

SECTION 03351
HIGH STRENGTH CEMENTITIOUS METALLIC TOPPING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Supply and installation of Section 03351 – High Strength Cementitious Metallic Topping
- B. Related Sections
 - 1. Drawing and general provisions of the contract, including General and Supplementary Conditions apply to this Section.
 - 2. Provisions of Section 03310 - Structural Concrete and 03350 – Concrete Finishing apply to this Section.

1.02 REFERENCES

- A. American Concrete Institute (ACI)
 - 1. ACI 212.3R-91 – Chemical Admixtures for Concrete
 - 2. ACI 301- 99 – Standard Specification for Structural Concrete
 - 3. ACI 302.1R -96 – Guide for Concrete Floor and Slab Construction
 - 4. ACI 304R-00 – Guide for Measuring, Mixing, Transporting and Placing Concrete
 - 5. ACI 305R-99 – Hot Weather Concreting
 - 6. ACI 306R-88 – Cold Weather Concreting
 - 7. ACI 318-02 – Building Code Requirements for Structural Concrete
 - 8. ACI 347R-01 – Guide to Formwork for Concrete
 - 9. ACI 503R-93 – Use of Epoxy Compounds with Concrete
 - 10. ACI 503.5R-92 – Guide for the Use of Polymer Adhesives in Concrete
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM A-615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (Including Supplementary Requirements S1)
 - 2. ASTM C-31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 3. ASTM C-33-01a – Standard Specification for Concrete Aggregates
 - 4. ASTM C-39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - 5. ASTM C-94 – Standard Specification for Ready-Mixed Concrete
 - 6. ASTM C 109 2" (50 mm) - Cubes

7. ASTM C-150-00 – Standard Specification for Portland Cement
8. ASTM C-171-97a – Standard Specification for Sheet Materials for Curing Concrete
9. ASTM C-172-99 – Standard Practice for Sampling Freshly Mixed Concrete
10. ASTM C-173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
11. ASTM C309-98a – Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
12. ASTM C-494 – Standard Specification for Chemical Admixtures for Concrete
13. ASTM C1315-00 – Standard Specification for Liquid Membrane Forming Compounds Having Special Properties for Curing and Sealing Concrete
14. ASTM D-4259-88 (1999) – Standard Practice for Abrading Concrete

C. International Concrete Repair Institute (ICRI)

1. Guideline 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

1.03 SYSTEM DESCRIPTION

- A. Cementitious Metallic Topping: Pre-formulated and Pre-mixed heavy-duty iron aggregate combined with a high strength cement based mortar topping as indicated on the Contract Drawings and specified in this section.
- B. The topping applicator shall provide and place heavy duty pre-formulated and pre-mixed iron aggregate topping, blended and packaged at the manufacturer's owned and controlled factory and deliver to the job site ready to apply. Work shall include materials and procedures for the required concrete surface preparation, including bonding, mixing, placing, finishing and curing.

1.04 SUBMITTALS

- A. Manufacturer's Product Data: Within 45 days after award of the contract, submit:
 1. Complete materials list showing all the items proposed to be furnished and delivered under this section.
 2. Sufficient technical data and manufacturer's specifications to demonstrate that all such items meet or exceed the specified requirements.
 3. Manufacturer's recommended installation instructions. The manufacturer's recommended installation procedures will become the basis for inspecting and accepting or rejecting actual installation procedures on this work.

4. Hold pre-slab construction conference per section 2.5.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Installer Qualifications: A Contractor and/or its employees with a minimum of 10 years' experience who has completed topping Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of similar size and application. Installer must be approved in writing by material manufacturer prior to bid.
2. Topping Material Manufacturer Qualifications: Material manufacturers shall be ISO 9001/9002 registered or provide proof of documented quality assurance system. Quality system must be registered by an independent registrar who is accredited by the American National Standards Institute, Registrar Accreditation Board (ANSI-RAB) or by another internationally recognized body. ISO 9001/9002 certification shall be included with material submittals.
3. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - a. Personnel conducting field shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI -1 or an equivalent certification program.

B. Warranty

1. The contractor shall furnish the owner a 1-year material and labor warranty signed jointly by the topping manufacturer and installer. The warranty shall include the following:
 - a. Suitability of topping material for the project;
 - b. Service preparation and bonding of topping for 1 year; and
 - c. Wear resistance: a wear failure shall be construed if the topping material wears through down to the substrate at any point during the warranty period.

- C. Pre-Installation Meetings (new construction only)
 - 1. At least 35 days prior to start of the concrete construction schedule, the contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction.
 - 2. The contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
 - Contractor's superintendent – Topping
 - Manufacture's Rep- Concrete subcontractor
 - 3. Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by him to all parties concerned within five days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Owner's representative - Resident engineer - Consultant engineer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cementitious Metallic Topping: Heavy-Duty iron aggregate topping, "EucoFloor 404", manufactured by The Euclid Chemical Company. Product shall be a pre-formulated specially processed and graded iron aggregate, tested cement and other high performance proprietary complementary components. Material shall be formulated and processed under stringent quality control free from non-ferrous material and rust, in manufacturer's owned and controlled facilities. Product must attain a minimum strength of 14,000 psi @7 days and 18,000 psi @ 28 days.
- B. Bonding Agent: "EucoFloor" Epoxy, a 100 percent reactive, two component aliphatic/amine type epoxy resin bonding agent, sand saturated, designed for bonding Delta Top 404 to a well cured and properly prepared and hardened base concrete.
- C. Curing Compound: "Super Aqua Cure VOX" applied at a minimum rate of 300 square feet per gallon.
- D. Joint Filler: "Euco 700" semi- rigid epoxy joint filler. If required.

PART 3 EXECUTION

3.01 EXISTING FLOOR SLAB SURFACE PREPARATION

- A. Saw cut perimeter of work areas and prepare existing slab surface to receive new topping as shown in the Drawings along the repair and overlay boundaries.

- B. Prepare all remaining surfaces to be repaired or overlaid using shot-blasting, scabblers, hydro-demolition, or concrete milling machines to remove all deleterious material and create a surface profile of ¼" amplitude. Acid-etched surface preparations are not acceptable. Surface preparation shall result in a surface profile acceptable to the bonding agent manufacturer, both in terms of amplitude and removal of surface grease, oils, or other materials that may adversely affect the bond of the topping. Surface preparation must be meet a minimum of ICRI CSP 7-9.

- C. Clean scarified surface thoroughly until all laitance, dirt and similar deleterious materials have been removed.

- D. Survey the surface of the existing slab. Map and report to the Owner any existing cracks that might telegraph through the new concrete repair or topping. The Owner shall evaluate any such cracks for the need for additional repair prior to repair or topping placement.

- E. Apply bonding agent to the prepared surface to receive repair or topping in accordance with the manufacturer's recommended instructions and sand saturate the wet epoxy until refusal. (recommended 2040 sand gradation). Allow the epoxy to cure and remove all loose sand prior to placement of EucoFloor 404 by sweeping and or vacuuming the area. Strict adherence to the working life of the bonding agent will be enforced. Manufacturer's representative shall be present during bonding agent application and shall approve surface preparation, moisture levels, and application procedures.

- F. Install triangular shaped wear Indicators every 1000 ft² to show amount of floor wear over time.

3.02 MIXING

- A. Thorough mixing of the topping material shall be in accordance with the manufacturer's recommendations.

3.03 INSTALLATION

- A. Slab preparation, moisture content, topping termination, bonding agents, topping placement, finishing and curing shall be in accordance with material manufacturer's written instructions.
- B. Materials manufacturer shall provide continual construction inspection during slab preparation and topping application. This inspection may be performed by the Contractor, as long as the Contractor is certified in writing by the manufacturer to do so prior to installation.
- C. Bonding agent must be epoxy-based and substrate condition must be approved by manufacturer's representative prior to topping installation.
- D. Any deviations from the manufacturer's installation instructions must be approved by the manufacturer in writing prior to execution.

3.04 METALLIC AGGREGATE TOPPING APPLICATION (to determine proper installation technique, contact manufacturer.)

- A. Two-Course Bonded
 - 1. All slabs in the topping area shall receive a minimum of 1 ½" thick metallic topping over a properly prepared based slab. Prior to the topping placement the surface shall be coated with EucoFloor epoxy adhesive, sand saturated and fully cured. The bond coat shall be mixed, placed, compacted and finished in strict accordance with the instructions of the manufacturer.
 - 2. The base slab preparation shall be approved by the representative of the topping manufacturer prior to the application of the bonding compound or epoxy adhesive.

3.05 PLACING AND FINISHING

- A. Immediately after thorough mixing is completed, discharge topping material for immediate placing and screeding. Use Eucobar to keep moisture in topping material.
- B. The minimum thickness of EucoFloor 404 shall be 1 ½ inch.

3.06 PROTECTION

- A. Protect concrete from physical damage or reduced strength due to weather extremes and plant operations.

END OF SECTION