SECTION 03 54 16
ENGINEERED CEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

This Section includes a cement-based self-leveling underlayment formulated with a special blend of polymers used to level and smooth interior concrete substrates, and non-soluble adhesive residue on concrete prior to the installation of finished flooring on all grade levels.

1.2 RELATED WORK

A. SECTION 09 67 23.20 RESINOUS (EPOXY BASE) WITH VINYL CHIP BROADCAST (RES-2)

1.3 REFERENCES

A. ASTM C 109M, Compressive Strength Air-Cure Only

B. ASTM C348, Flexural Strength of Hydraulic-Cement Mortars

C. ASTM E84, Surface Burning Characteristics of Building Materials

D. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. ASTM F1869, Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

F. ASTM 710 -Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Material Safety Data Sheets.
C. Qualification Data: For Installer

1.5 QUALITY ASSURANCE

A. Installation of the specified product must be completed by a factory-trained applicator, using mixing equipment and tools approved by the manufacturer.
B. Product must have hydraulic cement-based inorganic binder content as the primary binder which includes Portland cement per ASTM C150: Standard Specification for Portland cement and other specialty hydraulic cements. Gypsum-based products are not acceptable.
C. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for not less than 10 years. Contact Manufacturer Representative prior to installation.

1.6 WARRANTY

The product shall provide a minimum 10-year comprehensive warranty.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
B. Store products in a dry area with temperature maintained between 50° and 85° F (10° and 29° C) and Protect from direct sunlight.
C. Handle products in accordance with manufacturer's printed recommendations.

1.8 PROJECT CONDITIONS

Do not install material below 50° F (10° C) surface and air temperatures. These temperatures must also be maintained during and for 48 hours after the installation of products included in this section. Install quickly if substrate is warm and follow warm weather instructions available from the ARDEX Technical Service Department.

PART 2 - PRODUCTS

2.1 ENGINEERED CEMENT

A. Provide specified product (basis of design) or approved equal:
   a. ARDEX K 15®; Manufactured by ARDEX Engineered Cements: 400 Ardex Park Drive, Aliquippa, Pa 15001 USA, (724) 203-5000, www.ardex.com
      i. Primer Standard Porous Concrete: ARDEX P 51™ Primer
      ii. Primer Non-porous substrates, ceramic & quarry tile, non-water soluble adhesive residue, concrete treated with silicate compounds, metal, and wooden subfloors: ARDEX P 82™ Ultra Prime
      iii. Additive: ARDEX E 25™ Resilient Emulsion
B. Performance and Physical Properties: Meet or exceed the following values for material cured at 73° F+/-3°F (23° C+/-3°C) and 50% +/-5% relative humidity:

   a. Application: Barrel Mix or Pump
   b. Flow Time: 10 minutes
   c. Initial Set: Approx. 30 minutes
   d. Final Set: Approx. 90 minutes
   e. Compressive Strength: 4100 psi at 28 days, ASTM C109M.
   f. Flexural Strength: 1000 psi at 28 days, ASTM C78.
   g. VOC: 0 g/l, calculated SCAQMD 1168

2.2 WATER

A. Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).

PART 3 - EXECUTION

3.1 PREPARATION

A. Concrete Subfloors: Prepare substrate in accordance with manufacturer’s instructions.
   1. Prior to proceeding please refer to ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring. All

concrete subfloors must be sound, solid, clean, and free of all oil, grease, dirt, curing compounds and any substance that might act as a bond breaker before priming. Mechanically clean if necessary using shot blasting or other. Acid etching and the use of sweeping compounds and solvents are not acceptable.

2. All cracks in the subfloor shall be repaired to minimize telegraphing through the underlayment.
3. Substrates shall be inspected in accordance with ASTM F1869 or ASTM F2170 and corrected for moisture or any other conditions that could affect the performance of the underlayment or the finished floor covering. For areas where moisture vapor emissions exceed the limits required by the floor covering manufacturer refer to Section 07 26 19, Topical Moisture Vapor Mitigation Systems and install the appropriate ARDEX Moisture Control System.

B. Joint Preparation:
1. Moving Joints – honor all expansion and isolation joints up through the underlayment. A flexible sealing compound such as ARDEX ARDISEAL™ Rapid Plus may be installed.
2. Saw Cuts and Control Joints – fill all non-moving joints with ARDEX ARDIFIX™ Joint Filler or ARDEX SD-F™ FEATHER FINISH® as recommended by the manufacturer.

C. Cutback and other non-water soluble adhesive residues must be wet scraped to a thin, well-bonded layer.

3.2 APPLICATION OF ARDEX K 15®:

A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.

C. Priming:
1. Primer for standard absorbent concrete subfloors: Mix ARDEX P-51 1:1 with water and apply evenly with a soft push broom. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry to a clear, thin film (min. 3 hours, max. 24 hours). Underlayment shall not be applied until the primer is dry. Primer coverage is approximately 400 to 600 sq. ft. per gallon.
2. Primer for extremely absorbent concrete subfloors: Make an initial application of ARDEX P-51mixed with 3 parts water using a soft push broom. Do not leave any bare spots. Remove all puddles and excess primer. Allow to dry thoroughly before proceeding with the standard application of primer as described above for standard absorbent concrete.
3. Minimum drying time for ARDEX P-82 Ultra-Prime over cutback adhesive is 18 hours.

D. Mixing: Comply with manufacturer's printed instructions and the following.
1. Add 7 quarts (6.5 L) of clean potable water per two 55-pound bag.
2. Mix using a ½″ (650 rpm) low speed heavy-duty mixing drill with an

ARDEX T-1 mixing paddle. Do not overwater.

3. Aggregate mix: For areas to be installed over 1 ½″ thick, aggregate may be added to reduce material costs. Mix ARDEX K 15® with water first, then add from 1/3 up to 1 part by volume of washed, well graded pea gravel aggregate (1/8" to 1/4" or larger). Do not use sand. Note: The addition of aggregate will diminish the workability of the make it necessary to install a finish coat to obtain a smooth surface. Ardex recommends a ¼″ application of ARDEX K 15® neat to be installed as the finish coat.
4. For pump installations, ARDEX K 15® shall be mixed using the ARDEX Levelcraft Automatic Mixing Pump. Start the pump at 210 gallons of water per hour, and then adjust to the minimum water reading that still allows self-leveling properties. Do not overwater. Check the consistency of the product on the floor to ensure a uniform distribution of the sand aggregate at both the top surface and bottom of the pour.

E. Application: Comply with manufacturer's printed instructions and the following.

1. ARDEX K 15® must be installed at a minimum thickness of 1/8″ over the highest point in the floor, which typically results in an average thickness of ¼″ over the entire floor. ARDEX K 15® can be installed up to 1 ½″ over large areas neat, and up to 5″ with the addition of proper aggregate. ARDEX K 15® can also be featheredged to match existing elevations.
2. Pour or pump the liquid ARDEX K 15® and spread in place with the ARDEX T-4 Spreader. Use the ARDEX T-5 Smoother and featheredge and touch-up. Wear nonmetallic cleats to avoid leaving marks in the liquid ARDEX K 15®.

F. Curing

1. ARDEX K15® can be walked on in 2-3 hours. Moisture-insensitive tiles such as ceramic quarry and porcelain can be installed after 6 hours. Underlayment can accept all other finish floor covering materials after 16 hours at 70°F and 50% relative humidity. For resinous systems such as epoxy and polyurethane floors please contact the ARDEX Technical Services Department.

3.4 FIELD QUALITY CONTROL

Where specified, field sampling of the Ardex underlayment is to be done by taking an entire unopened bag of the product being installed to an independent testing facility to perform compressive strength testing in accordance with ASTM C 109/modified: air-cure only. There are no in situ test procedures for the evaluation of compressive strength.

3.5 PROTECTION

Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.

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