  in  $25\ \mu\text{m}$  increments.
- c. Atmospheric Conditions. No paint shall be applied when the receiving surface and ambient temperatures are less than  $1.5^{\circ}\text{C}$  or greater than  $38^{\circ}\text{C}$ , but there will be no restriction for humidity or for dew point-temperature differential.

In general, no paint shall be applied in the months of December, January, February, or March. If the contractor requests approval to apply paint in winter months, and if in the Engineer's opinion satisfactory results can be achieved, then the substrate shall be enclosed, painted under cover, and protected from the surrounding air. The interior of the enclosure shall be heated and the steel painted when the surface temperature is  $10^{\circ}\text{C}$ , or greater. Direct application of heat to the steel surface will not be allowed. The painted steel shall remain enclosed and heated for a minimum of eight hours, or until the applied coating is dry, whichever is longer. No additional payment will be made for the cost of enclosing, heating, and protecting paint that has been applied in conditions of cool weather.

When painting inside an enclosure adequate mechanical ventilation shall be supplied to meet OSHA regulations for worker exposure to solvents, fumes, lead, and other provisions. When mechanical ventilation is provided, filtration of the exit air will not be required. No additional payment will be made for the cost of ventilation.

- d. Mixing Paint. All paint shall be thoroughly mixed with mechanical mixers in accordance with the manufacturer's recommendations. After mixing the bottom of the container shall have no unmixed pigment.
- e. Solvents and Thinners. Paint may be thinned if recommended by the manufacturer and only if approved by the Engineer. Only approved thinner shall be used and added up to a maximum of 60 ml/L.

Thinning shall be performed by pouring one-half of the thoroughly mixed paint into a empty, clean container. The required thinner is then added to one of the half-sized portions, and the two portions are remixed to obtain a homogenous mixture.

The paints specified for this work have a limited pot life because of their reaction with the moisture in the atmosphere. The paint will gel when it nears the end of its pot life. Thinning to reduce the viscosity of gelled paint will not be allowed. The pot life of the paint can be extended by covering open containers to reduce exposure to moisture, and by keeping containers of paint cool.

Unauthorized use of solvents and thinners shall result in recleaning and repainting of the surface in accordance with this specification, at the contractor's expense.

- f. Paint Application. No painting shall begin until cleaned surfaces have been inspected and approved by the Engineer. The contractor shall provide safe, stable, and direct access to the work area for the Engineer's inspection.

Paint may be applied using brush, roller or spray methods, unless spray painting is prohibited by the Contract Documents. When spray painting is prohibited, paint shall be applied using brushes or rollers only. All paint shall be applied so as to produce a uniform, even coating free of runs, sags, drips, ridges or other defects.

To ensure adequate paint film thickness, stripe painting using primer shall be required on the following surfaces, whether cleaned to bare metal or coated with existing paint: all welds, rivets, bolts, nuts, and edges of plates, angles, bearings, lattice pieces or other shapes, and corners and crevices. To provide contrast, primer paint for stripe coating shall be a color that is different from the color of the receiving surface. On areas cleaned to bare metal, the stripe coat may be applied before or after touch-up primer is applied. On surfaces with existing paint the stripe coat shall be applied before the first full coat of intermediate paint is applied. Such striping shall extend a minimum of 25 mm from the edge. To prevent removal of the stripe paint by the following coat of paint, the stripe coat shall be allowed to set-to-touch before the next paint coat is applied. However, on bare metal surfaces the stripe coat shall not be permitted to dry for a period long enough to allow rusting of the unprimed steel, and on existing paint surfaces, the stripe coat shall

not be allowed to dry longer than 14 days before overcoating with the intermediate coat. Paint that curls or lifts after application of new paint shall be removed by hand scraping and the area shall be repainted. Wet paint shall be protected against damage until thoroughly dry.

Complete protection against paint spatter, spillage, overspray, wind blown paint, or similar releases of paint shall be provided. Covers, tarps, mesh, and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine or other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

- g. Paint Film Thickness. Paint shall be applied in such a quantity so as to produce the minimum specified dry film thickness for the type of paint material being used (see Approved List - Moisture-Curing Urethane Paint Systems).

The dry film thickness shall be determined in accordance with SSPC-PA 2, Paint Application Specification No. 2 - Measurement of Dry Film Thickness with Magnetic

Gages, using a Type 2 fixed probe magnetic gages, equipped with a digital readout display.

Areas failing to meet the specified minimum dry film thickness shall be overcoated with the same type of paint to produce at least the total dry film thickness required.

- h. Painting Schedule. Primer shall be applied to bare metal surfaces within twelve hours of the cleaning operation and before visible rust appears on the cleaned surface. Failure to apply primer to a bare metal surface within twelve hours or before the appearance of visible rust shall result in recleaning the surface in accordance with this specification, at no additional cost.

All coats of paint shall be overcoated with the subsequent coat in accordance with the time period specified for the paint material that is being used (see Approved List - Moisture-Curing Urethane Paint Systems). To prevent intercoat adhesion failure, recoating with the next coat of primer, intermediate, and finish paint, must be performed within the maximum specified time period, or 14 days, whichever is shorter. If the contractor fails to recoat within the specified time period the surface to be painted shall be lightly abraded, using power sanders, prior to applying the next coat of paint. The purpose of power sanding will be to improve adhesion by lightly roughening the surface of the existing paint, not to remove it.

#### **METHOD OF MEASUREMENT**

Payment shall be made by the lump sum price bid.

#### **BASIS OF PAYMENT**

The lump sum price bid shall include the cost of all labor, materials and equipment necessary to complete the work. The cost of providing protection against damage during pressure washing and paint application shall be included in the bid price. Payment for the containment and disposal of dust and paint waste generated by surface preparation work will be paid for under other items, however, payment for the accumulation of paint removal waste for deposition in the paint waste containers shall be included in this item. Progress payments will be made based on the percentage of the structure cleaned and primed and painted with two full coats of paint in accordance with this specification.

Payment will be made under:

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
18573.1010 nn M	Field Cleaning and Overcoating - SSPC-SP11	Lump Sum (for each structure)
18573.1011 nn M	Field Cleaning and Overcoating - SSPC-SP11 (Spray Prohibited)	Lump Sum (for each structure)

Note: nn denotes serialized pay item. See §101-53

DISAPPROVED BY EI 05-038