

SECTION 03 35 00

CONCRETE FLOOR POLISHING

[Note to Architect: Areas italicized and in brackets are optional on a project-by-project basis. Areas can be omitted or changed based on new or existing concrete, the need for a concrete dye, exposed concrete fines, and desired gloss finish. Concrete sealer is not essential but is recommended due to added stain resistance and increased amount of light reflection and gloss.]

For new concrete Section 03 30 00 Cast-In-Place Concrete will be directly related to the desired polished concrete finish. The following are recommendations for concrete properties:

1. *Minimum Concrete Compressive Strength: 3500 psi*
2. *Normal Weight Concrete: No lightweight aggregate.*
3. *Non-air entrained.*
4. *Overall FF 40.*
5. *Local FF 20.*
6. *Hard-Steel Troweled (3 passes) Concrete: No burn marks. Finish to ACI 302.1R, Class 5 floor.*
7. *Damp Curing or Water Curing: Minimum 7 day cure, 14 days is preferable.]*

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Surface Preparation
- B. Clear, colorless, liquid concrete hardener and densifier.
- C. *[Concrete Dye]*
- D. *[Concrete Sealer]*
- E. Grind and polish of concrete floor to desired finish.

1.02 RELATED SECTIONS

- A. Section 03 30 00 – Cast-In-Place Concrete

1.03 REFERENCES

- A. ASTM C 779 – Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
- B. ASTM C 609 – Standard Test Method for Using a Horizontal Pull Slipmeter (HPS). Acceptable Testing equipment Bot 3000.
- C. OSHA and *[ADA]* regulation for coefficient of friction.
- D. *[ACI 302.1R Guide for Concrete Floor and Slab Construction.]*

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each component used in polishing process.

- B. Provide Manufacturer's recommended cleaning instructions and cleaning product's data sheet.
- C. Installer's Qualification: Provide list of 5 completed projects of similar type, size, and complexity.

1.05 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20mm) wear in 30 minutes
 - 2. System will meet OSHA regulations for coefficient of friction of .50 *[and ADA regulation for coefficient of friction of .60 for surface areas and .80 for ramps.]*

1.06 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer shall be certified by manufacturer for installation of polished concrete system.
- B. Mock-Ups:
 - 1. Apply mock-up to demonstrate surface finish, color variations and to determine the level of workmanship.
 - 2. Prior to proceeding ensure that mock-up meets all requirements of the architect and the owner's representative.
 - 3. Maintain mock-up during construction in an undisturbed condition as a standard for judging the work.
 - 4. Mock-up shall include control joints, cracks, and saw cut sections of concrete if possible in order to view variations in floor finish.
- C. Pre-Installation Conference:
 - 1. Hold pre-installation conference prior to start of polished concrete floor system.
 - 2. Require attendance of parties directly affecting Work of this Section, including Owner's Representative, Architect, Concrete Contractor, and installer.
 - 3. Review floor flatness, concrete cracking, burn marks from power trowel, grinded areas and patched areas, saw cuts for trenches, and any stains as areas that will directly affect the appearance of the final floor finish.
- D. Ensure that correct amount of densifier is on-site.
- E. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from concrete, therefore prevention is essential. Following precautions to be taken:

1. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
2. Avoid parking vehicles on the interior slab. If necessary to complete the scope of work, drop cloths will be placed under vehicles at all times.
3. Avoid using pipe-cutting machines on the interior floor slab.
4. Avoid rust stains from placing or storing steel on interior slab

1.07 DELIVERY, STORAGE AND HANDELING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean dry area in accordance with manufacturer's instructions.
- C. Keep products from freezing.
- D. Protect materials during handling and application to prevent damage or contamination.

1.08 ENVIROMENTAL REQUIREMNTS

- A. Do not apply product when air, surface, or material temperatures are expected to fall below 40 degrees Fahrenheit within 4 hours of expected application.
- B. Do not apply to frozen concrete.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design: Floor Seal Technology, Inc. MirrorCrete Polished Concrete System; Contact: (800) 572-2344. www.floorseal.com

2.02 PRODUCTS

- A. MirrorCrete Hardener - lithium silicate based concrete chemical hardener, sealer, and densifier, designed to penetrate and react chemically with the surface of the concrete and meeting the following characteristics and properties:
 1. Chemical reaction shall form an insoluble bond with the free lime forming strong Tri-calcium silicate compounds that bind together micro particles.
 2. Minimum 16% solids, having no VOC content.
- [B. MirrorCrete Dye - Polished Concrete Dye, Solvent-based dye formulated using extremely fine molecules designed to penetrate and color concrete surfaces. (Water-Based Concrete Dye also available.)]*
- [C. MirrorCrete Sealer - Micro-film forming hybrid inorganic/organic lithium surface treatment concrete Sealer, containing lithium chemistry to form an insoluble bond with concrete surfaces, meeting the following characteristics and properties:*

1. *Lithium microfilm-forming treatment offering increased stain and abrasion resistance.*
 2. *Minimum 23% solids, containing less than 50 gms/L of VOC content.*
 3. *Penetrating between 2-8mm into concrete surface and offering excellent abrasion resistance.]*
- D. MirrorCrete MPC Cleaner – Lithium silicate enriched degreaser and detergent solution specifically designed to clean, maintain, and improve MirrorCrete floors over time.

2.03 EQUIPMENT

- A. Equipment to be used for grinding/polishing shall possess at least 500 pounds of head pressure.
- B. Diamond grinding segments available shall be: 6 Grit through 220 Grit and as applicable.

Note to Architect: Specify the desired final grit for resin polishing pads below and correlate the final grit in appropriate locations throughout the specification. 400 for satin finish, 800 for Semi-gloss finish, 1200 or greater for high-gloss finish

- C. Diamond Polishing Pads available shall be: 30 Grit resin through *[400], [800], or [1200]* Grit.
- D. Equipment to be used for densifying and cleaning the floor after grinding/polishing procedure has been performed:
1. Walk-behind auto-scrubber or equivalent with a head pressure of 150 pounds.
 2. Follow auto-scrubber's manual for cleaning instructions after densifying and conditioning the floor.
- E. Concrete Density Meter.

2.04 RELATED MATERIALS

- A. Water: Potable Water.
- B. Control Joint and Crack Filler: 100 percent solids, two-component, semi-rigid, epoxy control joint and crack filler as recommended by the system installer. Use standard color intended to match adjacent concrete surfaces.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive treatment. Notify Architect if surfaces are not acceptable. Do not begin application until unacceptable conditions have been corrected.
- B. Inspect and verify that the floor does not have curled joints, large cracks, spalling or lippage.
- C. Verify that the floor is clean and dry prior to polishing procedure.

- D. Verify concrete hardness based on results from Concrete Density Meter.

3.02 GENERAL POLISHING REQUIREMENTS

- A. Coordinate polishing operations with other associated work and trades.
- B. Do not use stain or scuff removing agents.
- C. Ensure concrete is a minimum of 28 days old.

3.03 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive treatment.

Note to Architect: Incorporate part B to expose light amounts of aggregate in the final product.

- [B. Mechanically remove the top finished surface at a minimum of a 1/32-inch. Pass the cream finish and into the cement fines or greater. Make sure the latent materials are removed deep enough enabling grinding to a smooth and suitable substrate.]*

Note to Architect: Cracks and control joints filled with an epoxy compound will be noticeably different than the adjacent concrete. If possible incorporate cracks and joints into mock-up to conceptualize difference in appearance.

- C. Remove existing joint materials. Prepare surface to receive new joint material.
- D. Treat and fill cracks that exceed ADA size regulations with epoxy joint filler as recommended by system installer.

3.04 APPLICATION

Note to Architect: Select the part A section that references the desired finish. Account for the use of a concrete sealer, burnishing, and concrete characteristics.

- A. Mechanically polish to achieve a satin finish that will reflect images from side lighting. (typical 400 grit finish)*
- A. Mechanically polish to achieve a semi-gloss finish that will reflect side images from 35-40 feet with increased light reflectivity. (typical 800 grit finish)*
- A. Mechanically polish to achieve a gloss finish that will reflect overhead and side images 15-20 feet with increased light reflectivity (typical 1200 grit finish)*
- B. Diamond Polish concrete floor surfaces with power disc machine sequencing from coarse to fine grit using dry method as follows:
 - 1. Expose aggregate and fines in concrete surface only as determined by approved mock-up
 - 2. Use metal bonded diamonds appropriate for specific concrete properties based on concrete hardness.
 - 3. Initiate grinding with appropriate metal bonded diamond disks and gradually increase from lower to higher metal bonded diamond grit until 120 grit to 220 grit is achieved based on specific concrete properties.

4. Vacuum the surfaces to remove loose particulates after every pass.
5. Clean prepared substrate with the use of a power scrubber. Use a low pressure or HVLP sprayer to apply MirrorCrete Hardener to form an even, glistening sheen. Apply enough MirrorCrete Hardener to keep the surface wet for 20 minutes. If areas dry out before that, apply additional material. Apply when surface and air temperatures are 40 °F to 100 °F (4 °C to 38 °C). In hot, dry or windy conditions dampen concrete before application to prevent flash drying. Ensure that no puddling of densifier occurs. Two applications may be necessary.
6. Verify that the floor is dry and clear of debris prior to continuation of polishing procedure.
7. Proceed using resin diamond pads at minimum 50 grit lower than final grit for metal bonded diamonds based on specific concrete properties. Increase grit as appropriate to 400 grit resin bond pad. Vacuum the surfaces to remove loose particulates after every pass.
- [8. Apply MirrorCrete Dye after 400 grit polish pass according to manufacturer's recommendations. Multiple light applications are recommended over one heavy application.]*
9. Using the auto-scrubber, clean the floor.
10. Proceed with resin bond pads to a finish of *[400] [800] [1200]* grit *[satin finish] [semi-gloss finish] [gloss finish]*.
- [11. Apply MirrorCrete Sealer at a rate of 1500-3000 sq ft., per manufacturer's recommendations. Apply additional coats to increase level of sheen]*
- [12. Burnish each coat with the use of a high-speed propane burnisher and a 3M purple diamond pad.]*

3.05 PROTECTION & MAINTENANCE

- A. Restrict foot traffic for at least 6 hours, 12 hours is preferable.
- B. Maintain completed polishes concrete floor per manufacturer's recommendation.

END OF SECTION