ITEM 573.2014NN91 - FIELD CLEANING AND PAINTING USING A FOUR COAT MOISTURE CURED URETHANE SYSTEM - TOTAL REMOVAL TO SP-10

DESCRIPTION

This work shall consist of pressure washing; abrasive blast cleaning to remove all paint, rust, rust scale, millscale, corrosion producing contaminants and other foreign matter; and painting structural steel surfaces with a new four (4) coat paint system as shown in the Contract Documents or directed by the Engineer.

MATERIALS

1. **Paint and Thinner.** The shelf life of all paint will be a maximum of 12 months from the date of manufacture. Paint that has expired will be removed from the work site immediately. Only paint and thinner arriving at the work site in new, unopened containers will be used. Containers of paint will be labeled with the manufacturer's name, product name, batch number, date of manufacture and color.

   All new paint to be applied to the structure will be produced by the same manufacturer. Any exception must have prior approval of the director of the Materials Bureau and the Engineer.

   Each single coat of paint will be a color different from the others. The color of the two primer coats and the intermediate coat are the Contractor's option. The colors must provide substantial contrast with the underlying substrate, and other coats. The color of the finish paint will be as specified in the Contract Documents.

2. **Water for Washing**. Water for pressure washing will be clean, fresh water. A soluble salt remover such as Chlor-Wash, Hold Tight 102, or approved equal will be used in the wash water. The salt remover must be approved by the paint manufacturer for use with their product. Salt water will not be allowed.

3. **Abrasive for Blast Cleaning.** Abrasive material for blast cleaning will be recyclable steel grit. All abrasive will be clean, free of lead and corrosion producing contaminants in accordance with SSPC AB2 and SSPC AB3. The abrasive selected for use will be designed to leave a profile as specified by the paint manufacturers data sheets. Steel grit should be blended to produce the required profile as well as to reduce contaminate levels. The Contractor will be responsible for obtaining the appropriate mix of grit in accordance with the grit manufacturers recommendation.

4. **Basis of Acceptance.** All primer, intermediate, finish paint, and thinner material, will be accepted on the basis of the manufacturer's name, and the product name, appearing on the Department's Approved List.

5. **Product Data Sheet**. The product data sheet accompanying the paint shall include the following information: VOC content, Recommended Wet Film Thickness Range, Recommended Dry Film Thickness Range, Minimum and Maximum Drying/Recoating Schedule, Pot Life, Sweat-In-Time, Recommended Reducer, Minimum and Maximum Blast Profile allowable, Mixing Ratios, and Temperature/ Humidity/Dew Point Requirements.

CONSTRUCTION DETAILS

All structural steel members, railings, downspouts, and other miscellaneous steel items as indicated by the Contract Documents will be cleaned of all paint, rust, rust scale, millscale, corrosion producing contaminants

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and other foreign matter; and painted with the new four coat paint system.

1. **Surface Preparation.** Steel surfaces will be prepared for painting by a combination of pressure washing and abrasive blast cleaning.

   Typically, pressure washing shall be performed first, followed by abrasive blast cleaning to remove all paint, rust, rust scale, and millscale, as per SSPC SP-10, Near White Metal. If heavy deposits of rust and scale are present, they are to be removed prior to pressure washing.

   If the paint to be applied has more stringent or additional surface preparation requirements than this specification, the Contractor shall prepare the surface in accordance with the paint manufacturers recommendations.

a. Pressure Washing. All steel surfaces to be painted shall be pressure washed, using equipment operating at a minimum pressure of 21.5 MPa, and with a minimum flow of 9.5 L/minute and capable of heating the water to temperatures between 85°C and 93°C. The pressure washer nozzle shall be held at a distance of 150 mm to 300 mm from the steel surface. The surface will be allowed to dry before subsequent abrasive blast cleaning is to begin. The soluble salt remover shall be mixed and applied per the manufacturer's recommendations.

   When the washing is completed, the cleaned surfaces will be free of dust, dirt, oil and grease, animal waste, salts, and other debris. When necessary, oil and grease will be removed by hand-wiping using solvents as described in SSPC SP1. The areas will be pressure washed again following this cleaning.

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

   During washing operations, a containment structure 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*[1]). All solid residue will be contained, collected, and allowed to air dry for treatment and disposal as hazardous paint removal waste under Item 571.01M. The containment provided will also prevent all spray and residue from falling on or interfering with traffic, pedestrians, or surrounding property, above or below the structure. Care shall be exercised to ensure that vehicles, pedestrians, and property are not exposed to the cleaning process.

   All structures over water courses shall be washed during the seasonal periods indicated in the Contract Documents. If no schedule is provided, washing will occur only when adequate flow in the stream exists to dilute possible contaminants. Operations will 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. Streams categorized by the Department of Environmental Conservation (DEC) as "CT(s)",

[1]***Note:*** *The containment for pressure washing is intended to capture solid paint chips and other solid debris that may become dislodged form 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 public 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.*

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i.e. trout spawning, will be washed prior to July 1 and bridges located at DEC yearling trout stocking sites will not be washed during April. When washing operations are performed on bridges over a public water supply, e.g., reservoir, or on bridges in the New York City watershed, the spent washwater will 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 will be performed within 7 calendar days of the completion of washing work. If more than 7 days pass by or the steel surfaces have become dirty, they shall be rewashed in accordance with this specification, at no additional cost to the State.

b. Blast Cleaning Blast cleaning shall be done in accordance with SSPC SP-10.

The blasted surface profile will be measured in accordance with ASTM D4417. Any method described in this standard can be used. No other method of profile measurement shall be accepted. The Contractor is responsible for ensuring that the blasted steel profile meets the requirements of the paint manufacturer's data sheets. The blast profile shall be measured three times in random locations every 50 square meters of blasted steel or as recommended by the Engineer.

All equipment and compressors used in the cleaning operation will be equipped with filters and traps to prevent moisture, oil, and other contaminants from being deposited on clean surfaces. The air cleanliness will be verified with the white blotter test in accordance with ASTM D4285 at least once per shift for each compressed air system.

The recyclable abrasive shall be cleaned of all paint, chips, rust, millscale and other foreign material after each use, and prior to reuse. All equipment used for cleaning abrasive will be specifically designed for this purpose, and approved by the Engineer. The cleanliness of the recycled abrasive during use will be confirmed according to SSPC-AB2. The Contractor shall provide results of the non abrasive residue test, water soluble test, and oil content test daily. The Engineer or representative will be present during this testing. The contractor shall also provide lead content test results weekly.

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

All fins, tears, slivers, burred and sharp edges that are present or occur during the blasting operation shall be removed by grinding, and then the area will be reblasted to provide the required profile.

All structural defects noted during blasting operations shall be reported immediately to the Engineer.

Throughout abrasive blast cleaning work, care shall be taken to protect newly painted surfaces from the cleaning operations. Tarps, covers, or other devices approved by the Engineer shall be used to protect new paint from contamination or damage. Contaminated areas of new paint (dirt, abrasive, etc.) shall be cleaned as necessary prior to the next coat of paint. Damaged paint will be thoroughly wire brushed or if visible damage occurs, reblasted to the required condition, and then repainted at no

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additional cost.

After cleaning operations are completed, all residue generated by the cleaning work will be removed by vacuuming using HEPA filtered vacuums. A HEPA filter will be defined as a filter that is at least 99.97% efficient for particles that are 0.3 μm in diameter, or larger.

Corroded and deteriorated surfaces that have been cleaned to SP-10 by abrasive blasting will be accepted by visual comparison to a prepared project standard(s) for each structure. The contractor will prepare a project standard by abrasive blast cleaning a representative area on the structure that is being prepared for painting. The prepared standard will generally conform to SSPC VIS 1-02, "Guide and Reference Photographs for Steel Surfaces Prepared By Dry Abrasive Blast Cleaning" Pictorial Standard A SP-10, B SP-10, C SP-10, D SP-10, G1 SP-10, G2 SP-10, or G3 SP-10 as applicable, and will be approved by the Engineer before the start of general cleaning work. At least one standard will be prepared on each structure that is to be cleaned. 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 will be at least 300 mm x 300 mm in size, and will be located in an area of the structure that is easily accessible, and approved by the Engineer. The Contractor will 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 will be cleaned and painted. If the project standard becomes deteriorated, or otherwise ineffective, it will be re-established at no additional cost to the state. In case of a dispute over the visual standard, the written SP-10 standard shall take precedence.

All cleaned surfaces will be inspected by the Engineer prior to painting. Any areas that are painted before being inspected shall be cleaned and restored to the SP-10 standard and repainted at no additional cost. If the cleaned surface begins to rust or becomes contaminated in any matter prior to applying primer, the surface will be restored to SP-10 standard.

2. **Painting.** Painting shall consist of applying four full coats of new paint and striping to all surfaces cleaned to SP-10. The paint coats will be applied in the following order; primer, primer, stripe coat, intermediate coat, and the finish coat.

If the maximum allowable blast profile as described on product data sheet for the primer is exceeded, the contractor must re-blast to the required profile.

a. Material Storage. Paint in storage will be protected from damage and maintained between 4.5°C and 29.5°C. If the manufacturer's recommendations for temperature are more restrictive than those listed in this specification, the manufacturer's temperature limits will be used for storage requirements.

b. Specifications and Inspection Equipment. Prior to the start of and throughout the duration of work the Contractor will supply the Engineer with the following specifications and equipment. No work will 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 10 - "Near-White Metal Blast Cleaning"

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2. One bound copy of the Steel Structures Painting Council surface preparation specification, SSPC SP-1 - "Solvent Cleaning"

3. One bound copy of the Steel Structures Painting Council pictorial standards, SSPC-VIS 1-02, Guide and Reference photographs for steel surfaces prepared by dry abrasive blast cleaning (Publication # 02-12)

4. 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.

5. One bound copy of Steel Structures Painting Council method SSPC AB-2 Specification for Cleanliness of Recycled Ferrous Metallic Abrasives, most recent edition.

6. One bound copy of Steel Structures Painting Council method SSPC AB-3 Specification for Newly Manufactured or Re-Manufactured Steel Abrasive.

7. One copy of ASTM D 4417-93 (1999) Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

8. One copy of ASTM D 4285-83 (1999) Test Method for Indicating Oil or Water in Compressed Air

9. One Air Thermometer, pocket type, -10°C to +40°C.

10. One non contact Infrared Thermometer, -10°C to +40°C.

11. One Magnetic Dry Film Thickness Gage, Type 2 (fixed probe), with a display capable of measuring 1 μm to 1500 μm in 1 μm increments.

12. Two Wet Film Thickness Gages, Prong Type, capable of measuring 25 μm to 125 μm in 25 μm increments.

13. Psychrometer.

14. Apparatus for measuring profile as recommended by ASTM D 4417-93 (1999) Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel (any of the listed methods).

c. Atmospheric Conditions. No paint shall be applied when the receiving surface and ambient temperatures are less than 1.5°C or greater than 38°C. If the manufacturer's recommendations for temperature are more restrictive than those listed in this specification, the manufacturers temperature limits will be used for application requirements. No paint will be applied unless the receiving surface is absolutely dry.

Paint shall not be applied when the relative humidity is more than 95% unless the coating manufacturers requirements are more stringent. No paint will be applied during rain.

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d. Mixing Paint. All paint will be thoroughly mixed with mechanical mixers in accordance with the manufacturer's recommendations. After mixing, the bottom of the container will be free of any unmixed pigment prior to use.

e. Solvents and Thinners. Paint may be thinned if recommended by the manufacturer. Under no circumstance should the paint be thinned where the resulting VOC level exceeds 340 grams/liter. The manufacturer will be able to advise the Contractor and Engineer as to the maximum amount of thinner allowed.

The paints specified for this work have a limited pot life because of their reaction with atmospheric moisture. The paint should therefore be covered and kept cool to reduce the exposure to moisture. Thinning to reduce the viscosity of gelled paint will not be allowed.

Use of unauthorized solvents and thinners, or using excess amounts of solvents and thinners is prohibited. Any area where unauthorized solvents or thinners are used will result in the Contractor restoring the surface to SP-10 at no expense to the State.

f. Paint Application. Painting will not begin until cleaned surfaces have been inspected and approved by the Engineer. The Contractor will provide safe, stable, and direct access to the work area for the Engineer's inspection. The Contractor will also provide sufficient time for the work to be inspected at various stages of completion.

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

Rollers used to apply the paint must be of a quality to produce a smooth uniform coating and not leave fibers in the coating. Areas of paint exhibiting trapped fibers shall be cause for rejection and shall be re-blasted. The roller nap length will be limited in accordance with the paint manufacturer's recommendation.

Complete protection against paint spatter, spillage, overspray, wind blown paint, or similar releases of paint will be provided. Covers, tarps, mesh, and similar materials will 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.

Stripe painting is required to ensure adequate paint thickness of the following surfaces, all welds, rivets, bolts, nuts, edges of plates and structural members, angles, bearings, lattice pieces or other shapes, corners, and crevices. To provide contrast, paint for stripe coating shall be a color that is different than the color of the receiving surface. The stripe coat must be applied after the second full coat of primer 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 minimum re-coat window for the stripe coat as established by the paint manufacturer data sheets shall be observed. Stripe painting will also be required on ALL steel surfaces in areas located within one meter of a bridge deck joint.

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g. Paint Film Thickness. Paint will be applied in such a quantity so as to produce the specified dry film thickness as directed by the paint manufacturers data sheets.

The dry film thickness will 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.

Areas failing to meet the specified minimum dry film thickness will be overcoated with the same type of paint to produce the total dry film thickness required. The overcoating must be performed within the paint's recoat window.

The Engineer may require areas exhibiting excessive paint thickness to be re-blasted to SP-10 at no additional cost to the State.

h. Painting Schedule. Primer will be applied to blasted surfaces within twelve hours of the final cleaning operation. Failure to apply primer to a bare metal surface within twelve hours will result in restoring the surface in accordance with the SP10 requirements, at no additional cost to the State.

All coats of paint will be applied in accordance with the time period specified for the paint that is being used (as per the paint manufacturers data sheets). To prevent inter-coat adhesion failure, re-coating must be performed within the manufacturer's recommended maximum recoat window or 14 days, whichever is shorter. If the contractor fails to re-coat within the specified time period, the surface to be painted will be cleaned by abrasive blast cleaning to SSPC SP-10, and repainted in accordance with this specification, at the Contractor's expense.

If the bridge has become dirty between coats, the Contractor shall wash the bridge again at no additional cost to the State.

i. Enclosure Operations. When painting inside an enclosure adequate mechanical ventilation will 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. Any lighting used in a containment or enclosure must be explosion proof.

j. Stenciling. After the finish coat of paint has dried, the Contractor shall stencil the following information on the inside face of the fascia member at both ends of the bridge, unless otherwise directed by the Engineer

- Month and year of completion
- Contract number
- SP10
- Name of Paint Manufacturer
- Name of Contractor

The stenciled lettering should be approximately 75mm to 100mm in height and be a contrasting paint color to the top coat.

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ITEM 573.2014NN91 - FIELD CLEANING AND PAINTING USING A FOUR COAT MOISTURE CURED URETHANE SYSTEM - TOTAL REMOVAL TO SP-10

METHOD OF MEASUREMENT

Measurement will be made on a lump sum basis.

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 will 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 collection of paint removal waste for deposition in the paint removal containers will be included in this item. Progress payments will be made based on the percentage of the structure cleaned and paint applied.

Payment will be made under:

Item No.	Item	Pay Unit
573.2014nn91	Field Cleaning and Painting Using A Four Coat Moisture Cured Urethane System - Total Removal to SP-10	Lump Sum (for each structure)

Note: nn denotes serialized pay item.

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