

SECTION 626 [New]**CORROSION PROTECTIVE COATING OF SANITARY SEWER MANHOLES AND STRUCTURES****626.1 GENERAL****626.1.1 Description**

(A) Scope: ~~If required~~ Unless otherwise approved by the Engineer Contracting Agency, or as called for on the plans, all new concrete manholes, and access structures constructed on 15-inch and larger ~~over 15 8-inch diameter or larger~~ sanitary sewers; plus extending to and including one upstream manhole regardless of lateral size, shall have an internal corrosion coating applied as specified herein. Drop manholes and force main manholes on 8-inch or larger diameter lines shall also be coated.

When specified, existing sanitary sewer manholes shall be similarly coated.

(B) Requirements:

- (1) Contractor shall furnish all labor, materials, and equipment required to clean and ~~line~~ coat the manholes.
- (2) Contractor shall comply with the local authority and all occupation safety and health administration (OSHA) requirements for confined space entry.
- (3) All materials specified by name brand or manufacturer shall be delivered unopened to the job in original containers.
- (4) All Safety precautions recommended by the manufacturer in printed instructions or special bulletins shall be obtained and followed.
- (5) For existing manholes, application of coating shall be carried out after all planned cleaning, prep and repairs to cone, walls, pipe penetrations, bench and invert are completed.
- (6) Contractor's applicator shall be certified by the coating and underlayment material manufacturers as properly trained for applying the manufacturer's coating and underlayment products. Underlayment products include repair materials, fillers, primers, etc.

626.1.2 Quality Assurance

(A) Standardization: Materials and supplies provided shall be the standard products of manufacturers. The standard products of manufacturers other than those specified shall be reviewed and approved by the Engineer Contracting Agency. ~~will be accepted when it is demonstrated to the Engineer that they are equal in composition, durability, and usefulness for the purpose intended.~~ Requests for submission Submittal info requirements shall include directions for the application, descriptive literature, safe storage, handling, and disposal of the product.

(B) Warranty:

- (1) A written warranty against coating failure shall be provided for the entire coating system, including all repair material, defect fillers, primers, intermediate, and finish coats. The minimum duration of the warranty shall be five (5) years. The product and the installation may be both covered by the manufacturer's warranty, or separate warranties may be issued by the manufacturer and installer.
- (2) This warranty shall state that the coating will not fail for a minimum period of five years. Coating failure is defined as blistering, cracking, embrittlement, or softening, or failure to adhere to the substrate. The warranty shall also apply to any underlayment materials used in the application. If any repair or replacement is necessary within the warranty period, a new **five (5)** year warranty period shall start at the date that the manhole is placed back into service.

(3) Contractor shall be required to submit a certification letter to the Engineer Contracting Agency documenting the effective warranty date which should typically be after all manhole testing has passed and after any manhole adjustments are complete for the specific project. The effective warranty date may also be a mutually agreed upon date or some other established acceptance date if otherwise directed by the Engineer.

626.1.3 Submittals Info Requirements

(A) Contractor Shall Submit:

(1) Manufacturer's data:

(a) Manufacturer's technical literature on coating material.

(b) Description of installation method including:

(I) Product material safety data sheets (MSDSI).

(II) Maximum storage life and storage requirements.

(III) Mixing and proportioning requirements (as applicable).

(IV) Environmental requirements for application and worker safety, including ventilation, humidity, and temperature ranges.

(V) Application film thickness PM coat of primer and finish coat.

(VI) Curing time required.

(2) Sample of finished product showing final color: Coating shall be light in color.

(3) Contractor (or subcontractor) applying coating shall be an Arizona licensed contractor: Each of the Contractor's employees applying coatings and underlayments shall be certified by manufacturer as having sufficient training and knowledge to properly apply their products. Contractor shall submit certification documents. Such certification shall be no more than two (2) years old for any applicator.

626.2 PRODUCTS

626.2.1 Coating Material

(A) Approved Materials: The coating material shall be an Engineer Contractor Agency approved product. Coating materials shall be one of the following pre-approved products:

~~(1) Sauereisen corrosion clad polymer lining No. 210, and Sauereisen underlayment. No. F 120, as manufactured by Sauereisen Cements, Pittsburgh, PA 15238. The underlayment shall be used to repair and reprofile corroded areas of manhole surfaces. Manhole surfaces shall be cleaned and prepared in accordance with the manufacturer's recommendations and requirements herein prior to application of any underlayment and coating.~~

~~(2) Sewer shield 100 topcoat as manufactured by Environmental Coating, Mesa, AZ 85207. An underlayment recommended by the manufacturer shall be used to repair and reprofile corroded areas of manhole surfaces. Manhole surfaces shall be cleaned and prepared in accordance with the manufacturer's recommendations and requirements herein prior to application of any underlayment and coating.~~

~~(3) Raven 405, as manufactured by Raven Living Systems, 1024 North Lansing Avenue, Tulsa, OK, 74106. An underlayment recommended by the manufacturer shall be used to repair and reprofile corroded areas of manhole surfaces. Manhole surfaces shall be cleaned and prepared in accordance with the manufacturer's recommendations and requirements herein prior to application of any underlayment and coating.~~

~~(4) COR+GARD, Polymer and Permacast MS 10,000 underlayment as manufactured by AP/M Permaform P.O. Box 55, 620 NW Beaver Drive, Suite 1 Johnston, IA 50131. The underlayment shall be used to repair and reprofile corroded areas of manhole surfaces. Manhole surfaces shall be cleaned and prepared in accordance with the manufacturer's recommendations and requirements herein prior to application of any underlayment and coating.~~

NOTE: This product is a trial product with limited applications. A maximum of 50 total manholes in City of Phoenix until February 26, 2019, or five (5) years following first installation, whichever is later. All applications shall be reported to the Water Services Department Wastewater Engineering and Construction Management Section.

(B) Dry film thickness of epoxy/polymer coatings shall be a minimum 1/8-inch (125 Mils) thick or per the manufacturer's recommendation, whichever is greater.

(C) Cured underlayment thickness shall equal or exceed minimum thickness recommended by manufacturer, but shall provide uniform finished surface for application of epoxy/polymer.

(D) An underlayment process and material recommended by the manufacturer shall be used to repair and reprofile corroded areas of manhole surfaces. Manhole surfaces shall be cleaned and prepared in accordance with the manufacturer's recommendations and requirements herein prior to application of any underlayment and coating. A separate adhesion pull test to verify the integrity of any underlayment repairs may be required by the Engineer.

626.3 EXECUTION

626.3.1 Manhole Cleaning

(A) Cleaning shall remove all sediment, rocks, debris, roots, grease accumulations, and obstructions from the manholes. Cleaning of the manhole walls, bench, and channel shall remove all grease, scale encrustation, and loose mortar so that no foreign intrusion shall cause imperfections in the coating. Cleaning methods shall include washing with high-pressure water, mechanical removal, or other as approved by the Engineer. Contracting Agency.

(B) The Contractor shall use water blasting with a minimum water pressure of 3,000 PSI to clean the manhole prior to applying the coating. Contractor shall also be responsible for any additional surface preparation beyond water blasting as required by the coating system manufacturer. Where additional preparation is required, the Contractor shall provide all labor materials and equipment as necessary at no additional cost to the Engineer Contracting Agency.

(C) Before installation of the coating system, the surface must be clean. Excess water shall be blown from the surface using compressed air equipment with oil-trapping filters. Suitable heaters shall be used as needed to produce a surface-dry condition. The surface shall be vacuumed to make sure that loose particles are not present.

(D) ~~Any~~ No sediment or debris from the cleaning operations ~~larger than U.S. #8 sieve shall not be deposited downstream~~ allowed in the sewer. Any sedimentation deposited ~~downstream~~ into the sewer system, as determined by the Engineer, shall be removed at no cost to the ~~City Engineer~~ Contracting Agency ?? Contracting Agency ?

626.3.2 Coating Installation and Repair

(A) With Engineer's ~~the Contracting Agency~~ approval, new manholes may have corrosion coating applied at manhole manufacturer's facility, but all final acceptance testing shall be performed in the field following installation of the manhole.

(B) If new manhole is coated at the manufacturer's facility then all joints will require sealing and coating in the field after manhole assembly. After the joint is assembled in the field the Contractor shall prepare the coated surface above and below the joint to receive the protective coating in accordance with the manufacturer's recommendations. Typically, a light abrasion blast to 2-inches above and below the joint will clean the surface and give the coating a good surface to adhere to.

(C) If the new manhole is coated at manufacturer's facility, coating of joints, ~~chimney~~ concrete adjustment rings, bench and invert, and any necessary repairs to barrel or cone shall be performed in the field after successful leakage testing per Section ~~611~~ 25.

(D) New manholes that do not have corrosion coating applied at manhole factory shall be fully coated in the field including barrels, cones, joints, ~~chimney~~ concrete adjustment rings, and bench and invert after successful leakage testing per Section ~~611~~ 25.

(E) Where specified ~~When identified~~ for corrosion coating, existing manholes shall be prepared in accordance with these specifications and the manufacturer's recommendations. Weak and deleterious material shall be removed down

to sound substrate. Repairs shall be made with coating manufacturer's recommended underlayment. Coating shall be applied to barrels, cones, joints, ~~chimney~~ concrete adjustment rings, and bench and invert. If flows cannot be bypassed or diverted with a flow through plug, ~~the Contracting Agency~~ Engineer may waive coating of invert.

(F) If the frame and cover of an existing coated manhole is adjusted in the field, the existing or added ~~chimney~~ concrete adjustment rings shall be coated or have coating repaired as necessary in accordance with the manufacturer's recommendations.

626.3.3 Inspection and Testing:

(A) Contractor shall give ~~the Contracting Agency~~ Engineer a minimum of two (2) business days ~~three days~~ advance notice before start of any surface preparation work, underlayment application work, coating application work or testing.

(B) All work and testing shall be performed in presence of the Engineer or a designated representative of the Contracting Agency Engineer, unless the ~~Contracting Agency~~ Engineer has granted prior approval to perform portions of the work in their ~~his/her~~ absence.

(C) Acceptance for holidays testing and adhesion testing ~~may~~ shall be witnessed by an independent Testing Agency or Laboratory approved by the ~~Engineer Contracting Agency~~ City of Phoenix. Documentation shall be in accordance with Engineer Contracting Agency requirements. Cost of this inspection and testing shall be the responsibility of the Contractor. ~~At owner's option, owner may waive requirement for Contractor provided testing agency or laboratory and have Engineer witness this testing.~~

(D) Additional illumination, scaffolding, and confined space entry equipment and support shall be provided by Contractor as necessary to facilitate inspection by ~~Contracting Agency~~ Engineer or Engineer's representative and/or Testing Agency when requested at no additional cost to the Agency.

(E) Contractor shall furnish appropriate equipment and supplies for holiday testing, dry and wet film thickness testing, and coating adhesion testing. Contractor shall provide trained personnel for performing required acceptance testing including operation of holiday detection devices.

(F) Holiday testing equipment and procedures shall be performed in strict accordance with latest edition of NACE "Standard Recommended Practice-Discontinuity (Holiday) Testing of Protective Coatings." Areas containing holidays shall be marked repaired or re-coated and re-tested in accordance with coating manufacturer's printed instructions. Holiday detectors shall be:

High voltage pulse-type holiday detectors ~~as manufactured by Tinker & Rasor or D.E. Stearns Co. Unit~~ shall be adjusted to operate at voltage required to cause sparks jump across air gap equal to twice specified coating thickness. Minimum applied voltage for 125 Mil coating shall be 12,500 volts.

(G) Wet film thickness measurement shall be provided by report submitted by Contractor to ~~Contracting Agency~~ Engineer. The report shall be presented after completion of underlayment, top coating operations, and shall state number of manufacturer's product units used and total square footage of surface area covered. ~~The Contracting Agency representative~~ Engineer shall have option of requiring Contractor to document number of units (coating materials) on hand before and after coating operations to verify actual minimum dry film thickness applied.

All film thicknesses not meeting required minimums will be re-coated per manufacturer's recommendations to required minimum 125 mil thickness.

(H) Contractor shall perform adhesion tests on 15% of the manholes coated on any given project (at least one manhole if 15% is less 1.0). Adhesion tests shall conform to ASTM D7234, minimum pull off strength shall be 200 PSI on concrete and 100 PSI on brick and some portion of substrate shall be adhered to coating and dolly. A minimum pull off strength of 150 PSI on concrete will be acceptable if substrate is adhered to coating and dolly on more than ½ the area of the dolly. 50mm dollies shall be used for adhesion testing. In the event of a failure, ~~the Contracting Agency representative~~ Engineer and Contractor shall determine limits of failure through additional investigation, sounding

and pull tests. Failed areas shall be removed and repaired in accordance with these specifications and manufacturers recommendations. Repaired area shall be re-tested per these requirements. Engineer shall be allowed to increase the testing frequency depending on number or percent of failed test results.

626.3.4 Warranty Period Inspection:

~~The Contracting Agency Owner~~ Engineer may conduct inspection any time prior to five (5) years following completion of new coating work and/or repaired coating work. Contractor and representative of coating manufacturer shall be notified of any apparent coating failures. Defective work or coating failures shall be repaired in accordance with specifications and to satisfaction of ~~Contracting Agency Owner~~ Engineer. If warranty inspections are not held, Contractor is not relieved of responsibilities under the Contract Documents.

626.4 MEASUREMENT

Measurement shall be per the square foot of manhole wall coated or per each treated manhole as required by the Contract Documents.

626.5 PAYMENT

If required, payment shall be made at the agreed upon unit price ~~bid per square foot~~, and shall be considered full compensation for cleaning, surface preparation materials, application, testing, and any incidentals, thereto, in conformance with the plans and specifications.

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