

SECTION 03365

POLISHED CONCRETE FLOOR SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Polished concrete floor system.

1.2 RELATED SECTIONS

- A. Section 03300 (03 30 00) – Cast-in-Place Concrete.
- B. Section 03930 (03 01 30.71) – Concrete Rehabilitation (Rehabilitation of Cast-in-Place Concrete): Rehabilitation of existing floor before installation of polished concrete floor system.

1.3 DEFINITIONS

- A. IPCI – International Polished Concrete Institute is a resource for architects, designers and contractors to learn more about polished concrete. Contractors become certified through educating and testing on various labor driven techniques to perform a proper scope of work. They do not become certified to use certain products.
- B. Concrete Polishing – The process of utilizing industrial diamonds to grind and polish a concrete surface with the application of a impregnating hardeners and sealers that will densify, polish and seal the floor.
 - 1. Process may be either a proprietary system from specialty contractor or use of specified products with acceptable grinding methods.
 - 2. Acceptable Grinding Methods: Equipment and techniques that produce documented results of concrete finishes.

1.4 REFERENCES

- A. ASTM C 1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- B. ASTM D 523 – Standard Test Method for Specular Gloss.
- C. ASTM E 1155 – Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.

1.5 SYSTEM DESCRIPTION

- A. Installation of polished concrete floor system for new interior concrete floors by dry grinding and polishing with various size grit metal-bonded and resin-bonded diamonds and application of concrete densifier.
- B. Performance Requirements: Improve performance of floor by installation of polished concrete floor system as measured by the following criteria:
 - 1. Static Coefficient of Friction, ASTM C 1028:
 - a. Dry Surface: _____ .
 - b. Wet Surface: _____ .
 - 2. Specular Gloss/Reflectance, ASTM D 523:
 - 3. Floor Surface Profile, ASTM E 1155:

1.6 SUBMITTALS

- A. Comply with Section 01330 (01 33 00) – Submittal Procedures.
- B. Product Data: Submit installer's product data, including surface preparation and installation instructions.
- C. Installer's Certification: Submit IPCI certification of installer and installer's employees.
- D. Installer's Project References: Submit installer's list of successfully completed polished concrete floor system projects, including project name and location, name of architect, and type and quantity of polished concrete floor system installed.
- E. Maintenance Manual: Submit installer's maintenance manual, including maintenance and cleaning instructions for polished concrete floor system.

1.7 QUALITY ASSURANCE

- A. Basis of Design: Perfect Polish, Mechanical Polishing, Ameripolish Dyes.
- B. Installer's Qualifications:
 - 1. Certified IPCI installer.
 - 2. Employ IPCI Certified Craftsmen for installation of polished concrete floor system.
 - 3. Employ IPCI installer with 2-4 years of experience when a floor system involves decorative work.
- C. Preinstallation Conference: Conduct conference at Project site before first concrete pour and start of application of Polished Concrete Floor Finish System. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator, and Manufacturers representative. Review the following:
 - 1. Environmental requirements

2. Curing methods
3. Surface preparation.
4. Application and decorative saw cuts.
5. Repair.
6. Field quality control.
7. Cleaning.
8. Protection of systems.
9. Coordination with other work.

D. Coordination: Concrete polisher shall coordinate the following:

1. Concrete placement, floating, troweling and curing shall be coordinated with the polisher so surface is acceptable for polishing.
2. Scheduling of joint sealant installation is not detrimental to the polishing process.
3. Cleaning of concrete surface prior to performing polishing.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Provide polished concrete samples: size 4"x4" or larger if specified for each polished concrete finish required.

1.8 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.1 INSTALLER

- A. Consult IPCI to find certified IPCI installers.
1. International Polished Concrete Institute, Toll Free (866) 421-9550. Website www.ipcionline.org. E-mail info@ipcionline.org.

Perfect Polish, (865)-494-5820. Website www.perfectpolishonline.com

2.2 GRINDING AND POLISHING EQUIPMENT

- A. Floor Grinder: Polishing shall be a dry diamond method, not wet, utilizing metal bonded diamond/resin bonded diamond multi orbital planetary action opposing rotational diamond headed machine with approximate grinding pressure of 675 pounds or more.
- B. Vacuum System: Vacuum system shall be directly connected to floor grinder to reduce amount of dust exposure. HEPA filtration system is required.

2.3 MATERIALS

- A. Concrete Densifier: Clear, odorless liquid form of a lithium silicate to permanently seal, densify, dustproof and harden concrete surfaces and provide abrasion resistance by penetrating into concrete pores and chemically reacting. Products must conform and meet minimum performance characteristics as described herein.
- B. Concrete Sealer: Clear, highly concentrated, quick drying penetrating water & oil repellent sealer specifically designed to deeply impregnate the surface pores and chemically bond with the concrete floor to increase durability.
- C. Penetrating Dye: Ameripolish "Color Perfect" colorants.
 - 1. Type: Solvent based.

Specifier Notes: Specify the color of the penetrating dye.
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- 2. Color: [Black] [Burnt Orange] [Cactus Green] [Charcoal] [Dark Chocolate] [Deep Purple] [Fire Brick] [Golden Rod] [Gray] [Hunter Green] [Indian Red] [Mahogany] [Maroon] [Moss Green] [Pearl Blue] [Peru] [Rose] [Saddle Brown] [Steel Blue] [Teal] [Weathered Sand] [Wheat]. (similar products/colorants may be substituted)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine floor to receive polished concrete floor system.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin surface preparation or installation until unacceptable conditions are corrected.
- D. Verify the Following for New Concrete Floors:
 - 1. Floor Finish:
 - a. Slabs and flatwork shall be placed and finished monolithically.
 - b. Strike off to true, plane surfaces at required elevations.

- c. Thoroughly compact concrete with vibrators, floats, and tampers to force coarse aggregate below the surface.
 - d. Laser Screed floor when applicable
 - d. Low speed power trowel with no hand finishing.
 - e. Pan float.
 - f. Steel trowel finish.
 - g. Surface should not be burned due to excessive troweling.
 - h. Imprints are not acceptable (i.e. boots, foreign objects dropped into concrete).
- 2. Floor and Joints:
 - a. Free of debris and excessive dirt, dust, clay, and mud.
 - b. Dry.
- 3. Floor Surface Profile:
 - a. Floor Flatness Number (F_F): 50 (preferred) 45 (minimum).
 - b. Floor Levelness Number (F_L): 35 (preferred) 30 (minimum).
 - 4. Concrete Compressive Strength: 3,500 psi to 5,000 psi.
 - 5. Lightweight Concrete: Not allowed if aggregate exposure is required.
 - 6. Concrete Curing: Minimum 8 days water cured or dissipating curing compound applied.
 - 7. Concrete Adjacent to Floor Penetrations: Troweled flat and level with surrounding concrete.
 - 8. Concrete Adjacent to Drains, clean-outs, etc: Finish level to the top of the structure.

3.2 SURFACE PREPARATION

- A. Protection: Protect surrounding areas and adjacent surfaces from the following:
 - 1. Minimal accumulation of dust from grinding and polishing.
 - 2. Contact with overspray of concrete densifier.
 - 3. Contact with overspray of concrete sealer.
- B. Surface Preparation: Prepare surfaces in accordance with installer's instructions.
- C. Clean Surfaces: Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, and other surface contaminants which could adversely affect installation of polished concrete floor system.

3.3 INSTALLATION

Specifier Notes: Installation requirements of the polished concrete floor system will need to be determined for each project based on the following:

- 1. New or existing floor.
- 2. Floor finish.
- 3. Curing of floor.
- 4. Condition of floor.
- 5. Aggregate exposure desired.
- 6. IPCI sheen level desired.
- 7. Amount of material to be removed by grinding and polishing.

8. Penetrating dye option desired.
9. Performance requirements of the completed polished concrete floor system. Consult a certified IPCI installer for more information.

- A. Install polished concrete floor system in accordance with installer's instructions at locations indicated on the Drawings.
- B. Aggregate Exposure:

Specifier Notes: Specify **one** of the following **three** aggregate exposures. Floor finish can greatly affect uniformity and placement of course aggregate. Course aggregate exposure may be sporadic and mottled due to finishing and curing of floor. Consult a certified IPCI installer for more information.

1. Cream Aggregate: Minimal to no course aggregate exposure.
2. Small Aggregate: Mottled salt-and-pepper coarse aggregate exposure.
3. Large Aggregate: Mottled large course aggregate exposure.

Specifier Notes: Specify **one** of the following **four** polished concrete floor system series. Consult a certified IPCI installer for assistance in determining the appropriate series.

Edit the specified floor system series as required for the specific application.

- C. Polished Concrete Floor System: IPCI Sheen Level 1 – Matte Finish.
 1. Preparation Step:
 - a. Remove existing floor coatings by grinding with 16-grit metal-bonded diamonds.
 - b. Remove existing floor coatings and level floor by grinding with 40-grit metal-bonded diamonds.
 - c. Open-up concrete to accept concrete densifier by grinding with 80-grit metal-bonded diamonds.
 2. Apply concrete densifier to deeply saturate floor.
 3. Remove residue of concrete densifier dried on floor surface by grinding with 150-grit metal-bonded diamonds.
 4. Remove 150-grit metal-bonded diamond scratches by grinding with 100-grit resin-bonded diamonds.
 5. Apply concrete sealer.
- D. Polished Concrete Floor System: IPCI Sheen Level 2 – Honed Finish.
 1. Preparation Step:
 - a. Remove existing floor coatings by grinding with 16-grit metal-bonded diamonds.
 - b. Remove existing floor coatings and level floor by grinding with 40-grit metal-bonded diamonds.
 - c. Open-up concrete to accept concrete densifier by grinding with 80-grit metal-bonded diamonds.
 2. Apply concrete densifier to deeply saturate floor.

3. Remove residue of concrete densifier dried on floor surface by grinding with 150-grit metal-bonded diamonds.
 4. Floor Closure Polishing:
 - a. Remove 150-grit metal-bonded diamond scratches by grinding with 100-grit resin-bonded diamonds.
 - b. Remove 150-grit metal-bonded and 100-grit resin-bonded diamond scratches by grinding with 200-grit resin-bonded diamonds.
 5. Achieve low-sheen finish by grinding with 400-grit resin-bonded diamonds.
 6. Apply concrete sealer.
- E. Polished Concrete Floor System: IPCI Sheen Level 3 – Median Gloss.
1. Preparation Step:
 - a. Remove existing floor coatings by grinding with 16-grit metal-bonded diamonds.
 - b. Remove existing floor coatings and level floor by grinding with 40-grit metal-bonded diamonds.
 - c. Open-up concrete to accept concrete densifier by grinding with 80-grit metal-bonded diamonds.
 2. Apply concrete densifier to deeply saturate floor.
 3. Remove residue of concrete densifier dried on floor surface by grinding with 150-grit metal-bonded diamonds.
 4. Floor Closure Polishing:
 - a. Remove 150-grit metal-bonded diamond scratches by grinding with 100-grit resin-bonded diamonds.
 - b. Remove 150-grit metal-bonded and 100-grit resin-bonded diamond scratches by grinding with 200-grit resin-bonded diamonds.
 - c. Prepare floor for polishing by grinding with 400-grit resin-bonded diamonds.
 - d. Achieve light-reflective finish when viewed from a distance of 30 feet by grinding with 800-grit resin-bonded diamonds.
 5. Apply concrete sealer.
- F. Polished Concrete Floor System: IPCI Sheen Level 4 – High Gloss.
1. Preparation Step:
 - a. Remove existing floor coatings by grinding with 16-grit metal-bonded diamonds.
 - b. Remove existing floor coatings and level floor by grinding with 40-grit metal-bonded diamonds.
 - c. Open-up concrete to accept concrete densifier by grinding with 80-grit metal-bonded diamonds.
 2. Apply concrete densifier to deeply saturate floor.
 3. Remove residue of concrete densifier dried on floor surface by grinding with 150-grit metal-bonded diamonds.
 4. Floor Closure Polishing:
 - a. Remove 150-grit metal-bonded diamond scratches by grinding with 100-grit resin-bonded diamonds.
 - b. Remove 150-grit metal-bonded and 100-grit resin-bonded diamond scratches by grinding with 200-grit resin-bonded diamonds.
 - c. Prepare floor for polishing by grinding with 400-grit resin-bonded diamonds.

- d. Achieve light-reflective finish when viewed from a distance of 30 feet by grinding with 800-grit resin-bonded diamonds.
5. Final Polish: Surface sheen gives off wet and shiny appearance with “lake-like” mirror effect reflecting surrounding objects above it.
 - a. Start final polish by grinding with 1500-grit resin-bonded diamonds.
 - b. Complete final polish by grinding with 3000-grit resin-bonded diamonds.
6. Apply concrete sealer.

Specifier Notes: Application of penetrating dye is optional with all IPCI sheen levels. Delete penetrating dye if not required. Consult a certified IPCI installer for more information.

G. Penetrating Dye:

1. Mix dye in accordance with installer’s instructions.

Specifier Notes: Include the following sentence when penetrating dye is required with IPCI Sheen Level 1.

2. Apply penetrating dye as last step before applying concrete sealer in accordance with installer’s instructions.

Specifier Notes: Include the following sentence when penetrating dye is required with IPCI Sheen Levels 2, 3, and 4.

3. Apply penetrating dye at 400-grit resin-bonded diamond-grinding step in accordance with installer’s instructions.
4. Thoroughly wipe surface clean of excess dye residue with acetone in accordance with installer’s instructions.
5. Repeat application of penetrating dye if due to porosity of floor or darker color is desired.

- D. Hand Tooling: When applicable in project utilize similar grinding and polishing process to blend the edges of all perimeter areas where obstructions lye with a variable speed polisher.

3.4 FIELD QUALITY CONTROL

- A. Inspect completed polished concrete floor system with Owner, Contractor, Architect, and Installer.
- B. Review procedures with Architect to correct unacceptable areas of completed polished concrete floor system.
- C. Testing: Test the following from completed polished concrete floor system:
 1. Static Coefficient of Friction, ASTM C 1028:
 - a. Dry surface.

- b. Wet surface.
2. Specular Gloss/Reflectance, ASTM D 523:
3. Floor Surface Profiles, ASTM E 1155:
4. Compare test results from tests performed before and after installation of polished concrete floor system.

3.5 PROTECTION

- A. Protect completed polished concrete floor system from damage until Substantial Completion.
 1. All hydraulic powered equipment shall be diapered to avoid staining of concrete.
 2. Vehicle parking on polished concrete slab shall be prohibited. If necessary to complete their scope of work, drop clothes shall be placed under vehicles.
 3. No pipe cutting machine shall be used on the finished floor slab.
 4. Steel shall not be placed on the finish slab to avoid rusting.
 5. Acids and acid detergents shall not be used nor come in contact with the slab.
 6. All painters to use drop clothes on finished slab. If spilled, paint must be immediately removed.
 7. All trades will be informed that the slab must be protected at all times.
 8. Repair damaged areas of completed polished concrete floor system to satisfaction of the Architect.

END OF SECTION