

SECTION 03 53 00
DIAMATIC® PC-5614 Polished Concrete Topping

PART I – GENERAL

1.01 SUMMARY

- A. This is the recommended specification for DIAMATIC® PC-5614 Topping System, including chemical treatments and process details.
- B. Complete installation details are provided in the DIAMATIC® Technical Brochures available at www.diamaticusa.com.
- C. This specification describes the surface preparation, priming, installation of the DIAMATIC PC-5614 Topping, and all the steps to process the topping through the use of mechanical grinding and polishing to produce a fully refined surface that's durable, sustainable and easy to maintain.

1.02 SECTION INCLUDES

- A. Products and procedures for the installation of the DIAMATIC® PC-5614 Topping System using a multi-step dry mechanical process and accessories indicated, specified or required to complete system and achieve specified finish:
 - a. DIAMATIC® Mechanical Diamond Grinding and Polishing Equipment
 - b. ULTRAFLO® Concrete Treatment Chemicals
 - c. DIAMATIC® PC-5614 Topping System components
- B. Products and procedures for the initial and long term maintenance of the DIAMATIC® PC-5614 Topping System.

1.03 SUBMITTALS

- A. Product Data: Submit Manufacturer's technical literature for each product indicated, specified or required. Include manufacturer's technical data, application instructions, recommendations and MSDS.
- B. Installer Qualifications: Data for company, principal personnel, experience, and training. Provide a letter documenting installer's accreditation and certification compliance, as specified under quality assurance.
- C. Maintenance Data: Provide manufacturer's 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, which may be detrimental to finishes and performance.

1.04 QUALITY ASSURANCE / WARRANTY

- A. Manufacturer Qualifications: The DIAMATIC® PC-5614 Topping System consists of a process and products engineered and manufactured by DIAMATIC. Any substitutions are not permitted and void warranty.

- B. Installer Qualifications:
- a. Installer must be a DIAMATIC® ELITE installer for the DIAMATIC® PC-5614 Topping System, including the use of DIAMATIC® equipment and diamond abrasives, and DIAMATIC® concrete preparation, surface priming, topping installation, chemical hardening and finishing materials.
 - b. Installer must 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.
 - c. A factory-trained, competent supervisor must be maintained on site during all times during which specified work is performed.
 - d. National brand specific projects must have DMS (Diamatic Management Services) personnel present during the pre-construction conference to insure quality control standards are in compliance.
 - e. Installer must provide written documentation from the manufacturer confirming the Installer's current accreditation and training from DIAMATIC on installation of the ULTRAFLOOR® DIAMATIC® PC-5614 Topping System and related equipment and processes. Failure to provide current accreditation will void any warranty implied or otherwise associated with the ULTRAFLOOR® System.
 - f. A current list of qualified installers may be obtained through DIAMATIC MANAGEMENT SERVICES, DIAMATIC® USA, 858-253-1612
- C. Mock-Up: Before performing the work in this section, an on-site mock-up of approximately 150 square feet shall be installed using the DIAMATIC® PC-5614 Topping System representative of 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.
- D. Static Coefficient of Friction: A reading of not less than 0.5 for level floor surfaces shall be achieved and documented, as determined by certified an NFSI walkway auditor using the ANSI B-101 quality control test.
- E. Test Reports: Comply with the provisions of the following specifications and standards, except as otherwise noted or specified, or as accepted or directed by the Owner and/or Architect. All test data shall be recorded and submitted upon completion of job.
- a. Section 03 30 00, Cast-In-Place Concrete
 - b. ASTM D-523, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry
 - c. ANSI B-101.0 Walkway Surface Auditing Procedure for the Measurement of Walkway Slip Resistance, SCOF
 - d. ACI 302 1 R-04 Guide for Concrete Floor and Slab Construction
 - e. ICRI 03732 Concrete Surface preparation for sealers, coatings and polymer overlays
 - f. ASTM F1869-11 Standard test method for measuring Moisture vapor emissions rate of concrete subfloor using anhydrous calcium chloride.

- g. ASTM F2170-11 Standard test method for determining relative humidity in concrete floor slabs using situ probes.
 - h. ASTM C805/C805M-13 Standard test method for rebound number of hardened concrete.
- F. Pre-Installation Conference: Prior to the installation of the DIAMATIC® PC-5614 Topping System, an on-site conference shall be conducted to review specification requirements.
- a. Required attendees include the Owner, Architect, General Contractor, DIAMATIC PC-5614 Topping System Subcontractor, and DMS representative as required in 1.04-B section d, Quality Assurance.
 - b. The minimum agenda shall include:
 - a. Tour of work area, inspection and discussion of preparation of substrate and other pre-Installation conditions and issues.
 - b. Inspection of any existing grades that cannot be changed to permit the installation of the topping. A Diamatic concrete planer may be required in these conditions to accommodate the depth of the material.
 - c. Review of System requirements, including drawings, specifications and other contract documents.
 - d. Review of required submittals and completion status.
 - e. Review and finalization of installation schedule, and verification of availability of required materials, trained Installer personnel, equipment and facilities to execute specification and avoid delays.
 - f. Limit access to work area by other trades to reduce possible damage to the floor before, during and after completion.
 - g. Review of required inspection, testing, certification and material usage accounting procedures.
 - h. Review of power requirements and responsibility
 - i. Review of governing regulations and requirements for insurance, certifications, inspection and testing, if applicable.
 - j. Review of temporary protection requirements during and after installation.
 - k. Review of cleaning procedures during and after installation.

1.05 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. Maintain copies of all chemical MSDS, and Technical data sheets for all products.
- C. Store all materials in a dry, climate-controlled environment at a minimum of 55°F (13°C) and maximum of 85°F (29°C).

1.06 SITE CONDITIONS

- A. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting the material installation and floor finish. Seal drafts (from HVAC, doors, windows etc) and deactivate AC 4-8 hours prior and for 36 hours after the installation to avoid accelerated moisture loss in the overlay material. Avoid direct sunlight on the overlay during the installation of the material.
- B. Close areas to traffic during and after DIAMATIC® PC-5614 Topping System application for a time period recommended by DIAMATIC®
- C. Inspect the existing substrate and document unsatisfactory conditions in writing. Verify that surfaces and site conditions are ready to receive work. The area must allow for a 3/8" application depth of the material. Correct unacceptable conditions prior to installation of System. Commencement of work constitutes acceptance of substrate conditions.
- D. Existing concrete must be cured for a sufficient time period as recommended by DIAMATIC® before the application can begin, typical 28 days.
- E. Protect existing concrete and the new DIAMATIC® PC-5614 Topping System from 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.
- F. Prohibit the placement and storage of construction materials over new DIAMATIC® PC-5614 Topping System, to include ferrous metals and steel members.
- G. Prohibit vehicle parking and pipe cutting operations over concrete before and after the DIAMATIC® PC-5614 Topping System is installed.
- H. Moisture Vapor Testing
 - 1. Test existing concrete for moisture vapor transmission according to methods indicated in ASTM F1869. Acceptable results: not more than 8-10 pounds per 1,000 square feet in 24 hours.
 - 2. Test existing concrete for relative humidity using in situ probes according to ASTM F2170. Acceptable results: not more than 80-85% RH.

PART 2 – PRODUCTS

2.01 SYSTEM INTEGRITY

- A. The DIAMATIC® PC-5614 Topping System is an engineered and integrated complete installation system requiring strict adherence to all specified installation processes, equipment, diamond abrasives, concrete preparation, priming, Topping application, joint treatment and chemicals to achieve the intended result. Any substitutions from the specified products and/or processes will void the system warranty.

2.02 MATERIALS

A. DIAMATIC® EQUIPMENT

1. DIAMATIC® BMG-780 or BMG-735: Planetary Grinder and Polisher, Large Platform: 32" planetary floor polisher. Head pressure of 500-600 lbs.
2. DIAMATIC® Micro Polisher MPS-1721-1727 - Burnisher: Specific weight and RPM are required to reach temperature of 100°F for application of FLOR-FINISH application.
3. DIAMATIC® 335 Shaver/Planer where required for a 3.8" depth.
4. Vacuums: Dust Collection must be designed for filtering of concrete dust. Minimum air speed of 300 CFM for Large and Medium Platform equipment.
5. DIAMATIC® BDC3140P, BDC 44, BDC 66
6. Power generator capable of supplying a minimum output of 45kw and above and capable of generating 480/240 Volt three phase power.

B. DIAMATIC® Diamond Abrasives and Blades

- a. Hard Bond Buffalo Metal Bonded Diamonds – 60/80 Grit
- b. Hard Bond Ceramic Diamonds – 50, 100 Grit
- c. Hybrid Flex-res Resin Bonded Diamonds -50, 100, 200, 400, 800, Grit.
- d. FLOR-GRIT Diamond Impregnated Pads – 800, 1500, Grit.
- e. DIAMATIC EASY EDGE Ceramic Bonded Edge Wheel – 100, 270 Grit

C. ULTRAFLO® CONCRETE TREATMENT CHEMICALS

1. DIAMATIC® FLOR-FILL™ (RSG) REACTIVE SURFACE GROUT, Reactive Pin Hole & Void Filler.
2. DIAMATIC® FLOR-COLOR™ Micronized Water Borne High Performance Dye.
3. DIAMATIC® FLOR-GUARD™ EX Surface Hardener and Protective Clear Coat.
4. DIAMATIC® FLOR-FINISH™ Stain and Wear Protection Treatment (high-gloss)

D. DIAMATIC® PC-5614 TOPPING SYSTEM COMPONENTS

1. DIAMATIC® PC-5614 TOPPING.
2. DIAMATIC® PC-CONCRETE PRIMER.
3. #16-20 Kiln Dried Silica Sand.

E. JOINT FILLER

1. VERSAFLEX 100% solids polyurea joint fillers
 - a. SL/75, SL/85, SL/90

F. PROTECTION MATERIALS

1. To prevent minor damage from light trade traffic during build out of site, an approved Construction grade flooring protection material for the ULTRAFLOOR® Architectural Polished Concrete System shall be installed. At no time will any tape be used or applied to a finished ULTRAFLOOR® surface as the adhesive may leave a permanent residue or remove the surface finish.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Inspect all concrete substrates and conditions under which the DIAMATIC® PC-5614 Topping System to be installed.
- B. Verify that all surfaces and site conditions are ready to receive work; document and correct conditions detrimental to timely and proper installation of work. Beginning work constitutes acceptance of substrate condition.
- C. Verify that existing concrete has cured a minimum of 28 days and meets finish and surface profile requirements in Division 03 Section “Cast-In-Place Concrete,” before installing the ULTRAFLOOR® DIAMATIC PC-5614 Topping System.
- D. Inspect to mock-up panel to insure it is satisfactory and meets all of the owner’s requirements.
- E. Conduct pre-installation conference, per Section 1.3 F.

3.02 PREPARATION

A. DEMOLITION

1. Clear surfaces of any debris and construction materials.
2. If a generator is not provided by the Installer, power connections for the equipment of the DIAMATIC® PC-5614 Topping System shall be located and prepared by general contractor.
3. Using the appropriate mechanical means and methods, remove existing floor coverings and coatings, including but not limited to carpet VCT, ceramic tile and grout, wood, epoxy/ urethane, quartz, mastic, adhesives, paint or other non-concrete floor materials. Adhesives must be removed to their penetrated depth.

a.**Note:** The mechanical removal of resilient flooring, backing, lining felt, cutback and other adhesives can be hazardous, as certain materials may contain asbestos or crystalline silica. Do not sand, dry sweep, dry scrape, drill, saw, bead blast, grind, mechanically chip or pulverize these materials, as harmful dust may result. Inhalation of this dust may cause asbestosis or other bodily harm. Please consult the adhesive manufacturer, the Resilient Floor Covering Institute (www.rfci.com) and all applicable government agencies for rules and regulations concerning the handling and removal asbestos-containing materials.

- b. Prevent any damage to concrete slab surface during demolition from chipping hammers. Existing flooring should be removed mechanically with walk-behind or ride-on scraping equipment.
4. Prepare the existing concrete mechanically via scarification, shot blasting or other means, including diamond grinding by using aggressive, metal bonded DIAMATIC® Polycrystalline diamonds (18/20 Grit or 30/40 Grit), to remove all contaminants and provide a sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil and other contaminants.
5. A shaver or planar may be required anyplace that the grade does not allow for the minimum depth of 3/8" of PC-5614 material.
6. The Concrete Surface Profile (CSP) shall be a 3 in accordance with ICRI-03732 for the installation of the DIAMATIC PC-CONCRETE PRIMER.
7. Chemical preparation of the substrate is NOT acceptable, including but not limited to acid etching, sweeping compounds, solvents and adhesive removers.
8. Suppress dust during demolition with the use of dust collection equipment to reduce or eliminate airborne concrete and substrate dust.
9. Where existing concrete is cracked, damaged, spalled, not within specified tolerance, or contains unacceptable levels of contaminants or moisture vapor, the Installer of

The DIAMATIC® PC-5614 Topping System will evaluate conditions and proceed with appropriate ULTRAFLOOR® System components.

B. Joint Fill (Indoor)

1. All joint fill materials shall be installed in accordance with the written recommendations provided in the approved manufacturer's technical data.
2. All existing joints shall be honored in the Topping installation.
3. For the best results all joints should be filled after the first pass of metal bonded diamonds, but before any further grinding continues.
4. If the joint filling will occur after the polishing process, apply DIAMATIC® FLOR- SIL or, tape, or soap to the edge of the concrete to keep the joint filler from staining the concrete.

3.03 GLOSS ATTAINMENT (ASTM E430)

- A. Gloss readings are obtained through the use of a digital gloss meter. Readings shall be an average of measurements taken on the finished floor surface.
- B. Readings shall be taken not less than 10' (3 m) on center in field areas and within 1' (0.3 m) of floor area perimeters. In no case shall a reading be below 2% of specified minimum sheen:
 1. Level A Sheen – Low Gloss reading of 30 to 40. 400 grit diamond finish.
 2. Level B Sheen – Medium Gloss reading of 41 to 55. 800 grit diamond finish.
 3. Level C Sheen – High Gloss reading of 56 or higher. 1500 grit or higher.

- C. For instructions on achieving gloss levels, refer to the appropriate sub-section of section 3.04 below.

3.04 POLISHING

A. CUT LEVELS

- a. LEVEL 1 CUT / A light cut that removes the surface paste exposing the fine aggregates near the surface. Also referred to as a light salt & pepper. Note that a Level 1 cut will show more aggregates with PC-5614 than a traditional polished overlay.
- b. LEVEL 2 CUT / A level 2 cut can be achieved by adding additional aggregates during placement of the material. The depth of the material will be increased to allow for the additional aggregate sizes.

B. SPECIFIED POLISHED FLOOR DETAILS

- a. Specified Floor Finish shall have a Cut Level of “ LEVEL 1 “
- b. Specified Floor Finish shall have a Gloss Level of “ LEVEL B “
- c. Specified FLOR-COLOR shall be “N/A”
- d. See section 3.06 for specific polishing steps

3.05 APPLICATION

A. DIAMATIC PC-CONCRETE PRIMER INSTALLATION

1. Prepare the surface to Concrete Surface Profile between a CSP 3 in accordance with ICRI-03732. Check to verify that the area is deep enough to accept 3/8” of the PC-5614 material.
2. Completely clean the surface to remove any loose particles or debris from the surface. The surface must be completely dry before the Epoxy application.
3. Mix the PC-Concrete Primer according to the installation guidelines and apply immediately to the surface using a 1/2” nap roller at the rate of 400 square feet per 3 gallon kit.
4. Broadcast the #20-30 kiln dried sand into the surface to the point of refusal, or 1 pound per square foot. Walking on the surface with spiked shoes is permitted.
5. Allow the primer to dry a minimum of 12-16 hours.
6. Remove any excess sand that is not bonded to the surface by sweeping and vacuum.

B. DIAMATIC PC-5614 TOPPING INSTALLATION

1. Mix the PC-5614 Topping according to the technical data sheet. The drill should be equipped with a box style paddle, and should run at a minimum speed of 800-1200 RPM. The material shall be mixed for a minimum time of 3 – 3.5 minutes. Recommend a 2 bag mix should be done to insure consistency in the application.
2. Be sure that a DIAMATIC® Calibrated container is used for measuring the mix water. Using exactly 3.0 quarts is critical to the application procedure.
3. Using a gauged rake (Mid-West Rake with 3/8" cams) spread the material evenly over the primed surface.
4. The material may be smoothed using a standard overlay stainless smoothing tool. Be sure to fill any holes or low areas in the surface during the installation. Do not overwork the surface.
5. Any smoothing or finishing should be done within 20 minutes of the application. After 20 minutes the surface should not be touched.
6. Allow the material to dry for a minimum of 12 hours before grinding begins, or until a rebound test result produces 2,500 PSI or greater.
7. Refer to the PC-5614 Technical Information Sheet for complete mixing, application, and complete safety details.
8. **Large Batch Mixing:** For large batch mixing place the measured amount of water in the mixer for all of the bags first. Hold back a small amount of the water to add during mixing. Add all of the bags to the mixer with the mixer running. Add the retained water during mixing. The material should mix for 6-7 minutes until a smooth and even consistency has been reached. Discharge the hopper directly into the pump for placement.

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3.06 POLISHING ADDENDUM

1. GRIND/POLISH #1: DIAMATIC 60/80 Grit Hard Bond Buffalo Segment diamonds.
2. Clean the floor to remove all residual dust.
3. GRIND/POLISH #2: DIAMATIC 100 Grit Hard Bond Ceramic diamonds.
4. Apply the FLOR-FILL™ (RSG) at the rate of 300 square feet per gallon in front of the grinder. Refer to the RSG Technical Information Sheet for complete details.
5. Allow the FLOR-FILL™ (RSG) to dry completely before continuing. The bottom of the grinder should also be thoroughly cleaned before running the next pass.
6. GRIND/POLISH #3: DIAMATIC 200 Grit FLEX-RES Resin bonded diamonds.
7. Clean the floor to remove all residual dust.
8. GRIND/POLISH #4: DIAMATIC 400 Grit FLEX-RES Resin bonded diamonds. (Level A)
9. Clean the floor to remove all residual dust.
10. GRIND/POLISH #4: DIAMATIC 800 Grit FLEX-RES Resin bonded diamonds. (Level B)
11. Clean the floor to remove all residual dust.
12. MICROPOLISH/BURNISH #1: FLOR-GRIT™ 800 Diamond Impregnated Pad.
13. Apply DIAMATIC FLOR-FINISH™ (High Gloss) per application instructions at a rate of 3,000 square feet per gallon.
14. Allow the FLOR-FINISH™ to dry for a minimum of 15-20 minutes.
15. MICROPOLISH/BURNISH #2: FLOR-GRIT™ 1500 Diamond Impregnated Pad. Must be able to produce 100 degrees F.
16. Apply DIAMATIC FLOR-FINISH™ (High Gloss) per application instructions at a rate of 3,000 square feet per gallon.
17. MICROPOLISH/BURNISH #3: FLOR-GRIT™ 1500 Diamond Impregnated Pad. Must be able to produce 100 degrees F

3.07 EDGES

- A. Where required polished edge work of all areas shall be done with a 5" or 7" DIAMATIC Hand Held or Walk Behind polishing tool. The edge polishing process will begin with a 100 grit Easy Edge Ceramic Bonded tool. Follow the steps outlined above for the desired gloss level and each edge polishing step shall be done immediately after the matching main polishing step.
- B. NOTE: All grinding and polishing completed with grinder/polisher equipment connected to a dust collector.

3.08 ACCEPTANCE

- A. Remove all installation materials and any foreign materials resulting from the installation, from the site.
- B. Clean adjacent surfaces and materials.
- C. Perform post job walk to ensure that the ULTRAFLOOR® DIAMATIC PC-5614 Topping System has been completed per the process spec.
- D. Take pictures of final product for documentation and submittal, if requested or required.

3.09 GENERAL MAINTENANCE

- A. Restrict using water on the surface for 72 hours after initial installation. The surface should not be cleaned using a string mop for 60 days to avoid streaking of the FLOR-FINISH™. Avoid using mats or treated coverings for a minimum of 14 days to allow the finish to fully cure.
- B. DO NOT USE cleaners that are acidic or have citrus (de-limonene) or butyl compounds. Although the ULTRAFLOOR® Architectural Polished Concrete System is chemical and stain resistant, the application of these high acid cleaners may etch the surface and cause a residual stain. Regular maintenance and cleaning will help prolong surface shine.
- C. Recommended cleaner for the ULTRAFLOOR® Architectural Polished Concrete System shall be the DIAMATIC® FLOR-CLEAN™ Neutral pH Cleaner.
- D. Specific maintenance requirements may vary for each project depending on the use and amount of traffic on the surface. Consult your ULTRAFLOOR® Certified installer for specific maintenance requirements.

Daily Maintenance

- A. An auto-scrubber may be used if equipped with a vacuum system to remove any standing water. The equipment tank should be filled with clean water only, NO CHEMICALS. The scrubber should be equipped with a soft pad only, DO NOT USE A BRUSH attachment.
- B. Use of the DIAMATIC® FLOR-CLEAN™ is acceptable in the auto-scrubber tank.

Weekly Maintenance

- A. An auto-scrubber may be used if equipped with a vacuum system to remove any standing water. The equipment tank should be filled with clean water only, NO CHEMICALS. The scrubber should be equipped with a soft pad only, DO NOT USE A BRUSH attachment.
- B. Use of a BURNISHER equipped with a FLOR-GRIT pad may be used as needed to restore gloss to specified levels. An 800, 1500, or 3000 grit pad is recommended.

Extended Maintenance

- A. After thorough cleaning a coat of the DIAMATIC® FLOR-FINISH™ may be applied annually or bi-annually depending on traffic and wear to restore original gloss and increase the stain resistance on the surface. Follow all technical data instructions for proper application or consult the original floor installer for assistance.
- B. Use of a BURNISHER equipped with a FLOR-GRIT™ pad may be used after the application of the FLOR-FINISH™ to restore gloss to specified levels. An 800, 1500, or 3000 grit pad is recommended.

END OF SECTION

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