GUIDE SPECIFICATION FOR INDUROSHINE®: POLISHED CONCRETE FLOOR FINISH

SECTION 03 35 43

POLISHED CONCRETE FINISHING

Specifier Notes: This guide specification is written according to the Construction Specifications Institute (CSI) format. The section must be carefully reviewed and edited by the architect or engineer to meet the requirements of the project. Coordinate this section with other specification sections and the drawings.

Specifier Notes: INDUROSHINE is a process utilizing a ready-to-use, colorless liquid, LIQUI-HARD®, consisting of active chemicals that deeply penetrate the surface of concrete. INDUROSHINE is specifically designed to produce hardened, dust-proofed, and improved chemically resistant surfaces wherever it is applied. Through various grinding and polishing techniques, various floor finishes can be obtained. Through a chemical reaction process, LIQUI-HARD penetrates progressively through the concrete and chemically solidifies all the component parts into a homogenous concrete mass. Besides its densifying and hardening action, LIQUI-HARD solidifies the concrete, eliminating dusting, rotting, and pitting. To provide optimum stain resistance, application of BELLATRIX® is then recommended. BELLATRIX is a water-based hybrid system, composed of unique polymers, specifically formulated to provide the dual actions of penetrating and topical protection for concrete that has been previously densified. When used in conjunction with the INDUROSHINE polished concrete system from W. R. MEADOWS®, BELLATRIX produces a clear, high gloss barrier, offering optimum protection for concrete.

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Application of clear, colorless, liquid concrete hardener and densifier.

C. Grind and polish of floor to desired finish.

D. Application of water-based concrete enhancer.

1.02 RELATED SECTIONS

Specifier Notes: Edit the list of related sections as required for the project. List other sections dealing with work directly related to this section.

A. Section 01 33 00 – Submittal Procedures.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 07 92 00 – Joint Sealants.

1.03 REFERENCES

A. ANSI B 101.0 – Walkway Surface Auditing Procedure for Measurement of Walkway Slip Resistance.

B. ANSI B 101.3 - Test Method for Measuring Wet DCOF of Common Hard-Surface Floor Materials.

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

D. ASTM D523 – Standard Test Method for Specular Gloss.

E. ASTM E1155 – Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.

1.04 PERFORMANCE REQUIREMENTS

A. Improve performance of floor by installation of polished concrete floor system as measured by the following criteria:
   1. Static Coefficient of Friction, ANSI B 101.0 and ANSI B 101.3:
      a. Dry Surface: [0.50].
      b. Wet Surface: [0.60].
   2. Abrasion Resistance, ASTM C779
      a. 50 % minimum increase.
   3. Specular Gloss/Reflectance, ASTM D523, 60 degree:

Specifier Notes: Select (a), (b), or (c) based on floor gloss level for project requirements.

      a. Satin Finish, 45-50.
      b. Semi-Gloss Finish, 55-60.
      c. High Gloss Finish, 61 or greater.
   4. Floor Surface Profile, ASTM E1155:
      a. Floor Flatness Number (F_F): [XX].
      b. Floor Levelness Number (F_L): [XX].

1.05 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Submit manufacturer's product data and application instructions.

C. Contact manufacturer of polishing system for a list of certified installers.

D. Provide documentation showing installer is certified by the polishing and densifier manufacturer.

E. Provide independent test reports verifying increased abrasion resistance over test sample using concrete densifier.

1.06 QUALITY ASSURANCE

A. Installer qualifications
   1. Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the floor treatment.
   2. The applicator shall either:
      a. An INDUROSHINE approved applicator as certified by W. R. MEADOWS, having a minimum of 10 projects performed within three years of similar type, size, and complexity as this contract.
      b. Be a Level 2 INDUROSHINE approved applicator by W. R. MEADOWS.

B. Mock-ups
   1. Apply mock-up of required finish to demonstrate surface finish, color variations, and to determine a level of workmanship.
   2. Build mock-up in the location and dimensions as directed by the architect or owner’s representative.
   3. Prior to proceeding, ensure that mock-up meets all requirements of the architect or owner’s representative.
   4. Maintain mock-up during construction in an undisturbed condition as a standard for judging the work.

C. Provide name of technically qualified concrete polishing field representative.

D. Provide name of technically qualified densifier manufacturer’s field representative.

E. Ensure that correct amount of densifier is onsite.

1.07 PRE-INSTALLATION MEETING

A. Convene one week prior to construction of mock-up sample.

B. Require attendance of all parties directly affecting work of this section, including architect, engineer, general contractor, approved polishing contractor, concrete supplier, polishing equipment and tooling field representative, and chemical manufacturer's representative.

C. Review examination, surface preparation, installation, field quality control, protection, and coordination with other work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Ensure correct amount of materials are onsite according to manufacturer's recommended application instructions.

C. Store materials in a clean, dry area in accordance with manufacturer's instructions.

D. Keep products from freezing.

E. Avoid direct contact with this product as it may cause mild to moderate irritation of the eyes and/or skin.

F. Protect materials during handling and application to prevent damage or contamination.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not apply product when air, surface, or material temperatures are expected to fall below 40° F (4° C) within four hours of expected application.

B. Do not apply to frozen concrete.

C. Do not use on highly dense or non-porous surfaces.

D. Limit and control damage from excessive dust caused by grinding/polishing procedure.

E. Properly dispose of collected dry dust from polishing.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. W. R. MEADOWS, INC., P.O. Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 214-2100. Fax (847) 683-4544. Website www.wrmeadows.com.

2.02 MATERIALS

A. Equipment to be used for grinding/polishing shall be:
   1. Three-head counter rotating variable speed floor grinding machine.
   2. Dust extraction system and pre-separator.
   3. 75kw MQ power generator or equivalent.

B. Equipment to be used for grinding/polishing shall possess at least 775 lb. of head pressure.

C. Equipment to be used for edge grinding/polishing shall be a hand grinder with dust extraction equipment.

D. Diamond grinding segments shall be:
   1. Metal bonds: 40, 60, 80 and 150 grit.

E. Resin bond grinding segments shall be:
   1. Resin bonds: 100, 200, 400, 800, 1500, and 3000 grit.

F. Grinding pads for edges shall be:
   1. Resin bonds: 40, 60, 80, 100, 200, 400, 800, 1500, and 3000 grit.

G. Equipment to be used for densifying and cleaning the floor after grinding/polishing procedure has been performed:
   1. Tennant ride-on auto-scrubber or equivalent with a head pressure of 150 lb.
   2. Follow auto-scrubber's manual for cleaning instructions after densifying and conditioning the floor.
   3. Do not allow densifier to remain inside the auto-scrubber after densifying.

H. Concrete Densifier:

Specifier Notes: Select (a) or (b) based on project requirements and contractor preference. Performance requirements using either material when applied according to W. R. MEADOWS application instructions will be equivalent.

   1. Liquid hardener/densifier shall be
      a. LIQUI-HARD by W. R. MEADOWS.
      b. LIQUI-HARD ULTRA by W. R. MEADOWS.

I. Concrete Enhancer:
   1. Water-based, synthetic polymer concrete floor enhancer shall be BELLATRIX by W. R. MEADOWS.

2.03 RELATED MATERIALS

A. Water: Potable water.

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. Final polishing system installation shall be equivalent to that as accepted on the mock-up.

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. Begin and complete polishing within two weeks prior to possession date.

D. Utilize machines to the maximum extent practical to achieve optimum efficiency.

3.03 SURFACE PREPARATION

A. Protect adjacent surfaces not designated to receive treatment.

B. Clean and prepare surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, dust, and dirt are removed prior to application.

C. Ensure concrete is a minimum of 28 days old.

3.04 APPLICATION

Specifier Notes: Select A, B or C based on floor finish for project requirements.

A. INDUROSHINE PDS-1: Satin finish that will reflect images from side lighting.

B. INDUROSHINE PDS-2: Semi-gloss finish that will reflect overhead and side images from 35 - 45 feet with increased light reflectivity.

C. INDUROSHINE PDS-3: High-gloss finish that will look wet and show mirror-like reflections of side and overhead images.

A. To obtain satin finish, ensure installer follows the applicable procedures incorporating grinding plates in the following order.
   1. Verify that the floor is clean and dry prior to polishing procedure.
   2. Inspect and verify that the floor does not have curled joints, large cracks, spalling, or lippage. If lippage or curled joints are present, refer to Section 03 01 00 – Maintenance of Concrete for corrective procedures.
   3. Using the 80-grit metal bond grinding segment, grind the floor surface at a rate of 500 $ft.^2$/hr. Vacuum the surface to remove loose particulates.
   4. Using the 150-grit metal bond grinding segment, grind the floor surface at a rate of 600 $ft.^2$/hr. Vacuum the surface to remove loose particulates.
   5. Apply concrete densifier according to manufacturer's instructions.
   6. Squeegee off excess material.
   7. Wait 24 hours.
   8. Verify that the floor is dry and clear of debris prior to continuation of polishing procedure.
   9. Using the 100-grit resin bond polishing segment, grind the floor surface at a rate of 600 $ft.^2$/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 $ft.^2$ until scratches are removed. Vacuum the surface to remove loose particulates.
   10. Using the 200-grit resin bond polishing segment, grind the floor surface at a rate of 700 $ft.^2$/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 $ft.^2$ until scratches are removed. Vacuum the surface to remove loose particulates.
   11. Using the 400-grit resin bond polishing segment, grind the floor surface at a rate of 700 $ft.^2$/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 $ft.^2$ until scratches are removed. Vacuum the surface to remove loose particulates.
   12. Using the 800-grit resin bond polishing segment, grind the floor surface at a rate of 1000 $ft.^2$/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 $ft.^2$ until scratches are removed. Vacuum the surface to remove loose particulates.
   13. Using the auto-scrubber, clean the floor thoroughly as per manufacturer's instructions with a white non-woven pad. Pads should be replaced approximately every 30,000 $ft.^2$.

B. To obtain semi-gloss finish, ensure installer follows the applicable procedures incorporating grinding plates in the following order.
   1. Verify that the floor is clean and dry prior to polishing procedure.
   2. Inspect and verify that the floor does not have curled joints, large cracks, spalling or lippage. If lippage or curled joints are present, refer to Section 03 01 00 – Maintenance of Concrete for corrective procedures.
   3. Using the 80-grit metal bond grinding segment, grind the floor surface at a rate of 500 $ft.^2$/hr. Vacuum the surface to remove loose particulates.
   4. Using the 150-grit metal bond grinding segment, grind the floor surface at a rate of 600 $ft.^2$/hr. Vacuum the surface to remove loose particulates.

5. Apply concrete densifier according to manufacturer's instructions.
6. Squeegee off excess material.
7. Wait 24 hours.
8. Verify that the floor is dry and clear of debris prior to continuation of polishing procedure.
9. Using the 100-grit resin bond polishing segment, grind the floor surface at a rate of 600 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
10. Using the 200-grit resin bond polishing segment, grind the floor surface at a rate of 700 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
11. Using the 400-grit resin bond polishing segment, grind the floor surface at a rate of 700 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
12. Using the 800-grit resin bond polishing segment, grind the floor surface at a rate of 1000 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
13. Using the 1500-grit resin bond polishing segment, grind the floor surface at a rate of 1500 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
14. Using the auto-scrubber, clean the floor thoroughly as per manufacturer's instructions with a white non-woven pad. Pads should be replaced approximately every 30,000 ft.^{2}.

C. To obtain high-gloss finish, ensure applicator follows the applicable procedures incorporating grinding plates in the following order.
1. Verify that the floor is clean and dry prior to polishing procedure.
2. Inspect and verify that the floor does not have curled joints, large cracks, spalling or lippage. If lippage or curled joints are present, refer to Section 03 01 00 – Maintenance of Concrete for corrective procedures.
3. Using the 80-grit metal bond grinding segment, grind the floor surface at a rate of 500 ft.^{2}/hr. Vacuum the surface to remove loose particulates.
4. Using the 150-grit metal bond grinding segment, grind the floor surface at a rate of 600 ft.^{2}/hr. Vacuum the surface to remove loose particulates.
5. Apply concrete densifier according to manufacturer's instructions.
6. Squeegee off excess material.
7. Wait 24 hours.
8. Verify that the floor is dry and clear of debris prior to continuation of polishing procedure.
9. Using the 100-grit resin bond polishing segment, grind the floor surface at a rate of 600 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
10. Using the 200-grit resin bond polishing segment, grind the floor surface at a rate of 700 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
11. Using the 400-grit resin bond polishing segment, grind the floor surface at a rate of 700 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
12. Using the 800-grit resin bond polishing segment, grind the floor surface at a rate of 1000 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.

13. Using the 1500-grit resin bond polishing segment, grind the floor surface at a rate of 1500 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
14. Using the 3000-grit resin bond polishing segment, grind the floor surface at a rate of 2000 ft.^{2}/hr. If scratches from the previous grit are still apparent, decrease the rate of grinding by 100 ft.^{2} until scratches are removed. Vacuum the surface to remove loose particulates.
15. Using the auto-scrubber, clean the floor thoroughly as per the manufacturer's instructions with a white non-woven pad. Pads should be replaced approximately every 30,000 ft.^{2}.

3.05 CONCRETE ENHANCER

A. Allow 24 hours before proceeding with concrete enhancer application.

B. Spray concrete enhancer full strength from container using an industrial sprayer delivering 1/10th of a gallon per minute.

C. Pre-wet micro-fiber applicator with concrete enhancer prior to use.

D. Uniformly spread concrete enhancer with a micro-fiber applicator creating a monolithic, thin, even film, ensuring that the product is not allowed to dry before spreading is complete.

E. Do not over apply concrete enhancer.

F. For optimum performance, apply a second coat at a 90° (right) angle to the first coat, after the first coat is thoroughly dry.

G. Allow 24 hours for concrete enhancer to dry.

H. Burnish with a hogs hair pad at 2000 rpm or substitute a diamond pad if necessary.

3.06 FIELD QUALITY CONTROL

A. Review procedures with installer to correct unacceptable areas of completed polished concrete floor system.

B. Testing: Contact a Certified Walkway Specialist to test the completed polished concrete floor system for the following:
1. Static Coefficient of Friction, ANSI B 101.0 and ANSI B 101.3:
   a. Dry surface.
   b. Wet surface.
2. Specular Gloss/Reflectance, ASTM D 523:
   a. 60 degrees.

C. Test Results: Test results will be provided in writing to Owner and Contractor within 24 hours after tests are completed.

3.07 PROTECTION

A. Keep surface dry for a minimum of 48 hours after application.

B. Allow 72 hours before heavy traffic.

END OF SECTION