**SECTION 093543**

**POLISHED CONCRETE FINISH**

## PART 1 GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. [Dye and] Polished concrete finish.

### 1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Manufacturer's descriptive data and application instructions for chemical products.

### 1.3 QUALITY ASSURANCE

A. Applicator Qualifications:
   1. Minimum 2 years documented experience in work of this Section.
   2. Certified by equipment and chemical manufacturers.

B. Mockups:
   1. Size: Minimum 100 square feet for each color and finish at location adjacent to floor that will receive polish, but will be covered with another flooring material.
   2. Show requested polished finish.
   3. Test aggregate to ensure it will accept polish.
   4. Include control joints and edges.
   5. Approved mockups may not remain as part of the Work.
   6. Minimum Gloss at 60 Degrees of 70 prior to application of sealer or the use of any dry tools
   7. Minimum DOI of 60 after the application of Concrete Hardener prior to application of Sealer
   8. Maximum RA of 20 micro inches or less

C. Coefficient of Friction: Minimum 0.43, tested to ANSI/NFSI B101.3 after polishing.

### 1.4 PROJECT CONDITIONS

A. Protect concrete surfaces scheduled to receive polished finish after concrete placement but prior to polishing; prevent damage and staining:
   1. Prohibit vehicular traffic on surfaces to be polished.
   2. Prohibit pipe cutting operations on surfaces to be polished.
   3. Prohibit storage on surfaces to be polished for minimum 28 days after concrete placement.
   4. Prohibit ferrous metals storage on surfaces to be polished.

5. Prevent liquid drippings from equipment on surfaces to be polished.
6. Prevent acids and acidic detergents from contacting surfaces to be polished.
7. Prevent painting over surfaces to be polished.

B. Comply with chemical manufacturer's requirement for ambient and surface temperature and humidity ranges before, during, and after application.

C. Close areas to traffic during finishing and for minimum time period after finishing as recommended by chemical manufacturer.

D. Concrete Floor Flatness and Levelness:
1. Minimum Floor Flatness rating of 40.
2. Minimum Floor Levelness rating of 30.

E. Concrete: Cured minimum 28 days or to which point where equipment can operate on slab without displacing aggregate.

1.5 SCHEDULING

A. Schedule polishing minimum 21 days prior to fixture and trim installation.

## PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products by Scientific Concrete Polishing. (www.ScientificPolishing.com)(www.matchpatchpro.com)

B. Ensure Concrete finishing compounds and repair materials are from a single source manufacture for Proprietary Products/Systems. No Substitutions Allowed.

2.2 MATERIALS

A. Concrete Dye:
1 Source: Penetrating Dye
2 Description: Penetrating dye or reactive acid stain.

B. Cutting Compound:
1. Source: Scientific Concrete Polishing
2. Type: Translucent Green, penetrating neutral pH, amorphous silica based cutting compound.
3. Product: Scientific Concrete Polishing "SCP- #1 Cutter".
4. Maximum volatile organic compound (VOC) content: <50 grams per liter.

C. Concrete Hardener:

1. Source: Scientific Concrete Polishing
2. Type: Neutral pH, Colorless, penetrating produced specifically for sealing and hardening concrete surfaces
3. Product: Scientific Concrete Polishing “SCP-#2 Hardener”.
4. Maximum volatile organic compound (VOC) content: <50 grams per liter

D. Sealer:
1. Source: Scientific Concrete Polishing
2. Type: Milky white, penetrating product produced specifically for sealing stained or polished concrete surfaces.
3. Product: Scientific Concrete Polishing “SCP-#3 Sealer”.
4. Maximum volatile organic compound (VOC) content: <50 grams per liter.

E. Hydrophobic Sealer:
1. Source: Scientific Concrete Polishing
2. Type: Milky white, penetrating product produced specifically for creating a hydrophobic and high stain resistance finish for stained or polished concrete surfaces.
3. Product: Scientific Concrete Polishing “SCP-Hydro-Polish”.
4. Maximum volatile organic compound (VOC) content: <50 grams per liter.

F. Repair Materials:

G. Patching Material
1. Source: Match Patch Pro a division of Scientific Concrete Polishing:
2. Type: Fast setting chemical resistant “MPP Polyurea” and “MPP Part C Cements” mixed with local aggregate.
3. Product: Match Patch Pro “MPP Match Patch”
4. Maximum volatile organic compound (VOC) content: <50 grams per liter.

H. Grout Material
1. Source: Match Patch Pro a division of Scientific Concrete Polishing:
2. Type: Proprietary Dry Non Shrinking Portland Cement Based Powder and SCP sealer.
3. Product: Match Patch Pro “MPP Dry Grout”
4. Maximum volatile organic compound (VOC) content: <50 grams per liter.

I. Chemical Resistant Grout Material
1. Source: Match Patch Pro a division of Scientific Concrete Polishing:
2. Type: Fast setting chemical resistant “MPP Polyurea” and “MPP Part C Cements” mixed.
3. Product: Match Patch Pro “MPP Chem-Grout”
4. Maximum volatile organic compound (VOC) content: <50 grams per liter.

J. Grinding Heads:
   a Metal bonded; 16,30,60,299,399, grits SCP Logo Diamonds
   b Resin bonded: SCP-400 grit semi metals, SCP-800,1500,3000 grit Transformers.

K. Grinding Pads for Edges:
   a Metal bonded; 16,30,60,299,399,499 grits SCP Logo Diamonds
   b Resin bonded: SCP-400 grit semi metals, SCP-800,1500,3000 grit Transformers.

   c Ceramic bonded: 30,50,100,200,400 grits SCP Super Edge

L. Joint Fill Material
   1. Source: Match Patch Pro a division of Scientific Concrete Polishing:
   2. Type: Fast setting chemical resistant Polyurea.
   3. Product: Match Patch Pro "MPP Joint 80"
   4. Maximum volatile organic compound (VOC) content: <55 grams per liter.

2.3 ACCESSORIES

A. Cleaning Products: Non-corrosive, neutral pH, Scientific Concrete Polishing "Fortifier" recommended to clean and maintain for after care.

2.4 EQUIPMENT

A. Polishing Equipment:
   1. Two, three, or four head counter-rotating, or planetary variable speed approved floor grinder with minimum 400 pounds down pressure.
   2. Hand grinder with dust extraction attachment and pads.

B. Vacuum Equipment:
   Approved dust extraction system, pre-separator, and squeegee attachments with minimum flow rating of 322 cubic feet per minute per OSHA Crystalline Silica Standard for Construction under 29 CFR 1926.1153

C. Auto Scrubber with soft disk style brushes

**PART 3 EXECUTION**

3.1 EXAMINATION

A. Examine concrete substrates for conditions affecting performance of finish.

B. Repairs not acceptable unless approved by Architect or General Contractor.

C. Verify that concrete substrate meets finish and surface profile requirements.

D. Ensure that concrete is sufficiently cured to accept polishing.

## 3.2 PREPARATION

A. Testing Concrete Floors:
   1. Alkalinity:
      a. Test method: Measure pH according to ASTM F710.
      b. Acceptable results: pH above 9.
   2. Moisture Vapor Transmission:
      a. Test method: Perform anhydrous calcium chloride test to ASTM F1869.
      b. Acceptable results: Maximum 5 pounds per 1000 square feet in 24 hours.
   3. Relative humidity:
      a. Test method: Perform relative humidity test using in situ probes to ASTM F2170.
      b. Acceptable results: Maximum 75 percent.

   4. Surface Texture

      a. Calibrate Profilometer and record surface texture per CSDA ST118.

B. Clean surfaces of loose and foreign materials and debris.

C. Protect adjacent surfaces from damage.

## 3.3 POLISHING

A. Initial Grinding:
   1. Determine required exposure (heavy aggregate, heavy salt and pepper, light salt and pepper or cream), gloss level, DOI, and RA
   2. Select appropriate tool and process to achieve desired results.
   3. Remove construction debris and floor slab imperfections until uniform scratch pattern and desired concrete aggregate exposure is achieved using “SCP-#1 Cutter”- cutting compound, appropriate tools, and manufactures instruction.
   4. Achieve maximum refinement as per ST 118 before proceeding to next tool.
   5. Clean floor using auto scrubber vacuum with brushes after each pass.

Include the following for a dyed finish.

B. Dying:
   1. Apply dye in accordance with manufacturer’s instructions. Ensure consistent coverage.
   2. Maintain wet edge, working newly applied solution into edges of adjacent wet edges of previously treated surfaces.
   3. Maintain consistent saturation throughout application.
   4. Prevent solution from contacting adjacent surfaces.
   5. When color matches approved mockup, neutralize solution as required by manufacturer.

C. Treating Surface Imperfections:
   1. Mix patching compound and grout material by using MPP "Match Stick" to match color of adjacent concrete surface.
   2. Fill surface imperfections prior to polishing. If surface residues exist, expose repair areas by a removal pass over floor first.

   3. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.

Include the following for a cementitious grout coat.

D. Surface Grouting: Apply MPP dry powder and SCP sealer for a cementitious grout coat onto surface to fill voids, to [match] [contrast with] color of concrete using grout pans on machine to work material into the pours. Allow to cure minimum of 6 hours to overnight.

**** OR ****

Include the following for a chemical resistant grout coat.

E. Surface Grouting: Apply Fast setting chemical resistant MPP Polyurea mixed with Part C Cements onto surface using grout pans on machine to work material into the pours per manufactures directions, allow to cure 4 hours.

F. Honing:
   1. Grind surfaces to within 2 - 3 inches of walls with semi metal bonded diamond pads of 299 and 400 grit, grinding 90 degrees from each previous grind.

Include the following if finished edges are desired.

   2. Grind edges with appropriate tool per ST118 and tools capacity.
   3. Remove scratches and achieve maximum refinement with each pass before proceeding to finer grit pads.
   4. Vacuum floor using squeegee vacuum attachment after each pass.

G. Polishing:
   1. Apply undiluted densifier/hardener at rate of 400 to 600 square feet per gallon.
      a. Allow to stand on surface for 10 minutes, then reapply to areas where densifier/hardener has soaked in and allow to stand for an additional 20 minutes.
      b. Allow material to dry.
      c. Do not remove excess densifier/hardener from floor.
   2. Use polishing equipment with resin bonded polishing and burnishing pads.
   3. Begin polishing in one direction starting with appropriate tool as required to achieve specified surface finish.

Include the following if finished edges are desired.

4. Polish edges first, then field of floor.
5. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass.
6. Achieve maximum refinement with each pass before proceeding to finer grit pads.
7. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.
8. Continue polishing until gloss appearance, as measured according to ASTM E430, matches approved mockup.

Include the following if a sealed finish is desired.

## 3.4 SEALING

A. Apply sealer to manufacturer's recommend coverage.

B. Remove excessive sealer.

C. Using burnishing equipment and finest grit burnishing pads, burnish to uniform sheen matching approved mockup.

D. Include the following if a Hydrophobic increased stain resistant finish is desired. Apply Hydro Polish after the 400# tooling step is finished an substrate is cleaned. Allow to cure for a minimum of 6 hours to overnight.

## 3.5 FIELD QUALITY CONTROL

A. Measure slip resistance using BOT-3000 slip-tester; ensure compliance with specified slip resistance rating.

## 3.6 PROTECTION

A. Close areas to traffic until concrete treatment has cured.

B. Protect completed work with non-staining sheet coverings until just prior to Substantial Completion.

## 3.7 CONCRETE POLISHING SCHEDULE

A. Sheen:
   1. Gloss of 35, DOI of 90, RA less than 20.

B. Aggregate Exposure:
   1. Cream Finish: Polish Portland cement paste resulting in little or no aggregate exposure.

**** OR ****

2. Fine Aggregate Finish: Remove maximum 1/16 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying fine aggregate with no, or small amount of, medium aggregate at random locations.

**** OR ****

3. Medium Aggregate Finish: Remove maximum 1/8 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying medium aggregate with no, or small amount of, large aggregate at random locations.

**** OR ****

4. Large Aggregate Finish: Remove maximum 1/4 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying large aggregate with no, or small amount of, fine aggregate at random locations.

C. Edges: [Painted.] [Honed.] [Polished.]

END OF SECTION