

SECTION 099656

EPOXY COATINGS

Part 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Furnish and install the flooring systems as specified and indicated. Prior to installation, provide decontamination and cleaning as specified. The term "epoxy floor system" as used in this section will include the primers, resin systems and aggregate materials, topcoats, cove building materials, and any related materials for the project.
- B. Complete the epoxy floor system installation in strict accordance with these specifications, the coating system manufacturer's most current requirements for surface preparation, application and inspection, and the instructions for safety. In the event of a conflict between these specifications and the manufacturer's instructions, the more stringent requirements will apply.
- C. The Contractor shall be responsible for providing ventilation, initial cleaning, inspection, supervision, dust control and equipment protection as specified herein and related sections for the work associated with this Section. The Contractor is responsible for all other work associated with this Section including protection of existing equipment and structures in the work area, surface preparation, laminate flooring application, curing, coating repair, rework, inspection and supervision.

1.02 REFERENCES:

- A. Society for Protective Coatings (SSPC) Specifications and Standards:
 - 1. SSPC-PA-3: "A Guide to Safety in Paint Application".
 - 2. SSPC-SP-13: "Surface Preparation of Concrete".
- B. NACE (National Association of Corrosion Engineers)
 - 1. NACE Publication 6D-173, "A Manual for Painter Safety".
 - 2. NACE Publication 6G-164, "Surface Preparation Abrasives for Industrial Maintenance Painting".
- C. ASTM (American Society for Testing and Materials)
 - 1. ASTM D4541 - L.R. "Standard Method for Pull-Off Strength of Coatings using Portable Adhesion Testers".
 - 2. ASTM E337 - L.R. "Standard Practice Test Method for Measuring Humidity with a Psychrometer".
 - 3. ASTM D4263-83 (1999), "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method".
 - 4. ASTM F1869-98, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride".
 - 5. ASTM D4414-95, "Standard Practice for Measurement of Wet Film Thickness by Notched Gages".
 - 6. ICRI Guide No. 03732, "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays," International Concrete Repair Institute, Sterling, VA.

7. ASTM 4262, "Standard Test Method for Measuring Surface pH of Acid Etched Concrete."
8. ASTM D4259, "Standard Practice for Abrading Concrete".

1.03 DEFINITIONS

A. Terms used in this Section are defined as follows:

1. Epoxy Flooring Work - The aspects involved with proper application of the specified high solids flooring system, including but not limited to cleaning, surface preparation, mixing, application, curing, and quality control.
2. Approved Materials - The coating system, blast media, and other specified materials for this coating work.
3. Wet Film Thickness - The primer or coating films' actual thickness immediately following application. Wet film thickness is measured in mils or thousandths of an inch (0.001") and is abbreviated WFT.
4. Dry Film Thickness - The primer or coating films' actual thickness following curing and drying. Dry film thickness is measured in mils or thousandths of an inch (0.001") and is abbreviated DFT.
5. Coating System Manufacturer - Refers to the approved coating Manufacturer, abbreviated as CSM in this Section.
6. Manufacturer's Technical Representative(s) - Refers to the technical representative(s) of the approved CSM.
7. A/E - Architectural or Engineering Firm.

1.04 QUALITY ASSURANCE

A. The Contractor shall meet the following requirements:

1. The Contractor is ultimately responsible for the workmanship and quality of the epoxy floor system installation. Inspections by the Owner, the Engineer, or others do not limit the Contractor's responsibility.
2. Do not use or retain contaminated, outdated, or diluted materials for flooring. Do not use materials from previously opened containers.
3. Use only products of the approved CSM. Provide the same products for repairs as for the original coating.
4. If any requirements of this specification are contradicted by a referenced standard or vice-versa, the matter shall be resolved in writing by the A/E or its representative.
5. Make available at all times all locations and phases of the work for access and inspection by the Engineer, the Owner, or other personnel designated by the Owner. The Contractor shall provide ventilation, egress, and whatever other means are required for the Owner, Engineer, or designated personnel to access and exit the work areas safely.
6. Conduct work so that the epoxy floor system is installed as specified herein. Inspect work continually to ensure that the coating system is installed as specified herein. The A/E shall inspect the work to determine conformance with the contract documents.
7. The Contractor's Supervisor shall be on site at all times and will be thoroughly familiar with the work in progress. This Supervisor shall have authority to receive and execute all direction provided by the A/E or the Owner.

8. The methods of construction shall be in accordance with all requirements of this specification and the best trade practices. Any changes in the epoxy floor system installation requirements shall be allowed only with the written approval of the A/E.
9. Installation shall be performed by a contractor having a minimum of 5 years experience and having completed a minimum of 5 projects of similar size and type. Provide case histories verifying compliance.
10. Apply a job site mock-up that is a minimum of 50 square feet to verify finish and skid resistance is acceptable. Accepted sample will become job standard for the rest of the project.

1.05 SUBMITTALS

- A. Submit the following prior to commencing with any phase of the work covered by this Section:
 1. Manufacturer's current printed recommendations and product data sheets for all epoxy floor system products including performance criteria, surface preparation and applications, volatile organic compound (V.O.C.) data, and safety requirements.
 2. Material Safety Data Sheets (MSDS) for any materials brought on-site including all coating system materials, solvents, and abrasive blast media.
 3. Contractor's written verification that the personnel who will perform this work have the required experience as specified in 1.05 1.9. This document must list the names of all of the Contractor's supervisors and tradespeople who will work on the project covered by this Section.
 4. List of cleaning and thinner solutions allowed by the CSM.
 5. Storage requirements including temperature, humidity, and ventilation for Coating System Materials.
 6. A minimum of two samples of each specified coating system with varying degrees of skid-resistance.
 7. Owner, contractor, and manufacturer's representative shall review and mutually agree upon color, grade, and final texture of coating system before starting installation. The acceptance of a sample will constitute the job standard by which installation will proceed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Material shall be delivered to project site in manufacturer's original unopened containers.
- B. Materials shall be stored indoors, protected from damage, moisture, direct sunlight and temperatures below 40 degrees F or above 90 degrees.
- C. Store all materials only in area or areas designated by the Owner solely for this purpose. Confine mixing, thinning, clean-up and associated operations, and storage of coating materials related debris before authorized disposal, to these areas. All materials are to be stored on pallets or similar storage/handling skids off the ground.
- D. Mix all coating materials in a designated enclosed mixing area. This enclosed area must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect

all other concrete and metallic surfaces and finishes from any spillage of material(s) within the mixing area.

- E. Do not use drain piping for disposal of coating materials.
- F. The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with the epoxy floor system materials as described on the pertinent Material Safety Data Sheets or container labels.
- G. Deliver all materials to the job site in new, unopened containers. Each container shall bear the CSM's name and label.
 - 1. Labels on all material containers must show the following information:
 - a. *Name or title of product.*
 - b. *Manufacturer's batch number.*
 - c. *Manufacturer's name.*
 - d. *Generic type of material.*
 - e. *Application and mixing instructions.*
 - f. *Hazardous material identification label.*
 - g. *Shelf life date.*
 - 2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.
 - 3. All materials shall be handled and stored to prevent damage or loss of label.
 - 4. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have exceeded their shelf life.

1.07 ENVIRONMENTAL CONDITIONS

- A. Surfaces and surrounding air temperatures must exceed 55 degrees F but must be less than 90 degrees F, with materials at not less than 70 degrees F during application.
- B. Do not apply coating materials when dust is being generated.
- C. If existing facility lighting is not adequate for flooring system application, the Contractor shall provide all temporary lighting during the work equivalent to one 200 watt explosion proof incandescent lamp per 100 square feet of work area.

1.08 PRE-INSTALLATION MEETING

- A. Contractor shall schedule a pre-installation meeting at least one week prior to commencement of work.
 - 1. Attendees to include Contractor, floor subcontractor, and Architect.
 - 2. Coordinate meeting with Architect prior to scheduling.

Part 2 - PRODUCTS

2.01 MANUFACTURER

- A. Sherwin Williams (High Performance Flooring) or prior approved equal
- B. Requests for substitution will be considered in accordance with provisions of Section 012500.

Part 3 - EXECUTION

3.01 GENERAL

- A. Protection
 - 1. Mask, cover, or otherwise protect all surfaces, equipment, and finishes not to receive the epoxy floor system specified in this Section.
- B. Strictly follow the approved CSM's written instructions and the requirements of this specification regarding all aspects of laminate flooring work including: mixing, application, recoat times and curing.
- C. Mock-up
 - 1. Prior to commencing the installation, the Contractor shall install with the owner's approval, a mutually agreed upon mock-up test sample to show final color and appearance of the epoxy floor system.

3.02 PREPARATION

- A. Thin film System
 - 1. Allow new concrete to cure for 28 days. Verify dryness by testing for moisture with a "plastic film tape-down test". (Reference ASTM D4263)
 - 2. Once the facility is climate controlled and the environmental conditions of the facility when in operation can be simulated, perform moisture tests on concrete as follows:
 - h. Perform calcium chloride moisture tests in accordance with ASTM D1869 once for every 1000 square feet of surface area to be coated. The maximum limit for moisture vapor emissions rate is 3.0 lbs. per 24 hours per 1000 sq. ft. If tests indicate rates higher than 3.0, install epoxy-based moisture vapor barrier in accordance with manufacturers instructions and as directed by the architect.
 - 3. Mechanically abrade to remove laitance, curing compounds, sealers and other contaminants and to provide surface profile equivalent to ICRI CSP 3.
 - 4. Vacuum clean concrete to remove all dirt, dust, and other loose materials.
 - 5. After mechanically abrading, verify that all surfaces are clean, dry and free of any contaminants, which could adversely affect the adhesion of the flooring system.
 - 6. If between final surface preparation work and epoxy floor system application, contamination of the prepared and cleaned substrates occurs, recleaning shall be required until the requirements of this Section are met.
 - 7. All surface preparation shall be performed in accordance with manufacturer's instructions.

3.03 INSTALLATION OF SYSTEMS FOR THIN FILM SYSTEM

- A. Thin Film System
 - 1. Primer: The primer shall be mechanically mixed, applied and cured in strict accordance with manufacturer's printed instructions. Apply uniformly at a film thickness of 6.0-8.0 dry mils.
 - 2. TopCoat: The material shall be mixed, applied and cured in strict accordance with manufacturer's printed instructions and at a film thickness of 6.0-8.0 dry mils.
 - 3. Incorporate 30-50 mesh silica into finish coat to achieve desired level of skid-resistance.
 - 4. Cracks and control joints, construction joints, expansion joints, and all epoxy floor system terminations shall be installed as indicated on the

Standard Flooring Details.

3.04 CLEANUP

- A. Remove waste materials, rubbish, and debris and dispose of them at the owner's direction. Leave work areas in a clean and tidy condition.

3.05 PROTECTION

- A. Protect the completed work from water, airborne particles or other surface contaminants until cured for a minimum of 24 hours after application.
- B. Protect from traffic, physical abuse, immersion and chemical exposure until the complete system has thoroughly cured for 24 hours at 75 degrees F. For different temperatures, consult the manufacturer's representative about curing times.

3.06 FIELD QUALITY CONTROL INSPECTION AND TESTING

- A. Inspection by the Engineer, Owner or others does not limit the Contractor's responsibilities for quality as specified herein or as required by the CSM's instructions.
- B. The Contractor shall perform the Q.C. procedures listed below in conjunction with the requirements of this Section. The Engineer will inspect the work to determine conformance to the contract documents.
 - 1. Degree of Cleanliness.
 - i. Visually inspect the degree of cleanliness of substrates to meet the requirements of this Section. The pH of the concrete substrates will be measured using pH indicating papers. pH testing is to be performed once every 100 sq. ft. of surface area to be coated.
 - j. Acceptable pH values shall be between 8.0 and 11.0 as measured by a full-range (1-12) color indicating pH paper with readable color calibrations and a scale at whole numbers (minimum). Use Hydrion Insta-Chek Jumbo 0-13 or 1-12 or equal. The paper shall be touched to the surface once using moderate finger pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the one touch, lift the paper vertically to not "wipe" the surface. Compare the color indicated with the scale provided and record the pH.
 - k. Note: If the surface of the concrete is dry, it is not possible to take a pH measurement. However, pH values are still important on dry surfaces. When a dry concrete substrate is encountered for a pH test, the surface where the pH test is to be performed shall be sprayed lightly with distilled, deionized water from a commercially available spray bottle that has been properly rinsed to preclude any dissolved solids. The spray shall just wet the surface to a "shiny" appearance. Wait 60 seconds to allow chemical equilibria to be established and then test the pH of the water on the surface. Perform this test in accordance with ASTM D4262.
 - l. Concrete Surface Profile
 - 1) Using the replicate rubber specimens inspect the concrete surface profile in accordance with ICRI Guide No. 03732. This should be performed once for every 100 square feet of surface area to be coated.
 - 2) Measure and record ambient air temperature once every two hours of

- each shift using a thermometer and measure and record substrate temperature once every two hours using a surface thermometer.
- 3) Measure and record relative humidity every two hours of each shift using a sling psychrometer in accordance with ASTM E337.
 - 4) Inspect correct mixing of coating materials in accordance with the CSM's instructions.
 - 5) Inspect and record that the "pot life" of coating materials used are not exceeded during installation.
 - 6) Measure and record the thickness of the coating system using a notched gauge in accordance with ASTM D4414 for Wet Film Thickness at least once every 10 sq. ft. of coating area.
 - 7) Inspect to verify proper curing of the epoxy floor system as recommended by the CSM.

End of Section 099656