

## **SECTION 03 54 16 - HYDRAULIC CEMENT UNDERLAYMENT**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section Includes:
  - 1. Polymer-modified, self-leveling, hydraulic cement underlayment for application below interior floor coverings at existing concrete substrate.
  - 2. Hydraulic cement underlayment may only be used at new concrete substrates if accepted by Structural Engineer in writing.
- C. Related Work:
  - 1. Division 03, Section 03 30 00 "Cast-In-Place Concrete"
  - 2. Division 09, Section 09 05 61 "Moisture Vapor Emission Control" for moisture mitigation system.
  - 3. Division 09, Section 09 30 00 "Tiling" for compatible tile setting systems.
  - 4. Division 09, Section 09 65 19 "Resilient Tile Flooring"
  - 5. Division 09, Section 09 65 36 "Static Control Resilient Flooring"
  - 6. Division 09, Section 09 67 23 "Resinous Flooring"

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Hydraulic cement underlayment.
  - 2. Primer.
- B. Sustainable Design Submittals:
  - 1. Product Data: For coatings, indicating VOC content.
  - 2. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.
- C. Floor flatness:
  - 1. Provide a survey of the existing flooring showing flatness and the required depths of underlayment to achieve required flatness using ASTM E1155 criteria. Measure depth of underlayment using ASTM C1708 as necessary to achieve a maximum variation to installation tolerances specified.
  - 2. New concrete floor tolerances shall comply with Section 03 30 00 "Cast-In-Place Concrete". Out of floor tolerances shall be communicated to Architect and Structural Engineer.

#### **1.3 QUALITY ASSURANCE**

- A. Manufacturer Qualification: Employs factory trained personnel who are available for consultation and Project site inspection.

- B. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- C. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.
- B. Store moisture mitigation membrane products in a temperature controlled environment, protected from weather and at ambient temperature of not less than 65 deg F, and not more than 85 def. F for at least 48 hours before use.

#### **1.5 FIELD CONDITIONS**

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
  - 1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.
  - 2. Maintain ambient temperature and relative humidity in installation areas in range recommended by manufacturer a for 48 hours before installation, during installation and 48 hours after installation, and where concrete surface temperatures remain a minimum of 5 deg. F. higher than dew point for ambient temperature, and relative humidity conditions during this period.

### **PART 2 - PRODUCTS**

#### **2.1 HYDRAULIC CEMENT UNDERLAYMENTS**

- A. Hydraulic Cement Underlayment: Polymer-modified, self-leveling, pumpable and pourable low alkali hydraulic cement product complying with ASTM C1708, that can be applied in minimum uniform thickness of 1/4 inch (6 mm) and that can be feathered at edges to match adjacent floor elevations; and up to required installation thickness.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ARDEX Americas; Ardex K-15.
    - b. Custom Building Products; CustomTech TL-150.
    - c. Laticrete International, Inc.; LATICRETE SUPERCAP SC500.
    - d. MAPEI Corporation; Ultraplan 1 Plus
  - 2. Cement Binder: ASTM C150/C150M, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C219.
  - 3. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C109/C109M.
  - 4. Flexural Strength: ASTM C348, 800 psi at 28 days

- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.
  - 1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F.
- D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
  - 1. VOC Content: Provide coating with VOC content of 100 g/L or less.
  - 2. Low-Emitting Materials: Verify coating complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances and for conditions affecting performance of the Work.
- B. Proceed with application only after unsatisfactory conditions have been corrected.
  - 1. Installation of system indicates acceptance of surfaces and conditions.

#### **3.2 PREPARATION**

- A. Prepare and clean substrate according to manufacturer's written instructions.
  - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
  - 1. Alkalinity Testing: Perform pH testing according to ASTM F710.
  - 2. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m) and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Install MVE-control system in locations where concrete substrate MVER exceeds 3 lb. of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.

- C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

### **3.3 INSTALLATION**

- A. General: Mix and install underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment installation and for time period after installation recommended in writing by manufacturer.
  - 2. Coordinate installation of components to provide optimum adhesion to substrate and between coats.
  - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Install underlayment to produce uniform, level surface.
  - 1. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during installation and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer if required by manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

### **3.4 INSTALLATION TOLERANCES**

- A. Finish and measure surface, so gap at any point between gypsum cement underlayment surface and an unlevelled, freestanding, 10 foot (3.05 m) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch (6 mm) except as follows:
  - 1. Where resilient flooring is to be installed, installation tolerance shall be 1/8 inch (3 mm).
  - 2. Where large format floor tile is to be installed, installation tolerance shall be 1/16 inch (1.6 mm) in 2 feet (610 mm)].
  - 3. Where resinous floor coating or other thin paint coatings are to be installed, installation tolerance shall be 3/16 inch (4.8 mm).
  - 4. Or flatter as required by interior floor coverings or the Owner's equipment.

### **3.5 PROTECTION**

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

### **END OF SECTION**