

ITEM 573.1014NN03 - FIELD CLEANING AND PAINTING - TOTAL REMOVAL TO SP-10 - ZINC RICH EPOXY PRIMER

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.

MATERIALS

1. **Paint and Thinner.** The shelf life of all paint shall be a maximum of 12 months from the date of manufacture. Paint that has expired shall be removed from the work site immediately. 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.

All new paint to be applied to the structure shall 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 shall be a color different from the others. The color of the primer and the intermediate paints are the Contractor's option. The colors must provide substantial contrast with the underlying substrate, and other coats. The color of the finish paint shall be as specified in the Contract Documents.

MSDS sheets will be required for all material received.

2. **Water for Washing.** Water for pressure washing shall be clean, fresh water. Any detergent or soluble salt remover used must receive approval by the paint manufacturer and the Materials Bureau.
3. **Abrasive for Blast Cleaning.** Abrasive material for blast cleaning shall be recyclable steel grit. All abrasive shall be clean, free of lead and corrosion producing contaminants in accordance with SSPC AB2 and SSPC AB3. The contractor shall be responsible for selecting the size, blend, and hardness of the abrasive..
4. **Basis of Acceptance.** -The following systems shall be used;

Ameron

Amercoat 68HS

Amercoat 399

Amercoat 450H

Carboline

Carbozinc 859

Carboguard 888

Carbothane 133 LH

Sherman Williams

Zinc Clad III HS

Macropoxy 646

Acrolon 218 HS

The zinc in the primer shall conform to ASM D520, Type II.

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 & Maximum Drying/Recoating Schedule, Pot Life, Sweat-In-Time, Recommended Reducer, Minimum & Maximum Profile Range, Mixing Ratios, Temperature – Humidity – Dew Point Requirements.

CONSTRUCTION DETAILS

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

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1. **Surface Preparation.** Steel surfaces shall 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 by hand or power tool prior to pressure washing.

- a. **Pressure Washing.** All steel surfaces to be painted shall be pressure washed, using equipment operating at a minimum pressure of 21 MPa, a minimum flow of 15 L/minute, and a water temperature of 85°C to 93°C. The pressure washer nozzle shall be held at a distance of 150 mm to 300 mm from the steel surface. The surface shall be allowed to dry before subsequent abrasive blast cleaning is to begin.

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

Pressure washing shall only be allowed when ambient air temperatures are greater than 4.5_C and rising. In no case shall 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 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 shall be contained, collected, and allowed to air dry for treatment and disposal as hazardous paint removal waste under a separate item. 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. 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 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. Streams categorized by the Department of Environmental Conservation (DEC) as "CT(s)", i.e. trout spawning, shall be washed prior to July 1 and bridges located at DEC yearling trout stocking sites shall 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 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 and painting work shall 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.

¹ **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 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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The blasted surface profile shall be measured in accordance with ASTM D4417, Method C. The Contractor is responsible for ensuring that the blasted steel profile meets the requirements of the paint manufacturer's data sheets. The profile shall be measured three times in random locations every 50 square prepared, unless otherwise ordered by the Engineer. The blasted profile shall not exceed 100 microns.

All equipment and compressors used in the cleaning operation shall be equipped with filters and traps to prevent moisture, oil, and other contaminants from being deposited on clean surfaces. The air cleanliness shall 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. The cleanliness of the recycled abrasive during use shall 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 may be present during this testing. The contractor shall also provide lead content test results weekly. All equipment used for cleaning abrasive shall be specifically designed for this purpose, and approved by the Engineer.

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.

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 shall be reblasted to provide the required profile.

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 shall be cleaned as necessary prior to the next coat of paint. Damaged paint shall be reblasted to the required condition, and then repainted at no additional cost.

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

Corroded and deteriorated surfaces that have been cleaned to SP-10 by abrasive blasting shall be accepted by visual comparison to a prepared project standard(s) for each structure. The contractor shall prepare a project standard by abrasive blast cleaning a representative area on the structure that is being prepared for painting. The prepared standard shall 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 shall be approved by the Engineer before the start of general cleaning work. At least one standard shall 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 shall be at least 300 mm x 300 mm in size, and shall be located in an area of the structure that is easily accessible, 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 cleaned and painted. If the project standard becomes deteriorated, or otherwise

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ineffective, it shall 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.

Upon completion of blast cleaning and prior to inspection, the containment should be vacuumed and the cleaned surfaces shall be free of all abrasive and paint debris.

All cleaned surfaces shall 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 to the State. If the cleaned surface begins to rust or becomes contaminated in any matter prior to applying primer, the surface shall be restored to SP-10 standard.

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

If the manufacturer recommended profile is exceeded, the contractor must reblast to the required manufacturer's profile.

- a. **Material Storage.** Paint in storage shall 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 shall be used for storage requirements.

- 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 (1) bound copy of the Steel Structures Painting Council surface preparation specification, SSPC-SP 10 – "Near-White Metal Blast Cleaning."
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.
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

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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. Profile micrometer with extra course tape.
- c. Atmospheric Conditions. No paint shall be applied when the receiving surface and ambient temperatures are less than 5°C or greater than 38°C. If the manufacturer's recommendations for temperature are more restrictive than those listed in this specification, the manufacturer's temperature limits shall be used for application requirements. No paint shall be applied unless the receiving surface is absolutely dry.
- Paint shall not be applied when the relative humidity is more than 85% unless the coating manufacturer's requirements are more stringent. No paint shall be applied during rain.
- Paint shall not be applied unless the air temperature is at least 3° C greater than the dew point temperature.
- 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 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 thinned paint have VOC levels exceeding 340 grams/liter. The manufacturer shall be able to advise the Contractor and Engineer as to the maximum amount of thinner 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 shall result in the Contractor restoring the surface to SP-10 at no expense to the State.
- f. Paint Application. Painting shall not 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. The Contractor shall also provide sufficient time for the work to be inspected at various stages of completion.
- Paint may be applied using brush or roller. All paint shall be applied so as to produce a uniform, even coating free of runs, sags, drips, ridges or other defects.

Brushes and rollers used to apply the paint must be of a quality to produce a smooth uniform coating and to not leave fibers in the coating. The roller type and nap length shall be limited in accordance with the paint manufacturer's recommendation.

Complete protection against paint spatter, spillage, 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

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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.

A stripe coat shall extend a minimum of 25mm away from the following surfaces; all welds, rivets, bolts, nuts, edges of plates and structural members, angles, bearings, lattice pieces or other shapes, corners, and crevices. Stripe painting shall also be required on all steel surfaces located within one meter of a bridge deck joint. To provide contrast, paint for stripe coating shall be a color that is different than the color of the receiving surface. The stripe coat shall be made using the intermediate coat and must be applied after the first full coat of primer. Stripe painting will be applied in accordance with manufacturer's recommendations, with particular attention to the film thickness and recoat window.

- g. Paint Film Thickness. Paint shall be applied to produce the specified dry film thickness as directed by the paint manufacturer's data sheets.

The actual 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.

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

The Engineer may require any area exceeding the manufacturers recommended dry film thickness to be blast cleaned to the SP-10 condition.

- h. Painting Schedule. Primer shall be applied to bare metal surfaces within twelve hours of the final cleaning operation. Failure to apply primer to a bare metal surface within twelve hours shall result in restoring the surface in accordance with the SP-10 requirements, at no additional cost to the State.

To prevent inter-coat adhesion failure, re-coating must be performed within the manufacturer's recommended 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 shall be cleaned by abrasive blast cleaning to SSPC SP-10, and repainted in accordance with this specification, at no additional cost to the State.

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 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 shall not be required. No additional payment shall 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

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

METHOD OF MEASUREMENT

Measurement shall 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 shall be included in the bid price. Payment for the containment and disposal of dust and paint waste generated by surface preparation work shall be paid for under other items; however, payment for the collection of paint removal waste for deposition in the paint removal containers shall be included in this item. Progress payments shall be made based on the percentage of the structure cleaned and paint applied.

DISAPPROVED BY EI 05-038