

PART I— GENERAL

WORK SPECIFIED HEREIN

- All labor, materials, equipment and services to install polished concrete floor systems for interior concrete slab surfaces as identified on the drawings.
- Densifier and stain guard application, as specified.
- Progressive polishing and burnishing of slab surface to achieve required gloss values, prior to and after application of stain guard.

RELATED WORK SPECIFIED ELSEWHERE

- Section 03300: Cast-in-Place Concrete.
- Section 03930: Joint Filling

SUBSTITUTIONS

- In accordance with Section 01600

SUBMITTALS

- The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.
- Submit the following items for review by PETSMART's Construction Manager.
- Submit all data items required within this section in a single submittal via e-mail (maximum document size 3Mb, scanned black and white, 150 dpi). Do not submit required information for this section combined with data from other sections.
 - Maintenance Manual: Submit installer's maintenance manual, including maintenance and cleaning instructions for polished concrete floor system.
 - Product data and cut sheets, including MSDS sheets:
 1. Manufacturer and model of all equipment to be used (as specified):
 - a. All grinding and polishing machines.
 - b. Manufacturer and model of diamond polishing heads. Product data and procedure of polishing must be submitted for verification of compatibility, prior to beginning slab enhancement work.
 - c. Dust extraction system.
 - d. High speed burnishing equipment, including burnishing pads. Product data for pads must be submitted for verification of pad texture prior to beginning burnishing work.

- e. Scrubber machines.
- f. Densifier applicators/sprayers.

2. Chemical Stripper: Brand name, chemical composition, dilution rate, installation directions and certificates of compliance with required standards, if applicable.
3. Reactive Surface Densifier, Colorant, and Stain Guard: Brand name, chemical composition, installation directions and certificates of compliance with required standards.

QUALITY ASSURANCE

- See Section 01400 for required testing and for payment provisions for testing.
- Installers Qualifications:
 1. Equipment certified installer with at least 5 years of experience in diamond concrete grinding, honing and polishing.
- Environmental Requirements:
 1. Comply with current federal and local toxicity and air quality regulations and with federal requirements on content of lead, mercury, and other heavy metals. Do not use solvents in floor polish products that contribute to air pollution.
 - a. All propane powered equipment must have catalytic converters on mufflers and certification of emission testing conducted within 6 months of operation that confirms compliance with all air quality regulation.
 2. Limit and control all noise, dust and moisture created by concrete surface enhancement work to meet all local, state, and federal ordinances, codes and laws.
 - a. Limit and control damage from dust or slurry caused by surface preparation and polishing.
- Pre-installation Meeting:
 1. Convene pre-installation meeting before start of all polished concrete work.
 2. Require attendance of parties directly affecting work of this section, including Contractor and installer.
 3. Review acceptance of test panel, surface preparation, installation, field quality control, protection and coordination with other work.

RELATED DOCUMENTS

- ASTM D 523-08 – Standard Test Method for Specular Gloss.
- ASTM D1455-87 (Reapproved 2008) - Standard Test Method for 60°

MATERIALS DELIVERY, STORAGE AND HANDLING

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

WARRANTY

- Installer shall warrant compliance with the Performance Requirements herein for a period of three years.

PART II – PRODUCTS

MANUFACTURERS

- Subject to compliance with project requirements, provide products and equipment by the following:
 1. 3M, www.3m.com
 2. American Decorative Concrete, www.adcsc.com
 3. Concrete Polishing Solutions, www.go2cps.com
 4. Convergent Concrete Technologies, www.convergentconcrete.com
 5. Diamond Tool Supply, Inc., www.diamondtoolsupply.com/
 6. Eagle Solutions, www.eaglefloorsolutions.com
 7. ETC of Henderson, Inc., www.etc pads.com
 8. HTC, www.htc-america.com
 9. Innovatech, www.innovatechproducts.com
 10. Norton Abrasives, www.nortonprocleaning.com
 11. Pioneer Eclipse, www.pioneer-eclipse.com
 12. Prosoco, www.prosoco.com
 13. Pullman-Ermator, www.ermatorusa.com
 14. Rubbermaid Commercial Products, www.rubbermaidcommercial.com
 15. SASE Company, Inc., www.sasecompany.com
 16. Substrate Technology, Inc., www.substratetechnology.com

17. Superabrasive, Inc., www.superabrasive.com/
18. VIC International Corporation, www.vicintl.com
19. VMC Technical Assistance Corp, www.vmctac.com

EQUIPMENT

- Three-phase 480-volt electrical supply to be provided by the Contractor.
 1. If generators are required due to site constraints, coordinate security at all access points for cables.
 - a. Location of Cables throughout sales floor must be coordinated with the Owner.
 - b. It is the responsibility of the Contractor to communicate safety hazards with all store personnel and provide adequate protection and marking for power cord(s) associated with all equipment.
- Dust extraction system and pre-separator for grinding and polishing.
 1. Heavy-duty industrial HEPA filtration vacuum system, suitable for extracting and containing large quantities of fine concrete dust (minimum 350CFM air flow) in conjunction with manufacturer recommended pre-separator.
 2. Provide one of the following:
 - a. 86D, by HTC.
 - b. T8600, by Pullman-Ermator.
 - c. Bull 1250, by SASE Company, Inc.
- Furnish minimum three grinding/polishing machines in full operating condition during the duration of the night's work.
 2. Planetary, counter rotating variable speed floor grinder.
 3. Minimum 600 pounds of downward pressure.
- Hand grinder or stand-up edger with dust extraction attachment and pads for edge grinding/polishing.
- Diamond Grinding Heads:
 1. Provide diamond grinding heads from one of the following manufacturers. Use heads from same manufacturer throughout entirety of project.
 - a. HTC
 - b. SASE, Inc.
 - c. Substrate Technology, Inc.
 - d. Superabrasive, Inc.
 - e. VMC Technical Assistance Corp

2. Grinding Diamonds
 - a. Metal Bonded Diamond Grit Sizes: 40, 80, and 150.
 - b. Hybrid Style Diamond: 30, 50, 100.
 - c. Resin Bonded, Phenolic Diamond Grit Sizes: 100, 200, 400, 800 and 1,500 as needed to achieve specified gloss, prior to stain guard application.
 - d. Grinding/Polishing Pads for Edges: Provide grit sizes matching grinding/polishing diamonds above.
3. Progression of all polishing steps shall include sequential grit sizes that are not greater than twice the previous grit used.
- High speed propane burnisher:
 1. Equipment shall meet the specified minimum performance requirements.
 - a. 27 inch head.
 - b. 585 cc engine size, generating 1,500 RPM or higher (as verified with tachometer).
 - c. 22 pound head weight (40 pound maximum).
 - d. Dust skirt assembly.
 - e. The weight and speed of the burnisher shall generate adequate heat and friction at the concrete floor surface to transform the lithium stain guard application to the specified gloss level.
 2. Provide burnisher as manufactured by one of the following:
 - a. Eagle Solutions.
 - b. Minuteman.
 - c. Pioneer Eclipse.
 - d. Onyx.
- Burnishing Pads:
 1. Diamond Impregnated Pads (1500 grit)
 - a. Scotch-Brite Diamond Floor Pads Plus, by 3M.
 - b. SpinFlex Diamond Polishing Pads, by Concrete Polishing Solutions.
 - c. Vortex Heavy Duty Diamond Impregnated Pads-Buff X, by Diamond Tool Supply, Inc.
 - d. Twister Diamond Cleaning System Pads, by HTC.
 - e. Diamond Polishing Pads, by Norton.
 2. Natural Hair Pads:
 - a. Niagra Super Hogs Hair Floor Pad 3700N by 3M.
 - b. Ultra Grizzly Bear by Norton.
 - c. Consolideck Heat Pad by Prosoco.

- Sprayer for Reactive Surface Colorant Densifier and Stain Guard:
 1. CO₂ sprayer.
 - a. SpraySafe System, by Patriot Sprayer Systems.
- Applicator pad:
 1. Minimum 24" Microfiber Wet Room Pad, by Rubbermaid.

M A T E R I A L S

- Reactive Surface Densifier: Clear lithium based chemical densifier specifically for concrete surface treatment which reacts chemically to the concrete surface forming a clear, dense, durable, hard, abrasion-resistant surface. Product shall be a colorless, odorless, water-based solution that is less than 50 VOC.
 1. Provide one of the following:
 - a. Consolideck LS, by Prosoco.
 - b. Pentra-Sil (NL), by Convergent Concrete Technologies.
 - c. SureLock Densifier, by American Decorative Concrete.
- Stain Guard (Protective Surface Treatment): Water-based, low odor, non-flammable, VOC compliant penetrating treatment.
 1. Provide product of same manufacturer as densifier.
 - a. Consolideck LS Guard, by Prosoco.
 - b. Pentra-Guard (HP), by Convergent Concrete Technologies.
 - c. SureLock Stain Protector, by American Decorative Concrete.
 2. Oil and Water Repellent Sealer – 1 application of SASE SPR3 or Ameripolish SR2

PART III – EXECUTION

S Y S T E M D E S C R I P T I O N

- Installation of polished concrete floor system for interior concrete floors by grinding, honing and polishing with various size grit metal- and resin-bonded diamonds, including application of concrete dye, densifier and stain guard for concrete slabs on grade.
- Chemical Resistance: System shall resist staining or deterioration from exposure to animal waste and the cleaning products normally used by PetSmart including, but not limited to, "Lemon Quat", "Green Light", "Buckeye Blue" and "Crossbow" as manufactured by Buckeye International, Inc.

E X A M I N A T I O N

- Examine floor to receive polished concrete floor system.
 1. Verify Floor Finish: smooth, flat surface free of rough areas.
 2. No stains or other defects exist in the slab that would affect the final floor finish.

3. Verify maximum vapor transmission per Anhydrous Calcium Chloride Test (ASTM F 1869) less than 5 pounds per 1,000 square feet.
- Floor and Joints:
 1. Free of debris, dirt, dust, clay and mud.
 2. Dry.
 - Notify PETSMART of conditions that would adversely affect installation or subsequent use.
 - Do not begin surface preparation or installation until unacceptable conditions are corrected.
 - Surface Preparation: Prepare surfaces in accordance with all specified product manufacturer's requirements.
 1. 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.
 - a. Remove all curing or sealing compounds, coatings (including epoxy resins), and wax by mechanical means that will not expose concrete slab coarse aggregate.
 - b. Thoroughly rinse floor surface with clean water to remove soap residue and contaminants. Vacuum with auto scrubber.
 - c. Squeegee dry.

SURFACE POLISHING, COLORANT AND DENSIFIER APPLICATION

- Install polished concrete floor system, as described below, at locations indicated on the Drawings.
 1. Aggregate Exposure: Salt and pepper look from exposed sand, with minimal coarse aggregate exposure to achieve a consistent appearance throughout the store.
- Ensure surfaces are clean and dry.
- Complete any joint replacement and slab repair work minimum 12 hours prior to commencement of any grinding or polishing.
- Dispose of all polishing waste. Disposal shall be in compliance with all local, state and federal guidelines and regulations for disposal.
- Open slab surface by progressively grinding with 40, 80, or 150-grit metal-bonded diamond heads. Use Mohs Pencil scratch test to determine initial grinding grit necessary to produce required gloss values and clarity (surface free of pits, inclusions and scratches).
 1. Do not expose coarse aggregate, unless unavoidable due to existing conditions and approved by Owner from observation of test sample.
 2. Sequential progression of diamond grinding shall be required and limited to no more than double the grit value of the previous diamonds used.

3. Each polishing pass must overlap previous polishing pass by 25%.
 4. Between grinding passes, thoroughly scrub and rinse slab surface with clean water and vacuum up with auto scrubber.
- Progressively hone and polish slab surface with 100, 200, 400, 800 and 1,500-grit resin-bonded, phenolic diamond heads. Use of 100/200 combination diamond heads will be acceptable if required to produce less scratching in the slab surface.
 1. Progressively diamond polish edges along and around all vertical abutments, including walls, columns, cases, and racking systems as shown on Drawings. Use same progression of polishing diamonds as specified above.
 2. Sequential progression shall be required and shall be limited to no more than double the grit value of the previous diamonds used.
 3. Between grinding/honing/polishing passes, thoroughly scrub and rinse slab surface with clean water and vacuum up with auto scrubber.
 4. Burnish slab to remove swirls from resin-bonded, phenolic diamond heads.
 - Apply reactive surface densifier at 500 sq. ft. per gallon, one time after 400-grit resin and before subsequent 800-grit resin diamond pass, according to manufacturer's instructions.
 1. Thoroughly clean slab surface pores with auto scrubber prior to application of densifier.
 2. Ensure slab surface is dry at time of application of lithium densifier.
 - Apply Stain Guard and oil and water repellent sealer as specified herein.

STAIN GUARD APPLICATION

- Subsequent to densifier and final colorant application, apply stain guard over surfaces to which densifier has been applied and has dried.
- Use proper Personal Protective Equipment (PPE) when applying lithium stain guard and/or burnishing.
- Application:
 1. Apply in accordance with manufacturer's published instructions, unless otherwise noted.
 - a. Apply using specified sprayer with red #6 spray tip.
 - b. Use new sprayer tip for each night's work.
 - c. Application of stain guard in excess of manufacturer's published instructions may result in additional cost to Contractor without an increase in Contract time.
 2. Use applicator pad, pre-wetted with stain guard, to pull material out to create a thin film prior to drying.

3. Remove product completely from areas of over application, as evidenced by surface streaking, and replace with unused stain guard.
- High speed burnish:
 1. After each application of stain guard is dry, burnish surface per manufacturer's instructions.
 2. Burnish at a slow movement pace using high speed machine with 1500 grit diamond impregnated or natural hair burnishing pads.
 3. Burnishing, pad type, and pace of forward movement shall combine to develop a minimum floor surface temperature of 91-degrees F directly below the burnishing pad as continuously measured by the operator during installation.
 - Continue periodic burnishing operations to retain specified gloss until Substantial Completion.
 - Provide final burnishing prior to Substantial Completion as required to eliminate damage from subsequent work.

FINISH REQUIREMENTS

- Appearance: Polished interior slabs shall comply with the following:
 1. Failure to comply with specifications to produce finish requirements may result in additional cost to Contractor without an increase in Contract time or additional disruption to Store operations.
 2. Slab surface must have a consistent look and exhibit a hard polish that is "mirror-like" in appearance with no evidence of scratching from polishing process.
 3. White residue or hazy appearance in the finished surface will not be accepted.
- Gloss: Final surface gloss shall be a Specified Overall Gloss Value (SOGV) of not less than 40 and Minimum Local Gloss Value (MLGV) of 30 as measured using a Horiba IG-320 Gloss Checker.
- Slip Resistance: Measured static coefficient of friction (SCOF) shall be not less than 0.50 (0.60 wet) at time of Substantial Completion as measured using an American Slip Meter ASM 825 Digital Meter, Regan Scientific Instruments BOT-3000 Tribometer.
- Leave work complete and ready for final inspection.

FIELD QUALITY CONTROL

- Completed polished concrete floor system to meet satisfaction of Owner, PETSMART, Contractor and Professional of Record.
- Review procedures with Owner's Representative to correct unacceptable areas of completed polished concrete floor system. Repairs to include re-polishing or removal of portions of slab as necessary to satisfy Owner's Representative.
- Take gloss measurements a minimum of once each five working days. Gloss shall be considered as a quantitative value that expresses

the degree of reflection when light hits the concrete floor surface. Gloss measurements will be taken independent of ambient lighting and within a sealed measurement window located beneath the testing equipment.

- Measurement and reporting of SOGV and MLGV shall be as follows:
 1. Collect a minimum of five samples in random locations in the center of the each aisle for each nights work area. Record measurement locations on copy of Floor Polishing Plan. Discard the high and low values measured in each area.
 2. The average of all samples collected in each area shall meet SOGV.
 - a. If the average of samples collected do not meet the SOGV, collect an additional three samples in each bay for each deficient result unless the individual samples fail to meet the MLGV or the average of all collected samples in each bay fail to meet the SOGV.
 - b. If samples fail to meet the SOGV, Contractor shall continue sweeping, scrubbing and polishing until the SOGV is achieved.
 3. No single measured value shall be less than MLGV.
 - a. If one or more samples fall below the MLGV, Contractor shall continue sweeping, scrubbing and polishing until all samples comply with Specified MLGV and SOGV.
 4. Collect and certify final gloss measurements.
 5. Within 24 hours of testing, submit all measurements to Owner for review.
- Slip Resistance Measurements:
 1. Take slip resistance measurements 2 weeks prior to Substantial Completion. Contractor shall notify the testing agency when floors are ready for testing.
 2. Four slip resistance measurements will be required within the areas of the two highest and two lowest SOGV measurements.
 3. Correlate single re-measured gloss value at each location in floor slab where slip resistance is measured.
 4. Within 24 hours of testing, submit all measurements to Owner for review.
- Testing: Test the following from completed polished concrete floor system.
 1. Static Coefficient of Friction, ASTM C 1028: both wet and dry surfaces.

PROTECTION OF POLISHED CONCRETE

- Protect slab surface from moisture for 72 hours to prevent re-emulsification of surface treatment prior to cure. Verify that all wood pallets are dry prior to placing on finished slab.

SECTION 03331: POLISHED CONCRETE FLOOR SYSTEM

- Protect completed polished concrete floor system from damage until 12 hours prior to Substantial Completion.
 1. Do not allow vehicle and pedestrian traffic on unprotected floor.
 2. Do not allow construction materials, equipment and tools on unprotected floor.
- Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings and other surface contaminants which could adversely affect completed polished concrete floor system.
- Repair damaged areas of completed polished concrete floor system to satisfaction of Owner's Representative.

END OF SECTION