

ITEM 03574.6099 M - CLASS WJ-A CONTAINMENT SYSTEM FOR WATER JETTING

DESCRIPTION:

This work shall consist of furnishing and installing a total containment enclosure around the immediate work area to contain and collect water and debris generated during **ultra high pressure (UHP) water jetting** paint removal operations. The work associated with dismantling and moving the enclosure to new locations on the structure as paint removal operations progress, and with removing the enclosure when paint removal operations are completed, is also included. The containment enclosure shall contain all spent materials, water spray, water vapor, dust, and other debris generated: (1) during water jetting surface preparation operations; (2) when air blowing, vacuuming or rinsing the steel surfaces on the structure in preparation for field painting; (3) when collecting and removing paint waste debris. The performance of the containment enclosure will be judged on its ability to prevent visible emissions (releases) of spent materials, water, spray, vapor, dust, or other debris into the environment.

The Class WJ-A containment enclosure provided shall be constructed of air and water impermeable materials affixed to a support structure. All seams in containment materials and all joints between the containment enclosure and the bridge shall be sealed by overlapping. An entryway into the work area shall be made using multiple overlapping door tarps. A forced exit air system shall maintain a lower air pressure inside the containment than outside so as to produce an inward air flow at open air entry points. The exhaust system shall be sized to produce a minimum theoretical air movement inside the containment enclosure. Air movement shall be verified by visual inspection. Exit air shall be exhausted into a dust collection system for filtering that can operate if wetted by water sprays and/or vapors resulting from the water jetting surface preparation.

Reference information on containment enclosures can be obtained from the following:

1. SSPC - Guide 6. Guide for Containing Debris Generated During Paint Removal Operations, Steel Structures Painting Council, Pittsburgh PA.
2. SSPC - Steel Structures Painting Manual, Volume 1, Steel Structures Painting Council, Pittsburgh, PA.
3. Industrial Lead Paint Removal Handbook, by Kenneth A. Trimber, SSPC Publication 91-18, Steel Structures Painting Council, Pittsburgh, PA.

MATERIALS

Materials and equipment as described in Construction Details shall be selected by the contractor and approved by the Engineer prior to use.

CONSTRUCTION DETAILS

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Rigid or flexible materials may be used to construct the containment enclosure except that rigid materials shall be used for the floor of the enclosure. Rigid materials shall be air and water-vapor impenetrable, water impermeable and may be comprised of plywood panels, or corrugated panels of steel, aluminum, reinforced fiberglass, or another suitable material. Flexible materials shall be air and water vapor impenetrable, water impermeable and fire retardant.

A rigid support structure comprised of scaffolding and framing or a flexible support structure comprised of a cabling system may be used as a framework for the enclosure. Containment materials shall be secured to the support structure.

All mating surfaces between the bridge structure and the containment enclosure, and all joints and seams formed in the fabrication of the enclosure shall be sealed. Joints and seams may be sealed by taping or caulking, or by overlapping materials, providing the other provisions of this specification are adhered to. Flexible materials shall be sealed by overlapping. The minimum overlap shall be 610 mm, and the overlapped materials shall be secured by clamping or taping or other suitable methods at intervals not exceeding 610 mm. Multiple overlapping door tarps shall be used for the entryway.

Dust collection equipment shall be 99.9% efficient against the passage of dust and particles 2 microns and greater in size. The dust collection equipment shall be capable of operating in the presence of water spray and/or water vapors. The size of the exhaust fan system supplied shall be designed to produce an average minimum crossdraft air velocity or an average minimum downdraft air velocity inside the containment enclosure. For enclosures designed with horizontal air flow, the exhaust fan shall have the capacity to produce an average minimum crossdraft velocity of 0.5 m/s, based on theoretical calculations.

Example: The maximum cross-section of the enclosure in the direction of air flow measures 5 m x 4 m (20 square meters). Minimum volume of air required for crossdraft is $10 \text{ m}^3/\text{s}$ ($20 \text{ m}^2 \times 0.5 \text{ m/s}$).

For enclosures designed with vertical air flow, the exhaust fan shall have the capacity to produce an average minimum downdraft velocity of 0.25 m/s, based on theoretical calculations.

Example: The floor space of the enclosure measures 6 m x 5 m (30 square meters). Minimum volume of air movement required for downdraft is $7.5 \text{ m}^3/\text{s}$ ($30 \text{ m}^2 \times 0.25 \text{ m/s}$).

Light intensity by natural or artificial means inside the containment enclosure shall be maintained at a minimum of 535 lx, on the steel surface, throughout surface preparation, inspection, and painting activities. Auxiliary lighting shall be provided as necessary. The contractor shall supply the Engineer with one (1) portable light meter, with a scale of 0 to 535 lx. The meter will be returned to the contractor at the completion of work.

All lighting, electrical cables and electrical equipment used within the containment enclosure or in surrounding areas shall be UL listed, capable of performing safely in a wet environment and meet all applicable electrical codes. All circuits used must be ground-fault circuit interrupter (GFCI) protected.

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Prior to the start of any water jetting paint removal work, the contractor shall submit for approval detailed working drawing(s) of the Class WJ-A containment system that is to be supplied for each structure. The drawings shall be prepared and stamped by a registered, licensed Professional Engineer.

Seven (7) complete copies of the working drawings shall be directly submitted for approval as follows:

- Regional Director - 5 copies
- Director, Structures Design and Const. Division - 1 copy
- Director, Materials Bureau - 1 copy

Upon receipt, 15 working days shall be allowed for the Regional Director to review and approve the contractor's working drawings.

The working drawings shall detail the proposed containment enclosure and include the following information:

1. Plan and elevation of the containment enclosure in relation to the bridge Structure.
2. The type of solid or rigid floor and working platform with appropriate safety and fall protection measures. A description of the method that will be used to provide worker access to the enclosure (personnel lifts, scaffolds, etc.), and the procedures and equipment that will be used to protect workers from falls shall be specified (OSHA Safety and Health Requirements, 29 CFR 1926). If a barge of another type of floating platform is used, include details regarding its construction, such as materials and dimensions, how the platform will be tied-off, how the debris will be collected and off-loaded, etc.
3. A description of how the drainage run-off from existing deck drains will be routed through the enclosure.
4. A description of the type of rigid or flexible material(s) for the containment walls, floor, and ceiling.
5. The type of rigid or flexible support structure that will be used for the floor, walls, and ceiling, including the method by which the containment enclosure materials are to be affixed to the support structure.
6. The method by which the containment enclosure will be supported or attached to the bridge, i.e. rollers, clamps. Welding, bolting, or similar connections will not be allowed.
7. The method that will be used to seal the joints (seams) formed when fabricating the containment enclosure, and the method that will be used to seal the mating joints between the containment enclosure and the bridge structure.
8. The method that will be used to seal the entryway. At a minimum, the use of multiple overlapping door tarps shall be provided to minimize dust, water and water vapor escape through the entryway.

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9. The ventilation system including open air make-up points, the dust collector and exhaust fan(s), the location, type of equipment, the manufacturer's data sheets, and the airflow capacities.
10. The type, size, and configuration of auxiliary lighting that will be provided for inside the containment enclosure.
11. A design analysis of the loads on the bridge due to the containment enclosure including: maximum dead and live loads of the enclosure, the workers, spent water, and equipment; maximum allowable load for the floor and working platform; wind loads imposed on the structure by the enclosure; and, maximum wind velocity that the containment enclosure is designed to withstand.

If the containment system is supported by the bridge, the working drawing submittal shall include certification by the Professional Engineer that the loads imposed do not cause the overall stress level of any element of the bridge to exceed the Operating Rating Allowable Stresses defined in AASHTO Manual for Maintenance Inspection of Bridges (current edition).

The analysis shall account for all loads on the structure, including the enclosure dead load, worker live load, spent water load, equipment load, wind load, structure dead load, and live load plus the impact. The highway live load used for analysis purposes shall be either a HS20 truck or equivalent lane loading, whichever is greater, unless a different highway live load is shown on the plans. Except as noted, the analysis shall use the loadings and design assumptions in the NYSDOT Standard Specifications for Highway Bridges.

12. Provide details on how the containment enclosure is assembled and disassembled, and moved to a new location on the structure as surface preparation work progresses. Indicate how the dust collector will be included in the containment enclosure.
13. Provide details on how the water will be collected, drained or otherwise removed from the enclosure for filtering and, if employed, recycling. All other pertinent details relating to the containment enclosure shall be included with the working drawings as notes, or as written narrative.
14. Provide details on how the use of the containment enclosure will be coordinated with the maintenance and protection of traffic. Encroachments onto roadways, and clearances over waterways and railroads shall be clearly identified. Whenever a structure spans a railroad, the requirements of §105-09 shall apply. Structures that span a navigable waterway may be subject to regulation by the U.S. Coast Guard, the U.S. Army-Corps of Engineers, the N.Y.S. Thruway Authority - Office of Canals, and the N.Y.S. Dept. of Environmental Conservation.

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All water jetting and paint removal work, and all work associated with the collection of paint waste debris, and with the subsequent water rinsing or vacuuming of debris from the steel surfaces on the structure in preparation for painting, shall be performed inside the containment enclosure.

Proper operation of the ventilation system and any water collection system shall be maintained after each assembly of the containment and during all phases of work. The Engineer shall require that the contractor visually demonstrate inward airflow movement into the enclosure at air entry points with smoke tubes.

Extreme care shall be taken to prevent emissions (releases) of waste materials when water jetting paint removal/surface preparation work is being performed near joints that are formed between the enclosure and the bridge structure, and near seams in the enclosure materials.

The contractor shall make every attempt to limit workers from entering or exiting the containment enclosure when water jetting paint removal/surface preparation operations are being performed.

All waste material that results from water jetting and paint removal operations shall be cleaned up and collected from the floor, walls, and other surfaces inside of the containment enclosure by vacuuming or rinsing with clean water. Sweeping, shoveling, or other mechanical means to remove the waste materials will not be allowed. Clean up operations shall be performed daily, before new paint is applied, or before a prolonged work stoppage, such as for weather interruptions.

Prior to disassembly or moving of the paint enclosure, the inside surfaces of the enclosure (walls, floors, ceiling, etc.) shall be cleaned of dust, spent water, or paint debris and other spent material by vacuuming. The contractor shall take all measures necessary to prevent the release of waste material during moving or removal of the containment.

All air exhausted from the containment enclosure shall pass through the dust collection system.

The effectiveness of the containment enclosure shall be determined by the Engineer, by visual inspection for water spray, dust plumes, water leakage or other visible evidence of emissions (releases) of waste materials into the environment. Throughout the duration of work there shall be no visible discharges. If the Engineer observes a visible discharge, the contractor shall immediately stop work and perform necessary repairs to the containment enclosure or modifications to blast cleaning operations to the Engineers satisfaction.

The Engineer may direct the contractor to stop all work activities and require the contractor to immediately clean up all waste materials within the enclosure when in the Engineer's opinion, threatening weather conditions exist. This measure may be exercised when an apparent threat exists that could cause the release of waste material to the surrounding environment, such as high winds or heavy rain.

If the wind velocity causes the containment enclosure to billow, or to emit dust or water, or to otherwise be a hazard in the opinion of the Engineer, the contractor shall immediately cease work and clean-up all the debris. Under severe conditions the contractor shall disassemble the containment enclosure.

For bridge structures that are located over or adjacent to water, if it is determined by the Engineer that

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floating waste materials may accidentally form on the water surface they shall be contained from moving upstream or downstream by the use of floating water booms (straw or screens). Floating waste material shall be collected daily, or more frequently, as directed by the Engineer. Any waste material that is released outside the containment enclosure shall be immediately cleaned up using vacuums. Care shall be taken on pavement and other surfaces to collect all waste material so as to prevent it from being redistributed into the air and environment by traffic.

All used filters from dust collectors and vacuums, and straw and screening from dam devices, shall be disposed of in accordance with all applicable Local, State, and Federal Laws, regulations and codes. The cost for disposing of these materials shall be included in the lump sum price bid for this item.

METHOD OF MEASUREMENT

Payment will be made at the lump sum price bid.

BASIS OF PAYMENT

The lump sum price bid shall include the cost for preparing the working drawings, and all labor, materials and equipment necessary to complete the work. All work shall be done in a manner satisfactory to the Engineer.

Progress payments will be made. They will be based upon the number of work days required to complete all of the water jetting paint removal/surface preparation work.

Prior to the beginning of any work, the Contractor shall supply the Engineer with an initial estimate of work days required to complete all of the water jetting paint removal work. This initial estimate will not be considered final. The Engineer may request a revised estimate at any time during the progress of the work.

The Engineer will determine a daily rate of payment using the lump sum price bid, distributed over the estimate of work days. The daily rate will be used to authorize payment in accordance with §102-17, Article 7.

Should the Engineer request a revised estimate and use that estimate to establish a new daily rate, the lump sum bid price shall be reduced by the total of the amounts previously authorized for payment, prior to the establishment of the new daily rate. Failure on the part of the Contractor to supply a revised estimate when requested, will be cause for the progress payment procedure to be immediately terminated.

Progress payments for this work will be made only for days during which water jetting surface preparation work is actually performed.

Payment will be made under:

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<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
03574.6099nn	Class WJ-A Containment System For Water Jetting	Lump Sum (for each Structure)