SECTION 03 5400
CAST UNDERLAYMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Liquid-applied self-leveling floor underlayment.
   1. Use cementitious type at all locations.

1.3 RELATED REQUIREMENTS

A. Section 01 7000 - Execution: Alteration project procedures; selective demolition for remodeling.

B. Section 03 3000 - Cast-in-Place Concrete concrete construction and finish.

1.4 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2013.

B. ASTM C 580 Flexural Strength

C. ASTM D 3931 Bond Strength (concrete).

D. ASTM F-2170 Relative Humidity in Concrete

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.

C. Certificate: Certify that products meet or exceed specified requirements.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results of underlayments for compliance with requirements indicated.

E. Minutes of preinstallation conference

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years of experience who has completed work similar in material, design, and extent to that indicated for this Project.

B. 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 ac-cording to ASTM E 548.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section 01300 Administrative Requirements

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

1.8 REGULATORY REQUIREMENTS

A. Conform to New York State Building Codes for combustibility or flame spread requirements.

1.9 MOCK-UP

A. Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Prepare mock-up in location designated by Fuller and D'Angelo, P.C..
   2. Area: 10 ft x 10 ft.
   3. Do not proceed with underlayment work until workmanship of mock-up has been approved by Fuller and D'Angelo, P.C.
   4. If Architect determines that mockups do not meet requirements, demolish and remove them from the site and cast others until mockups are approved.
   5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   6. Demolish and remove mockups when directed.
   7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Mock-up may remain as part of the Work.

1.10 FIELD CONDITIONS

A. Do not install underlayment until floor penetrations and peripheral work are complete.

B. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting underlayments performance.

C. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and 72 hours after installation of underlayment.

D. During the curing process, ventilate spaces to remove excess moisture.

E. Close areas to traffic during underlayments application and, after application, for time period recommended in writing by manufacturer

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cementitious Underlayment:
   1. Dramatic Surface Products/ Specialty Construction Brands, Inc; Product DSP 520: www.DramaticSurfaceProducts.com
   2. Ardex Engineered Cements Inc; Product Ardex K-15: www.ardex.com.

2.2 MATERIALS

A. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
   1. Compressive Strength: Minimum 4000 psi after 28 days, tested per ASTM C109/C109M.
   2. Flexural Strength: Minimum 1000 psi after 28 days, tested per ASTM C348.
   3. Bond Strength: 350-400 psi when tested in conformance with ASTM D 3931
   4. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
   5. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.

B. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch in size and acceptable to underlayment manufacturer.

C. Reinforcement: Galvanized metal lath complying with recommendations of underlayment manufacturer for specific project circumstances.

D. Water: Potable and not detrimental to underlayment mix materials.

E. Primer: Manufacturer's recommended type.

F. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240

2.3 MIXING

A. Site mix materials in accordance with manufacturer's instructions.

B. Add aggregate for areas where thickness will exceed 1-1/2 inch. Mix underlayment and water for at least two minutes before adding aggregate, and continue mixing to assure that aggregate has been thoroughly coated.

C. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.

B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.

C. Vacuum clean surfaces.

D. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

E. Close floor openings.

3.3 APPLICATION

A. Start topping application in presence of manufacturer's technical representative.

B. Existing Concrete: Apply epoxy-bonding adhesive, mixed according to manufacturer's written instructions, and scrub into dry base slabs to a thickness of 1/16 to 1/8 inch, without puddling. Place topping while adhesive is still tacky

C. Install underlayment in accordance with manufacturer's instructions.

D. Pump or pour material onto substrate. Do not retemper or add water.

1. Pump, move, and screed while the material is still highly flowable.
2. Be careful not to create cold joints.
3. Wear spiked shoes while working in the wet material to avoid leaving marks.

E. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft.

F. For final thickness over 1-1/2 inches, place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin application of the subsequent layer within 24 hours.

G. Place before partition installation.

H. Where additional aggregate has been used in the mix, add a top layer of neat mix (without aggregate), if needed to level and smooth the surface.

I. Construction Joints: Construct joints true to line with faces perpendicular to surface plane of topping, at locations indicated or as approved by Architect.

1. Coat face of construction joint with epoxy adhesive at locations where topping is placed against hardened or partially hardened topping.

J. Contraction Joints: Form weakened-plane contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before topping develops random contraction cracks.

1. Form joints in topping over contraction joints in base slabs, unless otherwise indicated.
2. Construct contraction joints for a combined depth equal to topping thickness and not less than one-fourth of base-slab thickness.
3. Construct contraction joints for a depth equal to one-half of topping thickness, but not less than 1/2 inch deep

K. If a fine, feathered edge is desired, steel trowel the edge after initial set, but before it is completely hard.

3.4 CURING

A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

B. Air cure in accordance with manufacturer's instructions.

3.5 JOINT FILLING

A. Prepare and clean contraction joints and install epoxy joint filler, according to manufacturer's written instructions, once topping has fully cured.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install epoxy joint filler full depth of contraction joints. Overfill joint and trim joint filler flush with top of joint after hardening

3.6 FIELD QUALITY CONTROL

A. Placed Material: Agency will inspect and test for conformance to specification requirements.

3.7 REPAIRS

A. Defective Topping: Repair and patch defective topping areas, including areas that have not bonded to concrete substrate

3.8 PROTECTION

A. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION