

SPECIALTY COATINGS FOR CONCRETE

1. GENERAL

1.1 Work Included

- .1 Supply and Installation of specialty coatings for the concrete pavement areas adjacent to the south side of the Bulk Chemical Building and Sodium Hypochlorite Building, and East Side of the WTP Building.

1.2 Measurement and Payment

- .1 Coatings for Concrete will be measured for payment by an area based on the number of square metres used to coat the concrete pavement surfaces. The price per square metre for “Concrete Coatings for Chemical Storage Building West Containment Area”, “Concrete Coatings for Chemical Storage Building East Containment Area”, “Concrete Coatings for Sodium Hypochlorite Building Containment Area” and “Concrete Coatings for East Side of the Water Treatment Plant Containment Area” will be payment in full for supplying and installing all concrete pavement coatings in accordance with this Specification.

1.3 Qualification

- .1 Installation is to be done by an established firm having at least ten (10) years of proven, satisfactory experience in this trade and employing skilled personnel. The firm is to be authorized by the coating manufacturer to install the specified product and product line.
- .2 The coating manufacturer is to have a minimum of ten (10) years proven, satisfactory experience in the manufacturing of chemical containment coating systems that are recommended by the Manufacturer.
- .3 Each coating system is to have a proven minimum one (1) full year containment with exposure to the chemical in which it is intended to contain, with no detrimental effects and staining on the coating system after spills of 72 hour duration.
- .4 Submit proof of qualifications and authorization in writing to the Contract Administrator, four (4) weeks prior to commencement of Work.

1.4 Design Standards, Code Requirements

- .1 Conform to requirements of SSPC Publications and visual standards, explanatory notes, comments and appendices:
 - .1 SSPC-PA-1 Shop, field and maintenance painting
 - .2 SSPC-SP-1 Solvent cleaning
 - .3 SSPC-SP-2 Hand cleaning
 - .4 SSPC-SP-3 Power tool cleaning
 - .5 SSPC-SP-5 White Metal Blast Cleaning

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- .6 SSPC-SP-6 Commercial blast cleaning
- .7 SSPC-SP-7 Brush off blast cleaning
- .8 SSPC-SP-10 Near white metal blast cleaning
- .9 SSPC-SP-13 Surface Preparation of Concrete

1.5 Submittals

- .1 Submit in accordance with Section 01300 - Submittals.
- .2 The coatings manufacturer shall certify in writing that the recommended system for containment coating has been used for ten (10) years in such containment, and that the Manufacturer's warranty includes intended chemical service and crack-bridging.
- .3 Submit colour samples of coating, minimum colour sample size 50 mm x 100 mm with finish indicated.
- .4 Indicate location of where the specific coating is to be applied.
- .5 Indicate specific coating sequence for each coating system and substrate.
- .6 Indicate dry film thickness requirements for each coating layer within the coating system.
- .7 Submit manufacturer's product data sheets and installation guides. A minimum of one (1) copy of the reviewed product data sheets and installation guides shall remain on Site at all times for all to view.
- .8 Prepare 300 mm x 200 mm samples of each coating type to Contract Administrator. Apply finishes on identical type materials to which they will be applied.
- .9 Submit manufacturer's preferred keyed-in coating termination detail for review by the Contract Administrator. Modify the termination detail as requested by the Contract Administrator at no additional cost. All coating areas are to be keyed-in at the perimeter of the area as directed by the contract administrator.

1.6 Inspection and Testing

- .1 Allow ample time for notification, review, and corrective Work, if required, before scheduling coating installation.
- .2 Inspection, and testing is to be performed by a third party CSA and SSPC certified inspection and testing firm. Testing of substrate required to be performed prior to the application of the coating and while the coating is being applied and curing is to be paid for by the Contractor. Testing of coating once the coating is cured, will be paid for by the City. Provide unencumbered access to all portions of Work and cooperate with appointed firm.
- .3 Notify the Contract Administrator at least 48 hours in advance of any coating installation or final substrate preparation.

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- .4 Repair all areas where the substrate surfaces and coatings were tested.
- .5 Testing of concrete will be performed in accordance with the indicated SSPC design standards. Test results are to be issued to the Contractor, the Contract Administrator, and the City.
- .6 The Contractor is to pay costs for required retesting due to defective materials or workmanship.
- .7 A minimum of one (1) complete SSPC test is to be performed on each concrete surface designated for coating.

1.7 Maintenance Data

- .1 Provide maintenance data for coatings complete with pertinent details, data sheets, and warnings against harmful maintenance materials and practices for incorporation into maintenance manual.

2. PRODUCTS

- .1 Quality: Manufacturer's highest quality products suitable and guaranteed for intended use.
- .2 The same Manufacturer is to be used for all of the work.
- .3 Coating systems to be monolithic and pinhole free.
- .4 Coating system used for different substrates within the same containment area are to be compatible to allow for full encapsulation of embedded items.
- .5 Coating system to fully encapsulate column base plates and anchor bolts within the containment areas. Grouts and injection gel epoxy used for anchor bolt anchorage or support are not intended to provide secondary containment. Coating system is to be compatible grouts and injection gel epoxy.
- .6 Coating system used on the housekeeping pads or concrete surfaces of containment areas are to be slip resistant. Do not use sand or other abrasive minerals as a broadcasting girt to obtain slip resistance.
- .7 Coating systems must be capable of bridging a 300 μ moving crack, such as shrinkage cracks, in the concrete substrate, with no breach or damage of any kind to the coating system. Coating must have memory and open or close with moving cracks without developing cracks or wrinkles. Manufacturer must show such crack-bridging of 300 μ in a mechanical demonstration unit as a submittal prior to commencing work.
- .8 Coating systems at full extension of crack-bridging shall not be damaged and must be certified to withstand the chemicals listed at full extension of crack-bridging with no adverse effects of any kind.

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- .9 Coating Manufacturer shall certify and guarantee that the coating systems recommended shall be totally unaffected by UV light exposure on a 24 hour per day basis.
- .10 Coatings shall be applied in containment areas to all concrete surfaces except FRP and galvanized grating surfaces.
- .11 Acceptable coating manufacturer's are:
 - .1 Carboline Coatings Company, St. Louis, MO
 - .2 KCC Corrosion Control Co. Ltd., Houston TX
- .12 Colours to be selected by the City from submitted samples.
- .13 Vicinity of Chemical Storage Building, design requirements:
 - .1 West Containment - exposed to the following two chemicals
 - .1 Chemical: 39% Ferric Chloride
 - .1 Containment period: 72 hours
 - .2 Temperature: -40°C to +40°C
 - .3 Exposed to UV light
 - .4 Neutralization chemical for spills: Sodium Hydroxide
 - .5 Minimum crack bridging capability: 300 µ
 - .2 Chemical: 93% Sulphuric Acid
 - .1 Containment period: 72 hours
 - .2 Temperature: -40°C to +40°C
 - .3 Exposed to UV light
 - .4 Neutralization chemical for spills: Water and Caustic Soda, Lime, or Soda Ash.
 - .5 Minimum crack bridging capability: 300 µ
 - .2 East Containment - exposed to the following two chemicals
 - .1 Chemical: 50% Sodium Hydroxide
 - .1 Containment period: 72 hours

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- .2 Temperature: -40°C to +40°C
- .3 Exposed to UV light
- .4 Neutralization chemical for spills: Water and Sulphuric Acid
- .5 Minimum crack bridging capability: 300 µ
- .2 Chemical: 19% Aqua Ammonia
 - .1 Containment period: 72 hours
 - .2 Temperature: -40°C to +40°C
 - .3 Exposed to ultraviolet light
 - .4 Neutralization chemical for spills: Dilute Sulphuric Acid
 - .5 Minimum crack bridging capability: 300 µ
- .14 Vicinity of Sodium Hypochlorite Building, design requirements:
 - .1 Chemical: 0.8% Sodium Hypochlorite
 - .1 Containment period: 72 hours
 - .2 Temperature: -40°C to +40°C
 - .3 Exposed to UV light
 - .4 Neutralization chemical for spills: Sodium Bisulphite
 - .5 Minimum crack bridging capability: 300 µ
- .15 Vicinity of East Side Water Treatment Plant, design requirements:
 - .1 Chemical: 35% Hydrogen Peroxide
 - .1 Containment period: 72 hours.
 - .2 Temperature: -40°C to +40°C
 - .3 Exposed to UV light
 - .4 Neutralization chemical for spills
 - .5 Minimum crack bridging capability: 300 µ

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3. EXECUTION

3.1 Pre-Installation Conference

- .1 Pre-installation conference for specialty coating products: prior to installation of specialty coating products, conduct a meeting with applicator, installers of Work adjacent to or that penetrates the specialty coating products, the Contract Administrator and Manufacturer's technical representative to review the following:
 - .1 General project requirements.
 - .2 Manufacturer's product data sheets and installation guides.
 - .3 Substrate conditions, moisture content, procedures for substrate preparation, and product installations.
 - .4 The Manufacturer's technical representative is to issue reports to the Contract Administrator confirming that the substrate conditions and installation procedures are being followed for each area where the specific product is being utilized.
 - .5 Responsibility and costs associated with verification and correlation of field dimensions, fabrication processes, techniques of construction, installation, and coordination of Work and Manufacturer's technical representative for all parts of the Work rests with the Contractor.

3.2 General

- .1 Notify the Contract Administrator of any conditions which would prejudice proper installation of this Work.
- .2 Commencement of this Work implies acceptance of existing conditions.
- .3 Steel substrates to be prepared to a SSPC-SP 5, White Metal Blast Cleaning.
- .4 Concrete substrates to be prepared to SSPC-SP 13, Table 1, Severe Service.
- .5 Apply each coat as a continuous film of uniform thickness. Recoat thin spots or bare areas before next coat of the coating is applied.
- .6 Remove weld spatter, weld slag and flux from metal before coating.
- .7 Remove concrete spatter and droppings before coating is applied.
- .8 Remove defective or damaged coatings as required by the Contract Administrator. Cost for defective or damaged coating removal and replacement will be at the Contractor's expense.
- .9 Relative humidity of the concrete surface for concrete substrates is to conform to SSPC-SP13 Table 1 Severe Service, using the ASTM F 2170 test method except that the relative humidity is to be less than 50 percent after surface preparation.

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- .10 Concrete surface tensile strength shall be 2.1 MPa minimum. Remediation of the concrete for values lower than 2.1 MPa will be at the Contractor's expense.
- .11 Termination of coatings to be keyed into the concrete substrate.
- .12 Install backer rod and elastomer in every expansion joint in the concrete pavement.

3.3 Protection

- .1 Protect other surfaces from substrate preparation, coatings and damage. Repair damage.
- .2 Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
- .3 Collect waste, cloths and material which may constitute a fire hazard, place in closed metal containers and remove daily from Site.

3.4 Brush Application

- .1 Where spray applications is not practical, work coating into cracks, crevices and corners and paint surfaces by brush.
- .2 Brush out runs and sags.
- .3 Remove runs, sags and brush marks from finished Work and repaint.

3.5 Spray Application

- .1 Provide and maintain specialized equipment that is suitable for intended purpose, capable of properly atomizing coating to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.
- .3 Test equipment for proper mixing proportion prior to application of coating following Manufacturer's written instructions.
- .4 Apply coating in uniform layer, with overlapping at edges of spray pattern.
- .5 Immediately brush out runs and sags.
- .6 Use brushes to work coating into cracks, crevices and places which are not adequately coated by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.
- .7 Remove runs, sags and brush marks from finished Work and recoat.

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3.6 Shop Painting

- .1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.
- .2 Do not shop paint metal surfaces which are to be embedded in concrete.
- .3 Copy previous erection marks and weight marks on areas that have been shop painted as required.

3.7 Field Painting

- .1 Touch-up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
- .2 Field paint surfaces which are accessible before erection but which are not to be accessible after erection.
- .3 Do not apply specialty coatings until concrete work is completed and cured as required by the coating manufacturer, except as directed by Contract Administrator. If concreting or other operations damage paint, clean and repaint damaged area.

3.8 Extended Warranty

- .1 Provide a five (5) year warranty against delamination of the coating and coating system, delamination of the coating and coating system from the substrate, defective coating and coating system application, and defects in the coating and coating system. Defects in the coating system will also include staining of the coating or coating system from the specified chemicals and neutralization chemicals.

END OF SECTION