

## **ARDEX GUIDE SPECIFICATION**

### **ARDEX K 521™ Self-Leveling Concrete Topping with Aggregate Surface**

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#### **SECTION 03 54 00 DECORATIVE 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 products and procedures for the installation of an ARDEX polished concrete topping finished to a specified finish using traditional dry concrete polishing techniques. Application of an ARDEX primer coat to prepared concrete substrate. 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 K 521™ Self-Leveling Concrete Topping with Aggregate Surface
- 2. ARDEX EP 2000™ Substrate Preparation Epoxy Primer
- 3. ARDEX ARDISEAL™ RAPID PLUS Semi-rigid joint sealer
- 4. ARDEX ARDIFIX™ Low Viscosity Polyurethane Crack Repair
- 5. ARDEX E 25™ Resilient Emulsion
- 6. Mechanical Diamond Grinding and Polishing Equipment
- 7. ARDEX PC 10™ Lithium Hardener
- 8. Stain and Wear Protection
- 9. Integral and Topical color

- 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, 6,800 psi Compressive Strength Air-Cure Only
- B. ASTM C348, 1,300 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, a Revit file with applicable materials meeting the Revit Content Style Guide, 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. Manufacturer Qualifications:
  - 1. The ARDEX Polished Concrete System (APCS) consists of a process and products engineered and manufactured by ARDEX Engineered Cements. Any substitutions are not permitted and void warranty.
- B. Installer qualifications:
  - 1. Product(s) for the ARDEX Polished Concrete System must be installed by an approved installer such as an ARDEX Choice Contractor or ARDEX LevelMaster Elite Installer™, qualified to provide the warranty as specified.
  - 2. 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.

- C. 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.
- D. Pre-Installation Conference: Prior to the installation of the ARDEX Polished Concrete System, an on-site conference shall be conducted to review specification requirements.
  - 1. Required attendees include the Owner, Architect, General Contractor, Subcontractor and Ardex representative.
  - 2. The minimum agenda shall include a review of the site conditions, construction documents, schedule, installation procedures, protection procedures and submittals.

## 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. ARDEX K 521™ is a cementitious material. 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 K 521™ application for a period recommended by the manufacturer.

## PART 2 – PRODUCTS

### 2.1 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 521™ Polished Concrete Topping; ARDEX Americas, USA, (724) 203-5000, [www.ardexamericas.com](http://www.ardexamericas.com)

- a. Primer: ARDEX EP 2000™ Substrate Preparation Epoxy Primer
- b. Resilient emulsion: ARDFEX E 25™ Resilient Emulsion
- c. Crack repair & joint sealer: ARDEX ARDIFIX™ & ARDISEAL™
- d. Moisture control when required: ARDEX MC™ RAPID
- e. 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% +/- 5% relative humidity:

- a. Flow Time: 10 minutes
- b. Compressive Strength: 6,800 psi (476 kg/cm<sup>2</sup>) at 28 days, ASTM C109M
- c. Flexural Strength: 1,300 psi (91 kg/cm<sup>2</sup>) at 28 days, ASTM C348
- d. VOC: 0

### 3. Topical Color

- a. Dyes and stains designed for use with cementitious toppings as selected by Architect.

### 4. Integral color

- a. 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.

## 2.2 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. 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.

## 2.3 CONCRETE TREATMENT CHEMICALS

- A. Concrete treatments designed for use in conjunction with the installation of the ARDEX Polished Concrete Topping.

## 2.4 STAIN AND WEAR PROTECTION

- A. Concrete stain and wear protection designed for used in conjunction with the installation of ARDEX K 521 and the ARDEX Polished Concrete System. Products should be selected to protect the surface based on the long-term use and wear of the surface.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Inspect all concrete substrates and conditions under which the ARDEX Polished Concrete Topping is to be installed.
- 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. Substrates shall be inspected for moisture or any other conditions that could affect the performance of the ARDEX system. Moisture vapor emissions shall not exceed 85% RH, ASTM F 2170. For areas where moisture vapor emissions exceed the specified limits refer to Section 09 05 61.12, Topical Moisture Vapor Emission Control, and install the appropriate ARDEX Moisture Control System.

- D. Joint Preparation: Honor all moving cracks and all joints, including expansion joints, isolation joints and control joints (saw cuts), up through the ARDEX Topping.

1. All non-moving cracks shall be filled, such as ARDEX ARDIFIX Low Viscosity Rigid Polyurethane Crack & Joint Repair.

### 3.3 APPLICATION OF ARDEX K 521™

#### A. PRIMING

1. Prime the prepared concrete with ARDEX EP 2000™. Follow manufacturers installation instructions, for complete instructions please refer to the ARDEX EP 2000™ Technical Brochure.
2. If the ARDEX MC™ RAPID Moisture Control System is used, the sand-broadcast surface of the ARDEX MC™ RAPID serves as the primer prior to the ARDEX Topping application. use a NIOSH-approved dust mask in conformance with OSHA requirements regarding the handling of sand (crystalline silica).

#### 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 data sheet.
2. When mixing sanded materials, ARDEX recommends using the ARDEX DUSTFREE™ or a standard "gutter hook" vacuum attachment in combination with a wet/dry (Shop-Vac® style) vacuum and HEPA dust extraction vacuum system. Additionally, each bag should be handled with care and emptied slowly to avoid creating a plume of dust. Contact the ARDEX Technical Service Department for more details on ARDEX products and air quality management. use a NIOSH-approved dust mask in conformance with OSHA requirements regarding the handling of sand (crystalline silica).
3. As this product uses several naturally occurring and mined raw materials, shade and/or color variations are to be expected. For this reason, it is strongly recommended to use product from the same batch or, when this is not possible, mix bags from different batches in a ratio determined by the amounts of each batch available
4. For pump installations contact ARDEX technical department ARDEX Americas, USA, (724) 203-5000 [www.ardexamericas.com](http://www.ardexamericas.com).

#### C. ARDEX K 521™ 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.

### 3.3 POLISHING PROCESS FOR ARDEX TOPPING

A. Processing of the ARDEX Polished Concrete System is an engineered and integrated complete installation system requiring adherence to all written recommendations. Dry processing is required, no wet grinding is permitted. Any substitutions from the specified products without manufacturer approval will void the system warranty. Please note the following:

1. Use a dust separator and collection system with HEPA filters connected to the planetary grinder, following the recommendations of the planetary grinder manufacturer.
2. Remove concrete dust using a portable vacuum with HEPA filters 1) between passes with the floor polisher and 2) when polishing disks are changed.

#### B. 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.

C. 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. Edge work steps should always precede the corresponding steps

D. POST INSTALLATION: All moving cracks and all joints and saw cuts shall be filled with ARDEX ARDISEAL™ RAPID PLUS Semi-Rigid Joint Sealant.

### 3.4 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. Light pedestrian use only in the 24 hours after installation. Normal traffic recommended 7 days after completion of the ARDEX Polished Concrete System.

### 3.5 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.
- B. Newly Installed ARDEX Polished Concrete System
  - 1. **Restrict water cleaning for 72 hours after installation of ARDEX K 521™.** Use only a dry mop to clean. Avoid putting mats or covering treated surface to allow coating to fully cure out.
  - 2. **DO NOT USE** cleaners that are acidic or that have citrus (de-limonene) or Butyl compounds. Do not permit standing liquids at any time.

**END OF SECTION**