

ITEM 16572.10nnnn M - THERMAL SPRAYED COATING SYSTEM

DESCRIPTION. This work shall consist of applying a zinc/aluminum coating system to structural steel parts. High velocity thermal spray is required on portions of the work that are not hot dipped galvanized. Bolts, nuts, washers, diaphragms and bottom lateral bracing members may be hot dipped galvanized or thermal sprayed, at the option of the Contractor. All coating work, except field touch-up shall be done in the shop. For purposes of this specification, a shop is defined as an enclosed facility.

High velocity thermal spray process must attain a particle velocity greater than 400 m/s.

MATERIALS.

Abrasive for Blast Cleaning. Abrasive material for blast cleaning shall be hard and sharp in order to produce an angular profile between 50-100 microns. Steel shot and other abrasives producing a rounded profile shall not be used to produce the final profile. The abrasive material shall leave the cleaned steel surface roughened to a degree suitable for the coating system that will be applied.

Metallizing Material. The wire used for thermal spraying shall be an 85/15 mixture of zinc and aluminum meeting the requirements of ASTM B-833 Standard Specification for Zinc Wire for Thermal Spraying (Metallizing). The metallizing material shall satisfy the requirements for Class B or better slip coefficient and creep resistance per Appendix A of A Specification for Structural Joints Using ASTM A325 or A490 Bolts by the Research Council on Structural Connections. The test data shall be provided to the DCES prior to the start of work.

Zinc for Galvanizing. The requirements of Subsection 719-01 shall apply.

Inspection Equipment. Prior to the start of and throughout the duration of the work, the Contractor shall ensure that the Inspector is supplied with the following equipment in good working order:

- A. Air thermometer, pocket type, -20°C to 100°C (2)
- B. Surface Thermometer, -20°C to 150°C (2)
- C. Sling Psychrometer (2)
- D. Dry film thickness gage, magnetic pull-off type (1).

Numbers in parentheses denote minimum quantity required.

CONSTRUCTION DETAILS.

Submittals

1. The Contractor shall submit a quality control plan covering all aspects of the cleaning and coating operations to the DCES for review and approval at least 10 working days before the start of coating work. The plan shall fully detail the cleaning and coating procedures and equipment that will used, the test methods and procedures used for

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quality assurance, the testing/inspection frequency, and any safety precautions that must be followed by workers and inspectors. No work shall be performed until the DCES has approved the plan.

2. The contractor shall submit proof of certification in accordance with ANSI/AWS C2.18 or Department of Defense 2138-A92.
3. The results of all testing performed as part of the quality control plan shall be submitted to the inspector at the end of each work shift. All profile depth tape shall be identified for the area it represents and shall be submitted with the test results.

Cleaning

1. All structural steel surfaces to be thermal sprayed shall be cleaned to bare steel in accordance with SSPC-SP10, Near White Blast Cleaning. All blast cleaning and coating shall be performed at the same facility.
2. Before blast cleaning begins, visible deposits of oil, grease, dirt, salt, or other contaminants shall be removed by the methods specified in SSPC-SP1, Solvent Cleaning.
3. No blast cleaning operations will be conducted under the following conditions:
 - a. The relative humidity exceeds 85%.
 - b. The surface temperature is less than 3°C above the dew point.
 - c. The area cleaned shall be limited to that which can be cleaned and coated within a 4-hour period provided the condition known as flash rusting does not occur.
4. After blast cleaning is completed, cleaned surfaces shall be defined by SSPC-Vis 1-89, Pictorial Standards A SP 10, and B SP 10 as applicable. All surfaces shall be cleaned of blasting products and other residues in accordance with SSPC-SP10. Cleaned surfaces shall be cleared of all foreign matter by means of oil-free, water-free, compressed air, or vacuum systems.

Thermal Spraying

Each thermal spray operator shall be qualified in accordance with ANSI/AWS C2.18.

The thermal spray shall be applied in two passes at right angles to each other to obtain a total thickness of 200-250 microns.

Coaters shall determine the best distance between the spray gun and receiving surface so

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as to promote uniform coverage and prevent discontinuity of the applied coating film. The spray gun shall be moved uniformly across and perpendicular to the receiving surface.

No coating shall be applied unless all of the following conditions are met:

1. The receiving surface shall be clean and absolutely dry.
2. The surface temperature and ambient air temperature are as recommended by the coating equipment manufacturer except in no case shall coating work be performed when surface and ambient air temperatures are less than 5°C or greater than 38°C.
3. The receiving surface temperature shall be at least 3°C above the dew point.
4. The relative humidity shall not exceed 85%.

All coating applied in violation of these conditions shall be completely removed, and the affected surface cleaned and recoated in accordance with stated requirements at no additional costs.

The top of the top flanges shall only be coated for 25 mm from each edge

All work is subject to inspection. The contractor shall provide adequate access and suitable lighting for such inspections to be made. Any work done while the Inspector has been refused, denied, or restricted from access, or work performed in a manner that in the Inspector's opinion prevents adequate inspection will automatically be rejected. All such work shall be recleaned and recoated in accordance with these requirements at no additional cost.

The Inspector may take readings to ensure minimum coating thicknesses and evenness of application. Coatings may also be monitored for the presence of holidays, pinholing, bubbling, cratering, lack of adhesion, and other defects. Coatings having less than the required thickness, or other defects unacceptable to the Inspector, shall be corrected in a manner satisfactory to the Inspector at no additional cost.

The Inspector may perform random adhesion tests at a rate of up to 1 test per 25 square meters to verify the adequacy of the operations. The test shall consist of cutting the coating with a sharp knife or chisel. If the metallizing can be lifted from the steel more than 6 mm ahead of the cutting blade without cutting the metal, the surface preparation/coating operation shall be considered unsatisfactory. The limits of

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unsatisfactory surface preparation/coating operation shall be determined by the Inspector through additional testing. The coating in the unsatisfactory areas shall be removed to bare steel and the surface shall again be blast cleaned and recoated in accordance with this specification. Adhesion test areas shall be repaired to provide the required coating thickness.

Hot Dip Galvanizing. The requirements of Subsection 719-01 shall apply.

Fastener Chasing. After coating, all bolts and nuts shall be chased with an appropriate sized tap or die to remove surface irregularities.

Field Coating. The only field work allowed to be done under this item is touch-up work after all steel erection has been completed and all concrete placement has been completed. All the requirements of this specification shall apply to field coating material with the following modifications:

- A. All dirt, grease and other foreign matter shall be removed in accordance with SSPC-SP1, Solvent Cleaning. Clean the damaged area of all loose and cracked coating by wire brushing or blast cleaning. Roughen the damaged area and the surrounding 50 mm to produce a suitable anchor for the coating.
- B. The repair method shall be in accordance with the following:
 - 1. Items galvanized in accordance with §719-01 shall be repaired in accordance with that subsection.
 - 2. Areas originally coated with high velocity spray shall be repaired with high velocity spray.
- C. All damage to the coating system shall be corrected by the contractor in accordance with the requirements of this item and to the satisfaction of the Engineer at no additional cost to the State.

METHOD OF MEASUREMENT. The work will be measured as a lump sum per structure.

BASIS OF PAYMENT. The price bid shall include the cost of all labor, materials, and equipment necessary to complete the work.

Progress Payments. Progress payments for Thermal Spray Coating System will be made in accordance with the following:

- A. Delivery. Upon delivery of properly coated structural steel to the project site or storage area as defined in §109-04. Total delivery progress payments will not be authorized for more than 90% of the price bid.

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B. Touch-up Work. After all touch up work is completed the remainder will be authorized for payment.

Payment will be made under:

Item No.	Pay Unit	Item
16572.10nnnn M *	THERMAL SPRAYED COATING SYSTEM	Lump Sum

* nnnn denotes a serialized pay item. Refer to subsection 101-53.