SECTION 03 54 16
HYDRAULIC CEMENT UNDERLAYMENT

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydraulic cement underlayments and surface preparation.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM C 109/C 109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
2. ASTM C 150/C 150M - Standard Specification for Portland Cement.
3. ASTM C 219 - Standard Terminology Relating to Hydraulic Cement.
4. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
5. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
6. ASTM E 492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
7. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.
1. Minimum 2 year experience installing similar products.
2. Installing contractor meets the requirements of a program identified and approved by the architect with the criteria for such program similar to or exceeding; INSTALL certified or equal.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: MAPEI Americas, which is located at : 1144 E. Newport Center Rd.; Deerfield Beach, FL 33442; Toll Free Tel: 800-42-MAPEI; Tel: 954-246-8888; Fax: 954-246-8801; Email: request info (techservicerequests@mapei.com/US-EN); Web: www.mapei.com/US-EN

B. Acceptable Manufacturer: MAPEI Americas, which is located at : 2900 Francis-Hughes Laval, PQ, Canada H7L 3J5; Tel: 450-662-1212; Fax: 450-662-0444; Email: request info (techservicerequests@mapei.com/CA-EN); Web: www.mapei.com/CA-EN

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

D. Substitutions: Not permitted.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Refer to drawings for UL assemblies required.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. IIC-Rated Assemblies: For IIC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 492 and classified according to

ASTM E 989 by an independent testing agency.

2.3 HYDRAULIC CEMENT UNDERLAYMENTS

A. Quick-Setting, Water-Resistant, High-Compressive-Strength, Self-Leveling Underlayment: Advanced hydraulic, specially formulated for the resurfacing of interior horizontal surfaces where environmental controls are not in place, that can be applied in minimum uniform thickness of 1/4 inch to 1 inch (6 mm to 25 mm).
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan Extreme 2.

B. Quick-Setting, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/8 inch to 1 inch (3 mm to 25 mm).
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Novoplan 2 Plus.

C. Reduced Preparation, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/8 inch to 1 inch (3 mm to 25 mm).
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Novoplan Easy.

D. Reduced Preparation, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied from feather edge to 2 inches (52 mm).
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan Easy.

E. High-Performance, Quick-Setting, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied from feather edge to 1-1/2 inches (38 mm).
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan 1 Plus.

F. High-Compressive Strength, High-Performance, Quick-Setting, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied from feather edge to 1-1/2 inches (38 mm).
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan M20 Plus.

G. Standard-Performance Self-Leveling Underlayment self-leveling, calcium-aluminate-based underlayment and repair mix for interior concrete and engineer-approved floors.
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Novoplan SP.

H. Extremely Fast-Setting, Self-Leveling Underlayment, high-flow, calcium-aluminate-cement-based underlayment designed for rapid subfloor preparation, suitable for all types of floor-covering installations in as soon as 1 to 3 hours after placement from 1/8 inch to 1/2 inch (3 to 12 mm)
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan QuickTraffic.

I. Lightweight, Self-Leveling Underlayment, polymer modified, calcium-aluminate based, self drying specifically designed for use as a self-leveling underlayment over subfloors that are not rated carry the full weight of traditional self-leveling underlayments from 1/8 inch to 2 inches (3mm to 5 cm),
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation;

Ultraplan Lite.

J. Performance Requirements:
   1. Cement Binder: ASTM C 150/C 150M, Portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
   2. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.
   3. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.
   4. Compressive Strength: Not less than 6000 psi (41.4 MPa) at 28 days when tested according to ASTM C 109/C 109M.

K. 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.

L. Water: Potable and at a temperature of not more than 70 degree F (21 degree C).

M. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

N. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
   1. Ultra-Low Viscosity, Consolidating Epoxy Primer:
      a. Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer CE.
   2. High-Performance, 100 Percent-Solids Epoxy Primer:
      a. Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer E.
   3. Advanced-Technology Acrylic Latex Primer for Concrete:
      a. Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer L.
   4. All-Purpose Primer for Self-Leveling Underlayments:
      a. Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer T.
   5. Water-Based Epoxy Primer:
      a. Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer WE.
   6. Multipurpose Bond-Promoting Primer:
      a. Product: Subject to compliance with requirements, provide MAPEI Corporation: ECO Prim Grip.
   7. VOC Content: Provide primer with VOC content of 200 g/L.

2.4 ACCESSORIES

A. Sound Mat:
   1. Product: Subject to compliance with requirements, provide MAPEI Corporation: Mapesonic 2 Sound Control Membrane and Primer; MAPEI SM Primer
   2. Product: Subject to compliance with requirements, provide MAPEI Corporation: Mapeguard 2 Sound Control Membrane and Primer; MAPEI SM Primer

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of the Work.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: 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. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 5 lbs of water/1000 sq. ft. (2,27 kg of water/100 sq. m) in 24 hours.

C. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.
   1. Install underlayment reinforcement recommended in writing by manufacturer.

D. Metal Substrates: Mechanically remove, according to manufacturer's written instructions, rust, foreign matter, and other contaminants that might impair underlayment bond. Apply corrosion-resistant coating compatible with underlayment if recommended in writing by underlayment manufacturer.

E. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.

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

G. Sound Control Mat and Board: Install sound control materials according to manufacturer's written instructions.
   1. Do not install mechanical fasteners that penetrate through the sound control materials.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.
   1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
   2. Coordinate application 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. Apply underlayment to produce uniform, level surface.
   1. Apply a final layer without aggregate to product surface.
   2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination

during application 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.

G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

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

END OF SECTION