

## **ARDEX GUIDE SPECIFICATION**

### **MC™ Rapid Concrete Moisture control & K 520™ Self-Leveling Concrete Topping**

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#### **SECTION 03 01 30 Concrete Moisture Control & Polished Concrete Topping**

##### **PART 1 - GENERAL**

###### **1.1 RELATED DOCUMENTS**

- A. Drawings, general provisions of the Contract, and other related construction documents such as Division 01 specifications apply to this Section

###### **1.2 SUMMARY**

- A. This Section includes a single-coat, fast-curing, 100% solids epoxy moisture management system formulated to suppress excessive moisture vapor emissions in new or existing concrete prior to the installation of an ARDEX polished concrete topping finished to a specified finish using traditional dry concrete polishing techniques. Application of joint filler for both moving and non-moving cracks and joints. Application of a densifier and stain protector/guard to inhibit absorption of liquid into the surface, thereby minimizing the potential for discoloration due to staining. Application of topical and/or integral color. Furnish all labor, materials, equipment, and services necessary for the dry diamond grinding and polishing of the self-leveling floor in accordance with industry standards.

1. ARDEX ARDIFIX™ Two-Part, Low Viscosity Rigid Polyurethane Crack & Joint Repair
2. ARDEX ARDISEAL™ RAPID PLUS Semi-Rigid Joint Sealant
3. ARDEX MC™ Rapid One-Coat Moisture Control System for Concrete to Receive ARDEX Products - For Use as a Fast-Track Primer
4. ARDEX K 520™ Polished Concrete Topping
5. ARDEX E 25™ Resilient Emulsion
6. Mechanical Diamond Grinding and Polishing Equipment
7. ARDEX PC 10™ Lithium Hardener
8. Integral and Topical color
9. Stain and Wear Protection

- B. Related Sections include the following:

1. Section 03 30 00, Cast-In-Place Concrete

2. Section 09 05 61.13, Moisture Vapor Emission Control

1.3 REFERENCES

- A. ASTM C109M, Compressive Strength Air-Cure Only
- B. ASTM C348, Flexural Strength of Hydraulic-Cement Mortar
- C. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes
- D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- E. ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Safety Data Sheets.
- B. Qualification Data: Provide written documentation from the manufacturer confirming that installer meets the qualifications as specified and is eligible for manufacturer's warranty. Provide project names, address, contact names, phone numbers of at least three projects of similar scope completed by the installer
- C. Maintenance Data: Provide instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under intended use. These instructions should contain precautions against cleaning products and methods that may be detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer should be experienced in performing specified work similar in design, products, and scope of this project, with a documented track record of successful, in-service performance and with sufficient production capabilities, facilities, and personnel to produce specified work.
- B. Mock-Up: Before performing the work in this section, an on-site mock-up of the representative product and specified process, surface, finish, color, and joint design/treatments must be installed for review and approval. These mock-ups should be installed using the same Installer personnel who will perform work. Approved mock-ups may become part of completed work, if undisturbed at time of substantial completion. Mock-up must also include specified edge finish and approved by the Architect/owner's representative.

- C. Pre-Installation Conference:
  - 1. Prior to the installation of the ARDEX MC™ RAPID & ARDEX K 520™ an on-site conference shall be conducted to review specification requirements.
  - 2. The minimum agenda shall include a review of the site conditions, construction documents, schedule, installation procedures, protection procedures and submittals.
- D. Warranty:
  - 1. ARDEX MC™ RAPID: Certified applicator must file a pre-installation checklist with the manufacturer and receive written confirmation of the approval to proceed to obtain the extended ARDEX MC™ RAPID Warranty. Upon receipt and approval of the pre-installation checklist, a 25-year ARDEX MC™ RAPID Warranty is available for ARDEX LevelMaster Elite® Installers and a 20-year ARDEX MC™ RAPID Warranty is available for factory-trained installers.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original containers, bearing manufacturer's labels indicating brand name and directions for storage, factory numbered and sealed until ready for installation.
- B. Store all materials in a dry, climate-controlled environment at a minimum of 50°F (10°C) and maximum of 85°F (29°C).
- C. Handle products in accordance with manufacturer's printed recommendations.

#### 1.7 SITE CONDITIONS

- A. Observe the basic rules of concrete work. Do not install below 50°F (10°C) or above 85°F (29°C) surface temperature. Install quickly if floor is warm (above 70°F/21°C and up to 85°F/29°C) and follow warm weather precautions available from the ARDEX Technical Service Department (724) 203-5000. Never mix with cement or additives other than ARDEX approved products.
- B. Inspect the existing substrate and document unsatisfactory conditions in writing. Verify that surfaces and site conditions are ready to receive work. Correct unacceptable conditions prior to installation of System. Commencement of work constitutes acceptance of substrate conditions.
- C. Close areas to traffic during and after the ARDEX MC™ RAPID & ARDEX K 520™ installation.

### **PART 2 – PRODUCTS**

#### 2.1 MOISTURE VAPOR EMISSION CONTROL

- A. One-Coat Moisture Control System for Concrete to Receive ARDEX Underlayment's and Toppings

1. Acceptable Products:

ARDEX MC™ RAPID; Manufactured by ARDEX Americas: USA, (724) 203-5000, [www.ardexamericas.com](http://www.ardexamericas.com)

2. Performance and Physical Properties: Meet or exceed the following values for material cured at 70° F +/-3°F (21° C +/-3°C) and 50% +/-5% relative humidity:

- a. Application: Manual
- b. Material Requirements on CSP 3 Prepared Concrete: Approx. 250 - 270 sq. ft. (25 m<sup>2</sup>) per mixed unit for 10 mils, and approx. 170 – 190 sq. ft. (16 – 18 m<sup>2</sup>) per unit for 14 mils
- c. Permeability (ASTM E96): ≤ 0.06 perms
- d. 14 pH solution (ASTM D1308): No effect
- e. Working Time: 20 minutes
- f. Pot Life: 20 minutes
- g. VOC: 19.9 g/L, A+B, ASTM D2369 Walkable: Minimum of 4 hours
- h. Prime and Install Underlayment: Minimum 4 hours, maximum 24 hours

2.2 POLISHED CONCRETE TOPPING

A. Portland Cement-based Self-Leveling Topping are suitable to receive a mechanical polish concrete process. Acceptable products include:

1. ARDEX K 520™ Polished Concrete Topping; ARDEX Americas; USA; (724) 203-5000 [www.ardexamericas.com](http://www.ardexamericas.com)

- a. Water: Shall be clean, potable and sufficiently cool (not warmer than 70°F/21°C)

2. Performance and Physical Properties: Meet or exceed the following values for material cured at 70°F (20°C) and 50% relative humidity:

- a. Flow Time: 10 minutes
- b. Compressive Strength: 6,000 psi (420 kg/cm<sup>2</sup>) at 28 days, ASTM C109M
- c. Flexural Strength: 1,200 psi (84 kg/cm<sup>2</sup>) at 28 days, ASTM C348
- d. VOC: 0
- e. Color: Gray

B. Low Viscosity Rigid Polyurethane Crack and Joint Repair; ARDEX ARDIFIX™; Manufactured by ARDEX Americas; USA; 724-203-5000, [www.ardexamericas.com](http://www.ardexamericas.com)

C. Semi-Rigid Joint Sealant; ARDEX ARDISEAL™ Rapid Plus Semi-Rigid Joint Sealant; Manufactured by ARDEX Americas; USA; 724-203-5000, [www.ardexamericas.com](http://www.ardexamericas.com)

D. Topical Color: As selected by Architect

E. Resilient Emulsion: ARDFEX E 25™ Resilient Emulsion; Manufactured by ARDEX Americas; USA; (724) 203-5000, [www.ardexamericas.com](http://www.ardexamericas.com)

F. Integral color

1. As selected by Architect. Powder or liquid pigments can be utilized for integral pigmentation. The pigments must be suitable for use with a cementitious product.

## 2.3 CONCRETE POLISH EQUIPMENT & TOOLING

- A. Equipment and Tooling for use as part of the multi-step dry mechanical process and accessories. Acceptable products include:

1. Planetary Grinder and Polisher

- a. Features: Large Platform: planetary floor polisher. Head pressure of 600 lbs.
- b. Tooling
  - i. Metal Bonded Diamonds 100/150 Grit bonded metal
  - ii. Transitional Diamonds Ceramic / Flat block resin Bonded
  - iii. Resin Bonded Diamonds - 200, 400, 800, 1500 Grit, as needed

2. Micro Polisher – Burnisher

- a. Specific weight and RPM are required to reach temperature of 100°F for application of floor finish/guard
- b. Required Tooling: Diamond Impregnated Pads – 400, 800, 1500, 3000 Grit

3. Other equipment and tooling as necessary for small areas and edge work.

4. Power generator – as needed

5. All grinding and polishing completed with grinder/polisher equipment should be connected to a dust collector.

## 2.4 STAIN & WEAR PROTECTION

- A. Concrete stain and wear protection designed for used in conjunction with the installation of ARDEX K 520™ and suitable for the type/location of the installation.

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Verify that existing concrete has cured a minimum of 28 days before installing ARDEX Concrete Toppings and meets the strength requirement of a minimum compressive strength of 3000 psi, a minimum density of 100 pcf and a minimum tensile strength of 200 psi.
- C. Conduct pre-installation conference, per Section 1.5 C.

### 3.2 PREPARATION

- A. 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. Acid etching and the use of sweeping compounds and solvents are not acceptable.
- B. Concrete shall be mechanically prepared to achieve a concrete surface profile (CSP) 3 in accordance with ICRI standards
- C. Prior to beginning the installation, the relative humidity within the concrete can be measured (ASTM F2170). No standing water shall be present.

### 3.3 CRACK & JOINT TREATMENT

- A. Joint Preparation: Honor all moving cracks and all joints, including expansion joints, isolation joints and control joints (saw cuts), up through the ARDEX Toppings.
  - 1. All dormant cracks must be pre-filled with ARDEX ARDIFIX™ in strict accordance with the installation instructions provided by the ARDEX Technical Department. Once the dormant cracks have been properly filled, broadcast sand to refusal, and allow these areas to cure thoroughly. Remove all excess sand prior to proceeding with the ARDEX MC™ RAPID installation.
  - 2. All joints, including control joints, expansion joints and isolation joints, and moving cracks must be honored up through the ARDEX MC RAPID, the ARDEX Topping and the sealer by installing a fully flexible sealing compound designed specifically for this use, such as ARDEX ARDISEAL RAPID PLUS.

### 3.4 APPLICATION OF ARDEX MC™ RAPID:

- A. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- B. Mixing: Comply with manufacturer's printed instructions and the following.
  - 1. Each individual 22 lb. (10 kg) unit contains separate, pre-measured quantities of hardener (Part B) and the resin (Part A). After opening each container, stir the individual components thoroughly before blending. The hardening agent (Part B) is added to the resin (Part A).
  - 2. Pour all the hardener into the resin portion and stir thoroughly for a minimum of 3 minutes using a low-speed drill and an epoxy mixing paddle. Once mixed, pour some of the epoxy back into the hardener container, stir for 10 seconds, and then pour all the contents back into the resin container. Mix for an additional 30 seconds before applying.
- C. Application: Comply with manufacturer's printed instructions and the following.
  - 1. Apply the freshly mixed ARDEX MC™ RAPID at a minimum thickness of 14 mils as specified in the technical data sheet to the prepared concrete surface in a uniform direction with a short-nap paint roller or notched squeegee with back-rolling for smoother surfaces,

and a longer nap roller for more uneven substrates. Sand broadcast to refusal while the ARDEX MC RAPID is still in a fresh state.

2. When broadcasting the sand, use a NIOSH-approved dust mask in conformance with OSHA requirements regarding the handling of sand (crystalline silica).
3. Following the application of MC RAPID and sand broadcast, install the selected ARDEX Topping as outlined in the technical data sheet.
4. It is not necessary to re-test the substrate for moisture emissions prior to installing the coating or floor covering.

### 3.5 APPLICATION OF ARDEX K 520™

#### A. PRIMING

1. No additional priming is needed. The sand-broadcast surface of the ARDEX MC™ RAPID serves as the primer prior to the ARDEX Topping application.

#### B. MIX DESIGNS

1. **Mixing Ratio:** The ARDEX Topping shall be mixed in 2-bag batches. Mix each bag of the powder with the specified amount of water in an ARDEX T-10 Mixing Drum using an ARDEX T-1 Mixing Paddle and a 1/2" heavy-duty drill (12 mm, min. 650 rpm). Mix thoroughly for 2-3 minutes to obtain a lump-free mixture. Follow written instructions on the ARDEX product bag label.
2. When installing ARDEX K 520™ in high-stress areas subject to rolling loads such as rubber-wheeled forklift traffic or similar use, the addition of ARDEX E 25™ is required to increase the resilience of the ARDEX K 520™. Mix 2 quarts (1.9 L) of ARDEX E 25™ with 4.5 quarts (4.25 L) of water for each bag of ARDEX K 520 following the mixing instructions in the technical data sheet. Please note that, if ARDEX E 25™ is used, the ARDEX K 520™ must first cure for 24 hours prior to receiving foot traffic and 48 hours prior to being polished.
3. **Aggregate mix:** For pre-leveling and areas, well graded, washed pea gravel may be added to reduce material costs. Mix the powder with water first, and then add from 1 part by volume of aggregate (1/8" to 3/8" [3 to 9.5 mm]). Do not use sand. The addition of aggregate will diminish the workability of the product and may make it necessary to install a finish layer. Allow the first layer to dry completely.
4. For pump installations contact ARDEX technical department ARDEX Americas, USA, (724) 203-5000, [www.ardexamericas.com](http://www.ardexamericas.com).

#### C. ARDEX K 520™ INSTALLATION

1. The minimum installation thickness for ARDEX Topping shall be 3/8" (9 mm). The necessary thickness will vary with jobsite conditions and must be adequate to achieve the desired finish.

2. Pour or pump the liquid topping and spread in place with the ARDEX T-4 Spreader. Use the ARDEX T-5 Smoother for installation. Contact ARDEX Technical Services if a spike roller is to be used. Wear baseball shoes with non-metallic cleats to avoid leaving marks in the liquid topping. The topping can be walked on in 2-3 hours at 70°F (21°C).
3. Allow the ARDEX Topping to cure a minimum of 24 hours before proceeding with the polishing process. Drying time is a function of jobsite temperature and humidity conditions, as well as the installation thickness.

### 3.6 POLISHING PROCESS FOR ARDEX TOPPING

- A. Processing of the ARDEX Polished Concrete Topping includes concrete preparation, joint treatment, and chemicals to achieve the intended result.

#### 1. PROCESSING

- a. GRIND/POLISH #1: 40 - 150 Grit Soft-Medium Metal Bonded Diamonds. Vacuum floor after each grinding/polishing step to remove dust.
- b. GRIND/POLISH #2: #50 - 200 Grit Transitional, Ceramic / Flat block resin bonded diamonds. Vacuum floor after each grinding/polishing step to remove dust.
- c. GRIND/HONING #3: 100 - 200 grit Resin Bonded Diamond. Vacuum floor after each grinding/polishing step to remove dust.
- d. GRIND/POLISHING #4: 400 grit Resin Bonded Diamond. Vacuum floor after each grinding/polishing step to remove dust.
- e. GRIND/POLISHING #4: 400 or 800 grit Resin Bonded Diamond. Vacuum floor after each grinding/polishing step to remove dust. Use 800 grit when higher gloss level is desired. Proceed with successively higher grits until gloss level desired.
- f. Apply a protective sealer that is appropriate for the intended use and wear of the surface. Allow the sealer to cure per the manufactures recommendation before opening it up to traffic.

2. NOTE: The above steps are typical for the processing and installation of ARDEX K 520™. However, additional steps may be required based on site conditions, age of installation and desired finish.
3. As is the case with all concrete surfaces in general, ARDEX K 520™ should be sealed with an appropriate concrete sealer such as ARDEX CG Concrete Guard 2.0 to resist damage from standing water, salt, oil as well as staining and marking.
4. EDGEWORK - Polished edge work of ARDEX Topping shall be done with a handheld or walk behind polishing tool. The edge polishing process will match the corresponding steps outlined above for the desired gloss level.

#### B. POST INSTALLATION

1. All moving cracks and all joints and saw cuts shall be filled with a flexible sealing compound specifically designed for use in moving joints, such as ARDEX ARDISEAL RAPID PLUS.



### 3.7 PROTECTION

- A. Protect the new ARDEX Topping from spills and contamination by petroleum, oil, hydraulic fluid, acid and acidic detergents, paint and other liquid dripping from trades and equipment working over these substrates. If construction equipment must be used on these substrates, diaper all components that may drip fluids. Protect surface by installing a Protective Floor Covering.
- B. Avoid moisture for 72 hours after installation.** Don't permit standing water for this period or place any protective plastic sheeting, rubber matting, rugs or furniture that can prevent proper drying, thereby trapping moisture, which can result in a cloudy effect on the floor.
- C. For 48 hours after application: Avoid moisture, standing water, deep cleaning and covering with protective plastic sheeting, mats, rugs, or furniture, which may inhibit proper curing. Light pedestrian use may occur after 3 hours. Maximum performance develops in about 72 hours.

### 3.8 MAINTENANCE

- A. **IMPORTANT NOTICE:** Maintaining the ARDEX Polished Concrete Topping and adherence to a recommended cleaning schedule will help the floor hold its mechanically polished gloss longer and greatly reduce the absorption of spilled liquids. The treated concrete floor is easily maintained by regular cleaning with the Maintenance/Post Cleaning procedure, accompanied by Micro Polishing. Specific maintenance recommendations shall be provided by the installer performing the work of this section. Contact the Manufacturer of selected chemicals or ARDEX Technical Services Department for recommendations.

**END OF SECTION**