

ITEM 03573.9920 M - ULTRA HIGH PRESSURE WATER JET CLEANING AND PAINTING, LEAD-BASED PAINT - TOTAL REMOVAL
ITEM 03573.9921 M - ULTRA HIGH PRESSURE WATER JET CLEANING AND PAINTING, LEAD-BASED PAINT - TOTAL REMOVAL (SPRAY PROHIBITED)

DESCRIPTION

This work shall consist of ultra high pressure, low volume, vacuum shrouded water jetting to remove all paint, rust and other corrosion producing contaminants and painting structural steel surfaces with three (3) full coats of new paint where indicated by the Contract Documents.

GENERAL

All electrical equipment shall utilize ground fault interrupters and shall be listed by the Underwriters Laboratory. High Efficiency Particulate Air (HEPA) filtration systems shall comply with ANSI 2-79.

The contractor shall provide all necessary equipment to capture, convey, collect, contain and filter surface preparation water and water used to decontaminate personnel and/or equipment. The Contractor shall reuse filtered wastewater to the extent practicable that minimizes volume, toxicity and cost for disposal and also reduces the volume of fresh water required without significantly impacting upon equipment function. All costs associated with treatment and disposal of the water will be paid for under Item 03571.989950. All particulate waste shall be contained and collected for treatment and disposal as hazardous paint removal waste under Item 18571.9810 M, Treatment and Disposal of Paint/Asbestos Coating Waste.

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 jetting Water.** Water for water jetting shall be from a clean, potable water supply. Water taken directly from non-potable sources will not be accepted. If recommended by the paint manufacturer, and approved by the Engineer, a rust inhibitor may be added to the jetting water to minimize oxidation (rusting) of the cleaned surface.

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All water collected from water jetting surface preparation work shall be filtered through a 5 micron or smaller filter upon generation prior to placement in tankers to separate solid paint chips, solid corrosion residues, and other solid particles from the water. All collected water shall be collected and filtered as soon after generation as reasonably possible. At least 10 days prior to the start of surface preparation work the contractor shall submit for the Engineer's approval a detailed description of the water filter process, including all equipment and materials that will be used in the filtering and recycling operation.

3. **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.

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 cleaned of paint, rust, and corrosion producing products, and then painted with three (3) full coats of new paint, the primer coat, the intermediate coat and the finish coat.

1. **Surface Preparation.** Steel surfaces shall be prepared for painting by ultra high-pressure water jetting (UHP-WJ) in accordance with water jetting SSPC/NACE WJ4/SCI.

All surfaces shall have rust, rust scale, paint, and other corrosion producing contaminants removed by water jetting to bare metal. Equipment for water jetting shall include the use of vacuum shrouded heads to promote recycling. It shall be of a type that is capable of producing a bare metal surface and shall be approved by a Engineer prior to use. Vacuum assembly on all nozzles shall be capable of containing visible water 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 μm in diameter, or larger.

Ultrahigh Pressure Water Jetting will only be allowed when ambient air temperature is greater than 4.5° C and rising. In no case shall water jetting be performed when in the opinion of the Engineer water will freeze on roadway or bridge surfaces, or in any other way create a hazardous situation.

When surfaces are inaccessible or otherwise impractical to prepare as determined by the Engineer,

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waterjet surface preparation may be done with unshrouded nozzles.

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

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 prepare.

Water dropping onto the floor of the containment enclosure shall also be drained, collected and recycled along with that collected by the vacuum shrouds.

After water jetting steel surfaces should be rinsed to remove any remaining dirt or debris.

All recycled water shall be cleaned of all paint, chips, rust, and other foreign material after each use and prior to reuse. All recycling of water shall be filtered at a sufficient rate to provide for a steady flow of filtered water at the water jetting nozzles. Fresh clean, potable water shall be used to replace recycled water as needed to maintain the surface preparation work.

Throughout surface preparation work, care shall be taken to protect newly painted surfaces from the surface preparation operations. Tarps, covers or other devices approved by the Engineer shall be used to protect new paint from damage. Damaged new paint shall be thoroughly wire brushed or if visible damage occurs, prepared again by water jetting to the required conditions and then repainted. Repairs to damaged paint surfaces shall be approved by the Engineer.

After surface preparation operations are completed, all excess water and residue generated by the surface preparation work not previously collected by vacuum systems or drained out/collected shall be removed from the containment system by vacuuming using HEPA filtered vacuums.

Corroded and deteriorated surfaces that have been prepared to bare metal shall be accepted by visual comparison to a project prepared standard(s) for each structure. The contractor shall prepare a project standard by preparing a representative area on the structure that is being prepared for painting using water jetting. The prepared standard shall generally conform to SSPC VIS4 (I) / NACE No. 7 Visual Reference Photographs C VIS WJ-2L or D VIS WJ-2L as applicable, and shall be approved by the Engineer before the start of surface preparation work. At least one standard shall be prepared for each structure that is being specified for surface preparation. More than one standard may be necessary if the prepared 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 surface preparation work the project standard shall again be prepared and painted in accordance with this specification. If in the opinion of the Engineer the project standard becomes deteriorated,

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or otherwise ineffective, it shall be re-established in accordance with this specification at no additional cost.

2. **Technical Assistance.** The water jetting equipment and paint manufacturer whose products are used on this project shall designate a qualified technical representative to be present at the work site for a minimum of three days during the start of each respective operation. Written confirmation of these designations shall be provided to the Engineer at least 3 weeks prior to commencing work.
3. **Painting.** Painting shall consist of striping and then applying three full coats of new paint to all surfaces prepared to bare metal. The first coat shall be primer, followed by the application of a full intermediate coat and a full 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/NACE 5 Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh Pressure Water Jetting prior to Recoating.
 2. One bound copy of the Steel Structures Painting Council pictorial standards for water jetting. SSPC VIS 4 (I)/NACE No. 7, Interim Guide and Visual Reference Photographs for Steel Cleaned By Water Jetting.
 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°C to +40°C.
 5. One Surface Thermometer, -10°C to +40°C.
 6. One Magnetic Dry Film Thickness Gage, Type 2 (fixed probe), with a digital readout display capable of measuring 0 µm to 1500 µm in 1 µm increments.
 7. Two Wet Film Thickness Gages, Prong Type, capable of measuring 25 µm to 125 µm in 25 µm increments.

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- c. Atmospheric Conditions. No paint shall be applied during the months of December, January, February or March. No paint shall be applied when the receiving surface and ambient temperature are less than 1.5° C or greater than 38°C. No paint shall be applied unless the receiving surface is absolutely dry. The Contractor shall be prepared to use fans or other means to dry steel before prime coat is applied. There are no restrictions for humidity or for dew point-temperatures differential.

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 prepared 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.

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To ensure adequate paint film thickness, stripe painting using primer shall be required on the following surfaces: 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. The stripe coat may be applied before or after the first 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 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.

Complete protection against paint spatter, spillage, over spray, 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 surface preparation operation and before visible rust appears on the prepared 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. 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.

METHOD OF MEASUREMENT

Payment shall be made by the lump sum price bid.

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BASIS OF PAYMENT

The lump sum price bid shall include the cost of all labor, preparation, materials and equipment necessary to complete the work. The cost of providing protection against damage during surface preparation and paint application shall be included in the bid price.

Payment for the containment and disposal of solid paint waste generated and for the liquid waste generated will be made under separate items; however, payment for the accumulation of solid and liquid paint removal waste shall be included in this item.

Progress payments will be made based on the percentage of the structure cleaned, primed and painted with two full coats of paint in accordance with this specification.

Payment will be made under:

Item No.	Item	Pay Unit
03573.9920nn M	Ultrahigh Pressure Water Jet Cleaning and Painting, Lead-based Paint Total Removal	Lump Sum (for each structure)
03573.9921nn M	Ultrahigh Pressure Water Jet Cleaning and Painting, Lead-based Paint. (Spray Prohibited) Total Removal	Lump Sum (for each structure)

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