

SECTION 03350 - SPECIAL CONCRETE SLAB FINISH**PART 1 - GENERAL****1.1 SUMMARY**

- A. Description of Work: Work of this Section includes, but is not limited to, the following:
1. Multi-pass polished interior concrete slabs.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. See Division 03 CAST-IN-PLACE CONCRETE.

1.3 SUBMITTALS

- A. Product Data:
1. Submit manufacturer's specifications and installation instructions for each product.
 2. Include manufacturer's printed installation instructions for each sealer, and hardener/ densifier, proposed including requirements for moisture content of concrete substrate.
- B. Qualification Data: Submit applicator qualifications for polished concrete, verifying ACI certification and years of experience; include list of completed projects having similar scope of work identified by name, location, date, reference names and phone numbers.
- C. Certificates:
1. If sequentially applied curing compounds and harder/densifier are products of different manufacturers, submit joint certification signed by respective manufacturers confirming compatibility.
 2. Submit harder/densifier manufacturer's certification that applicator for polished concrete is currently approved by manufacturer.
- D. Warranty: Submit signed and dated warranty.
- E. Maintenance Data: For polished concrete slabs.

1.4 SYSTEM REQUIREMENTS

- A. Static Coefficient of Friction: Provide polished concrete slab finishes with a static coefficient of friction of not less than 0.6, as determined by testing identical products in accordance with ASTM C1028.
- B. Visual Requirements:
1. Polished concrete: Architect may reject concrete slabs that measured below specified minimum local F-number tolerances. If Work is rejected, remove and replace concrete as required by Architect.

1.5 QUALITY CONTROL

- A. Installer Qualifications - Polished Concrete:
 - 1. Certified under the Concrete Flatwork Finisher Training and Certification Program as granted by the American Concrete Institute.
 - 2. Not less than 5 years documented, successful experience in polishing and finishing interior concrete floor slabs, with work comparable to Work of this Project.
 - 3. Certified in writing by manufacturer of hardener/densifier as qualified to provide polished concrete floor slab finishing indicated.

1.6 MOCK-UPS

- A. Polished Concrete Slabs:
 - 1. Prior to commencing Work and preceding pre-installation conference, provide mock-up of polished concrete slab.
 - 2. Size and location: Not less than 6 feet x 6 feet x full thickness of slab, in location acceptable to Architect.
 - 3. Materials and extent:
 - a. Use approved concrete mix design, and accepted hardener/densifier.
 - b. Demonstrate ability to achieve specified F-number tolerances.
 - c. Show full range of color, texture and finish, surface defects and repair, and workmanship expected in final Work.
 - 4. Simulate finished lighting conditions for Architect's review of mockups
- B. Architect's Review: Architect will review mock-ups for visual acceptance of color, texture and finish, and workmanship.
- C. Maintain approved mock-ups during construction as standard for subsequent Work.
- D. Remove mock-ups at completion of Project.

1.7 PRE-INSTALLATION CONFERENCE

- A. Prior to commencing Work, meet at site and review installation procedures and coordination with other Work, for polished concrete and abrasive blasted concrete.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.9 PROJECT CONDITIONS

A. Polished Concrete:

1. Environmental limitations:
 - a. Comply with hardener/densifier manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting polished concrete floor slab finishing operations.
 - b. Maintain ambient temperature of between 50 and 90 degrees F during application and for at least 48 hours after application.
2. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during polished concrete floor slab finishing operations.
3. Close spaces to traffic during polished concrete floor slab finishing operations and for not less than 24 hours after application, unless manufacturer recommends a longer period.

1.10 WARRANTY

- A. Special Warranty: Provide manufacturer's written material warranty, warranting that polished surface will remain water repellent, dustproof, hardened, abrasion- and food stain-resistant for 20 years from date of Substantial Completion.
- B. Project Warranty: Provide warranty in which installer/manufacturer agrees to repair, restore, or replace defective work within specified warranty period.
 1. Warranty period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Densifier/Hardener for Polished Concrete:

1. Clear, penetrating liquid hardener-densifier:
 - a. Chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless liquid that hardens and densifies concrete surfaces to protect against abrasion, dusting, and absorption of liquids.
 - b. VOC content: Not more than 300 gm/L.
2. Provide densifier/hardener manufacturer's etch and efflorescence remover, joint primer, and flexible epoxy primer, as recommended by manufacturer for conditions of installation.
3. Design Standard: Design is based on Certi-Shine Clear FSR by Vexcon Chemicals, Inc. to establish standard of quality. Equivalent products by the following manufacturers are acceptable:
 - a. Advanced Floor Products.
 - b. Curecrete Chemical Company.
 - c. L.M. Scofield Company.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine concrete Work and do not proceed with finishing operations until unsatisfactory conditions are corrected.

3.2 SLAB FINISHES

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces.
- B. Do not commence slab finishing operations if bleed water appears on surface of slab. Do not wet concrete surfaces.
- C. Finishing Tolerances for Polished Finish Slabs:
 - 1. Finish surfaces to tolerances specified in the following paragraphs, measured according to ASTM E1155 for a randomly trafficked floor surface. Measure preferably within 24 hours, but not more than 72 hours, of concrete placement.
 - 2. Correct unacceptable slab tolerances by re-floating, grinding or leveling to achieve specified surface tolerances.
 - 3. Use highway straightedge to re-straighten slabs. Do not use bull floats.
 - 4. Measure before removing shores.
- D. Float Finish:
 - 1. After screeding, consolidating and straightening concrete slabs, do not work surface until ready for floating.
 - 2. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats. The application of portland cement to slab during floating or troweling is prohibited.
 - 3. Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
 - 4. Tolerances: As required to achieve F-number tolerances specified under "Trowel Finish" below.
 - 5. Cut down high areas and fill in low areas.
 - 6. After re-straightening, re-float surface to uniform, smooth, granular texture.
- E. Trowel Finish:
 - 1. After providing float finish, power trowel slab, then hand trowel. Continue troweling and restraighten until ringing sound is produced, and surface is free of trowel marks, pockets, and other defects, and is uniform in texture and appearance. Grind smooth surface defects which would telegraph through applied finishes.

2. Tolerances:
 - a. Slabs to receive multi-pass polished finish:
 - 1) Test area (specified overall F-numbers): Flatness F_F of 50 and levelness F_L of 35.
 - 2) Minimum local F number: Flatness F_F of 33 and levelness F_L of 24.

3.3 POLISHED CONCRETE SLABS

- A. General:
 1. Comply with hardener/densifier manufacturer's written instruction except where more stringent requirements are specified herein
 2. Protect adjacent surfaces as required to prevent damage by polished concrete floor slab finishing procedures.
 3. Polished concrete will be final exposed floor finish. Maximize consistency of appearance for full extent of polished concrete.
 4. Protect polished surfaces upon completion of polishing operations.
- B. Preparation:
 1. Prepare and clean substrates according to hardener/densifier manufacturer's written instructions.
 2. Power sweep floor areas. Use sweeping compound to control airborne dust.
 3. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with hardener/densifier.
 - a. Clean the concrete surface, removing all coatings, dirt, oil and laitance with hardener/densifier manufacturer's recommended stripper.
 - b. Treat oil spots with oil emulsifier and oil absorber materials. Detail scrub with high pH detergent.
 4. Wet soak slabs with water for minimum of 30 minutes.
 5. Double scrub slabs with automatic scrubber capable minimum of 80 to 120 pounds of head pressure, equipped with black stripping pads.
 - a. Use proper dilution of high pH detergent.
 - b. Scrub slabs once without squeegee or vacuum. On second pass, remove water solution.
 - c. Power rinse surface removing all traces of soap residue.
- C. Water Absorbency Test:
 1. Perform surface absorbency test by applying water to a representative portion of the prepared concrete slab, in accordance with hardener/densifier manufacturer's recommendations. A properly prepared surface, when dry, will immediately absorb clean water without surface beading effects.
 2. If slab fails the absorbency test, apply hardener/densifier manufacturer's etch and efflorescence remover, in accordance with manufacturer's instructions. Repeat neutralizing and rinse procedures as required to obtain proper absorbency.
 3. Do not proceed with finishing operations until unsatisfactory conditions are corrected.

D. Application of Hardener/Densifier:

1. Immediately following cleaning operation apply hardener/densifier in accordance with manufacturer's instructions.
2. Apply hardener/densifier undiluted at recommended rate, using an airless sprayer.
3. Distribute and spread liquid using a roller or as otherwise recommended by manufacturer.
4. After the material penetrates totally into concrete reapply. Apply additional light coats as may be required until liquid no longer absorbs into concrete.
5. Do not allow liquid to puddle. Spread out to an even coat as it absorbs into concrete.
6. If material starts to gel on the surface, rinse with clean water and broom out. If white film starts to form, rinse immediately.
7. All hardener/densifier to stay on concrete surface for 45 to 60 minutes; re-distribute and add additional hardener/densifier as needed. Rinse areas that may be slightly slippery with water, or squeegee excess material from surface. If all material has absorbed and no gel forms do not rinse.
8. Burnish slab using high-speed burnisher or floor buffing machine equipped with black stripping pad.
9. Apply hardener/densifier manufacturer's fixative as recommended by manufacturer.
10. Let surface thoroughly dry before commencing polishing.

E. Multi-Pass Polishing:

1. General:
 - a. Grind concrete slabs using diamond grinder using triple or quad planetary counter-rotating heads, as recommended by hardener/densifier manufacturer.
 - b. Make each grinding pass at 90 degrees from the previous grinding pass. Remove all scratches from the previous pass.
 - c. Vacuum slab thoroughly after each grind, using squeegee vacuum attachment.
2. Perform multiple polishing operations to provide high-gloss polish level, equivalent to 60 degree film gloss of 80 when viewed on an angle.

F. Joints that require application of joint sealant:

1. Prime joints with hardener/densifier manufacturer's recommended primer, and fill joint with hardener/densifier manufacturer's recommended flexible epoxy joint sealant, after completion of polishing operations.
2. Perform joint priming and sealing by to be performed by hardener/densifier manufacturer's certified installer.

3.4 PROTECTION

- A. Protect finished concrete surfaces from damage by construction equipment, operations, and from adverse weather conditions.

- B. Protect polished concrete floor finishes from damage and wear during remainder of construction period. Use protective methods and materials, including temporary covering of 1 inch rigid insulation under plywood, as recommended in writing by hardener/densifier manufacturer.

END OF SECTION