

MASTER SPEC
POLISHED CONCRETE FINISHING

PART 1- GENERAL

1.01 SUMMARY

- A. Section Includes: This Section specifies [Dyed and] polished concrete.
- B. Related Sections:
 - 1. Section [03 01 30 Maintenance of Cast-in-Place Concrete].
 - 2. Section [03 30 00 Cast-in-Place Concrete].
 - 3. Section [07 92 00 Joint Sealants].

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 302.1R Guide for Concrete Floor and Slab Construction.
- B. ASTM International:
 - 1. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 2. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete.
 - 3. ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
 - 4. ASTM D523 Standard Test Method for Specular Gloss

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide polished flooring that has been selected, manufactured and installed to achieve the following:
 - 1. ASTM C779 Method A- standard test method for abrasion resistance of horizontal concrete surfaces.
 - 2. Reflectivity: ASTM D523, Specular gloss in accordance with architect's required gloss unit (GU) reading
 - 3. ANSI B101.1- Test method for measuring wet SCOF of common hard surface floor materials.
- B. Design Requirements:
 - 1. Hardened Concrete Properties:
 - a. Minimum Concrete Compressive Strength: 4000 psi (24 MPa).
 - b. Normal Weight Concrete: No lightweight aggregate or deleterious materials.
 - i. Ensure all aggregates used are non-porous and polishable.
 - c. Non-air entrained.
 - d. Additional compressive strength over specification is considered desirable and does not constitute any pricing increase from polishing contractor
 - 2. Placement Properties:
 - a. Natural concrete slump of 4 inches. Admixtures may be used.
 - b. Any admixtures, plasticizers, slag, fly ash or anything taking the place of Portland-based cement shall not exceed 15%. * a straight cement mix is recommended
 - c. Flatness Requirements: Overall FF 50, Local FF 35.
 - d. Levelness Requirements: Overall FL 30, Local FL 20.
 - e. Hard-Steel Troweled (3 passes) Concrete: No burn marks. Finish to ACI 302.1R, Class 5 floor.
 - f. When placing edges use a 3' metal or wooden 2x 4 screed and run parallel with form or edge after initial screed and before floating.
 - g. Hand floating shall be parallel to edge and done in 2' increments to avoid lifting or depressing edges. Do not reach out beyond 2' of edge with hand tools or float in a fan direction pulling excessive mud to the forms.
 - 3. Curing Options:

- a. Membrane forming curing compounds (polyethylene film not recommended.)
 - b. Damp Curing: Seven day cure.
4. Slab Protection Immediately Following Placement (see also section 3.6):
- a. Silicone chalks should NOT be used if at all possible. The RED and yellow chalks are PERMANENT DYES. RED Chalk, black markers, wax pencils should NOT be used for framing. White or Blue chalks are OK. Do not over mark for the framing. Do NOT use silicone sprays to "Hold" the lines. The sprays repel the stain and leave harsh, permanent scars on the floor.
 - b. Do not use , Tape, Glue, Solvents, Pine-Sol, Varnish, Non Breathing Plastics, Liquid Nail, Silicone, Plastics, Nails, Plumbers Glue, Foam Insulation, Bond Release Agents, Flux, Oils, Grease, Polyurethane, Paint, Markers (framers often write dimensions of doorways in marker on the slab. Ask them to make that note on the wood framing the doorway), Grease Sticks, Spray Paints, Crayons, Muriatic Acid, and other chemicals both before and after staining.
 - c. It is important that wood, sheet goods, insulation boards, plywood, press board, drywall, sections of framing and the like not lay on the slab for extended periods of time. They can transfer resins and tannins into the slab. This will alter the moisture content in the slab which leaves a pattern in the finished floor. Cardboard should be placed between the slab and the stacked material to minimize any unwanted transfers. Also Food, Beverages, Oil, Glass, Metal, Paint, Caulk, or Primers.

1.04 ACTION SUBMITTALS

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section [01 33 00 - Submittal Procedures] [_____].
- B. Product Data: Submit product data, including manufacturer's spec data product sheet, for specified products.
 1. Material Safety Data Sheets (MSDS).
 2. Preparation and concrete grinding procedures.
 3. Colored Concrete Surface, Dye Selection Guides.

1.05 INFORMATION SUBMITTALS

- A. Quality Assurance:
 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in 1.03 Performance Requirements.
 2. Certificates:
 - a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 3. Manufacturer's Instructions: Manufacturer's installation instructions.

1.06 CLOSEOUT SUBMITTALS

- A. Warranty: Submit warranty documents specified.
- B. Operation and Maintenance Data: Submit operation and maintenance data for installed products in accordance with Section [01 78 00 - Closeout Submittals] [_____].
 1. Include:
 - a. Manufacturer's instructions on maintenance renewal of applied treatments.
 - b. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.07 QUALITY ASSURANCE

- A. Qualifications:
 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 2. Installer trained and holding current certification in system to be applied (if available).
- B. Mock-Ups:
 1. Construct mock-ups in accordance with Section [01 45 00 - Quality Control] [_____].
 2. Mock-Up Size: [100 ft2 (9.3 m2)] [_____] sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
 3. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, aggregate suitability, color selection and shine. Perform ASTM D523 Standard Test Method as cited

in Section 2.02 Finishes and provide printed results to architect prior to commencement of work.

4. Allow [24] [] hours for inspection of mock-up before proceeding with work.
 5. When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.
- C. Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with [Section 01 31 19 - Project Meetings] []. Review the following:
1. Environmental requirements.
 2. Scheduling and phasing of work.
 3. Coordinating with other work and personnel.
 4. Protection of adjacent surfaces.
 5. Surface preparation.
 6. Repair of defects and defective work prior to installation.
 7. Cleaning.
 8. Installation of polished floor finishes.
 9. Application of liquid hardener, densifier.
 10. Protection of finished surfaces after installation.

1.08 DELIVERY, STORAGE & HANDLING

- A. General: Comply with [01 61 00 - Common Product Requirements] [].
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original packaging with identification labels and seals intact.
- D. Storage and Protection:
 1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 2. Protect concrete slab.
 3. Protect from petroleum stains during construction.
 4. Diaper hydraulic power equipment.
 5. Restrict vehicular parking.
 6. Restrict use of pipe cutting machinery.
 7. Restrict placement of reinforcing steel on slab.
 8. Restrict use of acids or acidic detergents on slab.
- E. Waste Management and Disposal:
 1. Separate waste materials for [Reuse] [And] [Recycling] [] in accordance with [Section 01 74 19 - Construction Waste Management and Disposal] [].
 2. Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.09 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Comply with manufacturer's written recommendations.

1.10 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.
- C. Warranty: Commencing on date of acceptance by [Owner] [Architect] [Consultant] [].

1.11 MAINTENANCE

- A. Comply with manufacturer's written instructions to maintain installed product.

1.12 EXTRA MATERIALS

- A. General Contractor to provide maintenance materials in accordance with Section [01 78 00 - Closeout Submittals]

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PART 2- PRODUCTS

2.01 MANUFACTURERS

- A. Ensure that manufacturer has a minimum of 5 years' experience in manufacturing components similar to or exceeding the requirements of this project.

2.02 POLISHED CONCRETE FINISHING PRODUCTS

- A. Products/Systems:
1. Hardener, Sealer, Densifier: Water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film. Silicate or amorphous silica designed specifically to be used in conjunction with concrete polishing. No silicate hardener will be accepted.
 2. Polyurea Joint and Crack Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, control joint and crack filler with Shore A 80 or higher hardness.
 3. Spall Repair: Polymer modified cementitious material compatible with concrete polishing process designed to repair surface defects in concrete.
 4. Oil Repellent Sealer: Penetrating concrete sealer designed specifically to be used in conjunction with polished concrete.
 5. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with water or VOC exempt solvent; formulated for application to polished cementitious surfaces with UV stabilizers designed to help protect colorant from fading.
 6. Cleaning Solution: Mild, highly concentrated liquid concrete cleaner and conditioner; biodegradable, and environmentally safe. Cleaner must be ph neutral.
 7. Floor Protection: Liquid applied latex base coat with impact and tear resistant fabric on top.
- B. Finish: To be tested in accordance with ASTM D523 test method. Provide printed results to Architect, General Contractor, and Owner within 24 hours of completion. A minimum of 10 samples must be taken from each section of project to obtain an accurate average. Minimum will be no less than 75% of specified finish for any single test and no less than 85% as an average. Porous aggregates may provide artificially low readings and if present should not be included in measurements. [Matte Finish, 15 GU @ 60°], [Satin Finish, 30 GU @ 60°], [Semi-gloss, 45 GU @ 60°], [High gloss, 60 GU @ 60°] [].
- C. Color: [].
- D. Aggregate Exposure: [Paste finish: No aggregate exposed (less than 1/16")], [Minimal exposure: Average of 1/16"-1/8" aggregate to be exposed and all paste removed from surface], [Moderate exposure: Average of 1/4" – 3/8" aggregate to be exposed], [Heavy exposure: 1/2"- 3/4" aggregate to be exposed consistently throughout] []. (Moderate exposure floors have an average of 1/4"-3/8" exposed, but will likely have substantial inconsistencies in exposure throughout and should not be specified if consistency is crucial!!!)

PART 3- EXECUTION

3.01 EXAMINATION

- A. Site Verification of Conditions:
1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.
 2. Verify Concrete Slab Performance Requirements:
 - a. Verify concrete is cured to 28 day 4000 psi (24 MPa) strength.
 - b. Verify concrete surfaces received a hard steel-trowel finish (3 passes) during placement.

3.02 PREPARATION

- A. Remove previously installed flooring using self-propelled flooring removal equipment only. Use of chipping guns, rotor hammers, or other equipment not specifically designed for removal of sheet flooring is strictly prohibited as it can damage underlying concrete.
- B. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- C. Examine surface to determine soundness for concrete for polishing.

- D. Fill surface defects with acceptable cement based material compatible with polishing process.
- E. Fill large cracks (greater than 1/16") with polyurea joint and crack filler flush with concrete surface.
- F. General Contractor to remove surface contamination.

3.03 INSTALLATION

- A. Sequence of Polishing:
 - 1. Perform grinding and polishing [before partition studs are erected] [after partition studs are erected, but before gypsum board is installed] [after gypsum board and paint, but before casework and base are installed].
- B. Floor Surface Polishing and Treatment:
 - 1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
 - 2. Apply floor finish prior to installation of fixtures and accessories.
 - 3. Apply patching compound and crack filler flush with concrete surface where necessary.
 - 4. Diamond polish concrete floor surfaces with planetary grinding machine with a minimum head pressure of 600 lbs (3-4 headed machine). Sequence coarse to fine grit.
 - a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Level of sheen shall meet specified gloss unit measurements. Failure to meet a minimum of 85% of specified average gloss reading will result in a reduction to the subcontract according to the following calculation:
 - i. ***Reduction in Contract = $\frac{1}{2}$ of original contract x (1 - $\frac{\text{Measured average gloss reading}}{\text{Specified average gloss reading}}$)***
 - b. Expose aggregate in concrete surface as determined by approved mock-up.
 - c. All concrete surfaces shall be as uniform in appearance as possible with no visible scratches anywhere in surface.
 - 5. Grind and polish edges to a maximum of 1/8" of walls to match field area of floor.
 - 6. Edge into corners with a maximum size of 5" diameter grinding & polishing discs.
 - 7. Apply silicate densifier/hardener per manufacturer's specifications
 - 8. Remove defects and re-polish defective areas.
 - 9. Finish edges of floor finish adjoining other materials in a clean and sharp manner
- C. Concrete Sealer:
 - 1. No topical sealer allowed.
 - 2. The appearance of any streaking or swirling from the use of topical sealing products will not be accepted. Identification of such issues will require the surface be ground off and re-polished.
- D. Dyed and Polished Concrete (option):
 - 1. Locate demarcation line between dyed surfaces and other finishes.
 - 2. Apply dye per manufacturer's specifications.
- E. Joint Fill:
 - 1. Apply polyurea joint filler to saw cut contraction joints only. Product not to be used on tooled, expansion, keyed, or isolation joints. Refer to section [07 92 00 Joint Sealants] for these joints.
 - 2. Slightly overfill joints to create a crown and allow the material to cure for 15-20 minutes or until dry to the touch.
 - 3. Shave excess joint fill off flush with the top of the slab with a razor blade to create a seamless finish.
- F. Floor Protection:
 - 1. Apply latex base coat to clean polished concrete surface using 1/4" - 3/8" nap roller or paint sprayer. Allow to dry completely.
 - 2. Apply second coat of latex base coat over initial coat and immediately place fabric mat over the top. Roll out fabric mat with a nap roller to ensure good adhesion. Allow 4-6 hours before opening to traffic.

3.04 ADJUSTMENTS

- A. Polish to higher gloss those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface.

3.05 FINAL CLEANING

- A. Do cleanup in accordance with Section [01 74 00 - Cleaning and Waste Management] [_____].

3.06 PROTECTION

- A. It is important that wood, sheet goods, insulation boards, plywood, press board, drywall, sections of framing and the like not lay on the slab for extended periods of time. They can transfer resins and tannins into the slab. This will alter the moisture content in the slab which leaves a pattern in the finished floor. Cardboard should be placed between the slab and the stacked material to minimize any unwanted transfers. Also Food, Beverages, Oil, Glass, Metal, Paint, Caulk, or Primers
- B. It is extremely important that you do not tape directly to the floor! Duct Tape, Masking Tape, Packaging Tape, Strap Tape, Blue Tape, Green Tape, and Electrical Tape there are NO exceptions. The tape alters the natural curing process and transfers chemicals to and from the slab. Tape, Plastics and other Adhesives can contribute to **Plasticizer Migration**. This WILL SHOW in the finished product.

3.07 SCHEDULE

Specifier Note: Include a schedule of finish types, colors and locations to suit project requirements.

- A. Matte Finish, Color [_____]: [Location].
- B. Semi-Gloss Finish, Color [_____]: [Location].
- C. High Gloss Finish, Color [_____]: [Location].

END OF SECTION