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 520™ Self-Leveling Concrete Topping with Aggregate Surface
2. ARDEX EP 2000™ Substrate Preparation Epoxy Primer
3. ARDEX MC™ Rapid Moisture Control System – Alternate Primer
4. Mechanical Diamond Grinding and Polishing Equipment
5. Pigments / Colorants
6. Chemicals, Protective sealers, guard

B. Related Sections include the following:

C. 1. Section 030100 Maintenance of Concrete

D. 2. Section 030140 Maintenance of Precast Concrete

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

4. Section 034000 Precast Concrete

5. Section 079129 Joint Fillers

6. Section 09 05 61.13, Moisture Vapor Emission Control

7. Section 096100 Flooring Treatments

1.3 REFERENCES

A. ASTM C109M, Compressive Strength Air-Cure Only

B. ASTMC309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

C ASTM C348, Flexural Strength of Hydraulic-Cement Mortar

C ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces

D ASTM C1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer PullMeter Method

E ASTM C1315 Liquid Membrane-Forming Compounds Having Special Properties of Curing and Sealing Concrete

F ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

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

H ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

I ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry

J ACI 3021R-04 Guide for Concrete Floor and Slab Construction

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.

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 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. Coefficient of Friction:

1. Achieve following coefficient of friction by field quality control testing in accordance to the following standards:

a) ANSI B101.1 Static Coefficient of Friction - Achieve a minimum of [.5] for level floor surfaces.

b) ANSI B101.3 Dynamic Coefficient of Friction - Achieve a minimum of [.35] for level floor surfaces.

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 520™ 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. 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 Topping installation.

PART 2 – PRODUCTS

2.1 HYDRAULIC CEMENT SURFACE 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: 400 ARDEX Park Drive Aliquippa, PA 15001, 1-888-512-7339, www.ardexamericas.com

    a. Primer: ARDEX EP 2000™ Substrate Preparation Epoxy Primer
    b. Water: Shall be clean, potable and sufficiently cool (not warmer than 70°F/21°C)

2. Performance and Physical Properties:

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

        i. Flow Time: 10 minutes
        ii. Compressive Strength: 6,000 psi (476 kg/cm^2) at 28 days, ASTM C109/mod -air cure only
        iii. Flexural Strength: 1,200 psi (91 kg/cm^2) at 28 days, ASTM C348
        iv. VOC: 0

B. Topical Color

1. As selected by Architect
2. A . Dye: Non-film forming soluble colorant dissolved in a carrier designed to penetrate and alter coloration and appearance of a concrete floor surface without a chemical reaction. Color:_____

C. 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 ARDEX cementitious products.

2.2 RELATED MATERIAL

A. Underlayment and Concrete Repair

1. ARDEX V1200™ SELF LEVELING UNDERLAYMENT
2. ARDEX CP™ CONCRETE PATCH
3. ARDEX B24™ CONCRETE RAMPING MORTAR
4. ARDEX B40™ TRENCH REPAIR MORTAR
5. ARDEX ARDIFIX™ LOW VISCOSITY RIGID POLYURETHANE CRACK AND JOINT REPAIR
6. ARDEX ARDISEAL™ RAPID PLUS SEMI RIDGED JOINT SEALANT

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 must be sufficient for the tooling selected .
b. Tooling
   i. Metal Bonded Diamonds 30 - 150 Grit bonded metals as needed
   ii. Transitional Diamonds Ceramic / Flat block resin Bonded as needed
   iii. Resin Bonded Diamonds - 200, 400, 800, 1500 Grit, as needed

2. Micro Polisher / Burnisher

a. High speed walk-behind capable of generating high speed revolutions per minute and with sufficient head pressure suitable to prepare for final finishes.
b. Required Tooling: Diamond Impregnated Pads – 400, 800, 1500, 3000 Grit as required

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

4. Power generator – as needed

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

2.4 CONCRETE TREATMENT CHEMICALS

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

Topical Grouting a 100% solids, two-component, low viscosity structural polyurea/polyurethane hybrid intended for use in repairing cracks and small surface defects in industrial, retail or commercial concrete floors.

Liquid Densifier: A liquid product that penetrates into the toppings surface to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the topping. A mockup should be completed with the selected densifier to confirm compatibility and desired color enhancement effects.

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 the maximum allowed by the protectant being used and in accordance to 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 Toppings.

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 520™

A. PRIMING

1. Prime the prepared concrete with ARDEX EP 2000™. Follow manufacturers installation instructions.

2. If alternate primer 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.

B. MIX DESIGNS

1. Mixing Mix thoroughly with specified amount of water for 2-4 minutes to obtain a lump-free mixture. Follow manufacturers instructions

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. 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.

3.4 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 Consult Diamond Tooling manufacture for recommendations on best solutions for the below steps.

   a. GRIND/POLISH #1: 30 - 150 Grit Metal Bonded Diamonds as needed. Vacuum floor after each grinding/polishing step to remove dust.
   b. GRIND/POLISH #2: #100 - 200 Grit Transitional, Ceramic / Flat block resin bonded diamonds as needed. Vacuum floor after each grinding/polishing step to remove dust.
   c. GROUT COAT #3 A grout coat may be applied and allowed to dry per the manufactures specifications. Then removal of excess material and film should be performed using #100 - 200 Grit Transitional tooling as required. Vacuum floor after each grinding/polishing step to remove dust.
   d. HONING/POLISHING #4: 200 grit Resin Bonded Diamond. Vacuum floor after each grinding/polishing step to remove dust.
   e. Apply densifier, allow to dry per Manufacturer's Instructions before beginning the next step.
   f. HONING/POLISHING #5: 400 grit Resin Bonded Diamond. Vacuum floor after each grinding/polishing step to remove dust.
   g. HONING/POLISHING #6: 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.
   h. Apply finish/guard per manufacturer's instructions

i. OPTIONAL STEPS:
    a. MICROPOLISH/BURNISH Use 800 – 1500 grit pad. Dry, micro fiber mop the floor clean to remove all debris. Floor should be allowed to cool to room temperature prior to second application.
    a. Apply finish/guard per application instructions.
    b. MICROPOLISH/BURNISH Use 1500-3000 grit pad. Dry mop the floor clean to remove all debris.

2. EDGEWORK - Polished edge work of ARDEX Topping shall be done with a hand held or walk behind polishing tool. The edge polishing process will match the corresponding steps outlined above for the desired gloss level.

3. Use overlay manufacturer's approved polishing system from one of the following manufacturers: 1. HTC 2. SASE 3. Husqvarna 4. Lavina 5. STI

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.

3.5 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.

3.6 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.

END OF SECTION