# PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 and 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

A. Section Includes: Polished concrete, including surface preparation: grinding, honing and polishing using a silicate repair product, hardener densifier, silicate sealer, un-reacted silicate rinse and non-film forming stain protection.

B. Related Sections
1. Section 018113 “Sustainable Design Requirements.”
2. Section 033000 "Cast-in-Place Concrete" for concrete slab requirements.
3. Section 033555 “Sealed Concrete” for concrete scheduled to be sealed only.

## 1.3 REFERENCES

A. American Concrete Institute (ACI): Comply with the following, unless more stringent provisions are indicated:
1. ACI 302.1R Guide for Concrete Floor and Slab Construction.

B. The American National Standard for Ceramic Tile (ANSI)
1. A137.1-2012, for Dynamic Coefficient of Friction AcuTest.

C. ASTM Standards: Comply with the following, unless more stringent provisions are indicated:
1. ASTM C642 Standard Test Method for Density, Absorption, and Voids in Hardened Concrete.
2. ASTM C 1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
3. ASTM C1378 Standard Test Method for Determination of Resistance to Staining
4. ASTM D 236 Standard Test Method for Volatile Content of Coatings
5. ASTM D 3363 Standard Test Method for Film Hardness by Pencil Test.
6. ASTM D 4060 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abrasion: Modified.
7. ASTM D 4541 Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers
8. ASTM D 5178 Standard Test Method for Mar Resistance of Organic Coatings
9. ASTM E 430 Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry.
10. ASTM G154 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

## 1.4 SUBMITTALS

A. Product Data: For each type of product required. Include manufacturer's technical data, application instructions, and recommended coverage rates. Provide documentation of preparation and concrete grinding procedures.
1. Indicate installation interface required with adjacent construction.

2. Submit description for protection of surrounding areas, surface preparation, application, and final cleaning.
3. Provide name of technically qualified concrete polishing field representative.

B. LEED Submittals: Credits MRc4, MRc5 and EQc4.2: Refer to Section 018113 “Sustainable Design Requirements” for additional submittal requirements.

C. Shop Drawings: Include the following:
1. Typical layout including dimensions and floor grinding schedule.
2. Plan view of floor and joint pattern layout.
3. Hardener, sealer, densifier in notes.

D. Manufacturer’s Certificates: Certify products meet or exceed specified requirements.

E. Qualification Data: Applicator qualifications from manufacturer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency indicating compliance with performance requirements.

G. Maintenance Data: Provide 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 that may be detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Ensure manufacturer has minimum 5 years experience in manufacturing components similar to or exceeding requirements of project.

B. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
1. Installer shall be trained and holding current certification from manufacturer of polished concrete system in specified system.
2. Installer shall be familiar with specified requirements and systems.
3. Installer shall have successfully performed a minimum of 5 projects of at least 5,000 SF each.

C. Source Limitations: Obtain all concrete finishing components and materials from single source from single manufacturer.

D. Ensure that correct amount of densifier is onsite.

E. Mock-Ups: Provide mockup to demonstrate aesthetic effects, color variations and set quality standards for materials and execution.
1. Size: 100 square feet sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
2. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, surface appearance, and the amount of reveal of sand and/or aggregate and shine level acceptable to Architect.
3. When accepted, mock-up shall demonstrate minimum standard of quality required for this work.
4. Mock-up shall include control joints, score joints, patched concrete areas, cracks and saw cut sections of concrete in order to view variations in floor finish.

5. Maintain mock-up during construction in an undisturbed condition as a standard for judging the work.

F. Pre-installation Conference: Conduct conference at Project site to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. 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. Use of repair material during the grind.
7. Repair of defects and defective work prior to installation.
8. Cleaning.
9. Installation of polished floor finishes.
10. Application of liquid hardener and densifier.
11. Protection of finished surfaces after installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original packaging with identification labels and seals intact.

B. Storage: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

C. Protection of Concrete Slab Throughout Construction:
a. Do not drag or drop equipment or material across the slab which will scratch or chip it.
b. Protect from petroleum stains during construction.
c. Diaper hydraulic power equipment.
d. Restrict vehicular parking: No trade shall park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths shall be placed under vehicles at all times.
e. All equipment shall be equipped with non-marking tires and all screws removed daily.
f. Restrict use of pipe cutting machinery.
g. Restrict placement of reinforcing steel on slab to avoid rust staining.
h. Restrict use of acids or acidic detergents on slab.
i. Do not store structural steel or metal fabrications on slab.
j. Exposed concrete scheduled to remain exposed shall be protected throughout construction.

1.7 PROJECT CONDITIONS

A. Environmental Limitations:
1. Comply with manufacturer's recommendations regarding environmental requirements and temperature and conditions of surfaces to receive finishing system.

B. Lighting:
1. Illuminate work areas during installation to provide the same or greater level of illumination required to properly perform work, and as will occur in the room or space after the building is in operation.

1.8 WARRANTY

A. Manufacturer's Warranty: Submit 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.
   1. Food Stain Resistant Polished Concrete: Provide manufacturer's material warranty commencing at date of building substantial completion. Manufacturer shall warrant to the owner that polished surface will remain water repellent, dustproof, hardened, abrasion resistant and food stain resistant.
      a. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide the following:
   1. Certi-Shine Clear FSR from Vexcon Chemicals, Inc. (Basis-of-Design)
   2. Consolideck Concrete Polishing System from PROSOCO,Inc.
   3. FGS/Permashine Concrete Polish System from L&M Construction Chemicals, Inc.

B. Polished Concrete: Includes grinding and honing installation of silicate sealer, hardener, densifier, un-reacted silicate rinse, polishing, and a non-film forming stain repellant.

2.2 PERFORMANCE REQUIREMENTS

A. Provide polished concrete floor that has been selected, manufactured and installed to achieve the following:
   1. Coefficient of Friction (COF): Meets or exceeds DCOF value of 0.42 when measured per the DCOF AcuTest in accordance with ANSI A137.1.
   2. Meets or exceeds ANSI/NFSI B101.1, High Traction field testing.

B. Gloss readings should be obtained in accordance with ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry.
   1. Readings shall be taken not less than 10-feet on center in field areas and within one foot of floor area perimeters. In no case shall a reading be below 2-percent of the specified minimum sheen.

C. Design Requirements: Comply with polished concrete floor system manufacturer's requirements, unless more stringent provisions are indicated.
   1. Hardened Concrete Properties:
      a. Minimum Concrete Compressive Strength: 3500 psi.
      b. Normal Weight Concrete: No lightweight aggregate.
      c. Non-air entrained.
   2. Placement Properties:
      a. Natural concrete slump of 4 1/2 inches - 5 inches. Admixtures may be used.
      b. Flatness Requirements:
         1) Overall FF 40.
         2) Local FF 20.
   3. Hard-Steel Troweled or plastic blades-preferred (3 passes) Concrete: No burn marks. Finish to ACI 302.1R, Class 5 floor.
   4. Curing Options:
      a. Damp Curing: 14 days cure minimum or as directed by manufacturer.

D. Performance Requirements:
   1. ASTM C642 Absorbability: Reduction of 75% of Control
   2. ASTM D5178 Balance Beam Mar Tester: Greater than 50% harder
   3. ASTM D2486 Abrasive Scrub: 1200 Cycles
   4. ASTM D4060 Modified Taber Abrasion 600 Rev: 0.37% treated vs. 0.68% untreated
   5. ASTM G154: 5000 HR QUV: No fade, change or erosion
   6. ASTM D4541 Bonding: Greater than 50 psi
   7. ASTM D2369 Solids: 18% Min.

2.3 MATERIALS

A. LEED Material Credits MRc4, MRc5 and EQc4.2: Refer to Section 018113 “Sustainable Design Requirements” for additional product requirements.

B. VOC Content of all sealers, primers and other liquids used on interior concrete shall comply with South Coast Air Quality Management District requirements.

C. Hardener, Penetrating Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
   1. Acceptable Material: Vexcon Chemicals, Inc., Certi-Shine Clear or equal.

D. Un-reacted Silicate Rinse: Liquid rinse solution, increases stain resistance.
   1. Acceptable Material: Vexcon Chemicals, Inc., Certi-Shine Fixative or equal.

E. Stain Repellent (non-film forming): Ready to use, food (oil and acid), hydraulic fluid and motor oil stain and water repellent, Silane and Silane polymer blend available in 3 formulations.
   1. Acceptable Material: Vexcon Chemicals, Inc., Certi-Shine Finish Coat Ultra WB meeting SCAQMD VOC regulations or equal..

F. Silicate floor repair material: Liquid silicate material which fills and repairs concrete surface imperfections.
   1. Acceptable Material: Vexcon Chemicals Inc., Certi-Shine Fusion or equal..

G. Cleaning Solution: Eco-friendly degreaser and cleaner, concentrate pH must be slightly alkaline.
   1. Acceptable Material: Vexcon Chemicals, Inc., StarSeal EF Degreaser and Cleaner or equal..

H. Joint Filler: Joint primer and epoxy joint sealant.
   1. Acceptable Material: Vexcon Chemicals, Inc.: Certi-Shine PowerCoat Primer and Flexible Epoxy Joint Sealant or equal..

I. Finish Gloss Level Standard:
   1. Medium Shine (Gold), equivalent to 60 degree film gloss of 60 when viewed at an angle or equal.

J. Surface Appearance: Mixture of sand and aggregate exposure as selected by Architect’s during mockup installation.

2.4 ACCESSORIES

A. Temporary Surface Protection Mat: Pre-coated fabric mat and primer.

1. Products: Subject to compliance with requirements, provide the following:
   a. Skudo HT with water-based base coat by Skudo USA, Inc.
   b. Or Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: 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.

B. Verify concrete slab requirements are met as listed under "Performance Requirements" and as required by manufacturer.

3.2 PREPARATION

A. Complete surface preparation per manufacturer's written instructions.

B. Protect adjacent surfaces not designated to receive treatment.

C. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.

D. Examine surface to determine soundness of concrete for polishing.

E. Remove surface contamination.

3.3 INSTALLATION

A. General: Comply with manufacturer's written instructions. Ensure concrete is a minimum of 28 days old.

B. Install concrete polishing materials per manufacturer's written instructions.

C. 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. Complete entire installation prior to installation of fixtures and accessories.
   3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit using wet or dry method cross hatching each grit.
      a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Level of sheen shall match that of approved mock-up.
      b. Expose aggregate in concrete surface only as determined by approved mock-up.
      c. All concrete surfaces shall be as uniform in appearance as possible.
   ~~4.~~ Apply hardener and densifier per manufacturer's written instructions.
   5. Remove defects and re-polish defective areas.

6. Apply non-film forming stain protection per manufacturer's written instructions. Apply additional coats to increase level of sheen as required to match approved mock-up. Burnish as recommended by manufacturer.
7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.
8. Install joint filler per manufacturer's instructions: Prime and fill joints with epoxy joint sealant at joints requiring sealant after the application of the finishing system or as directed by the manufacturer.
   a. Fill joints flush to surface.

D. Scoring: Score decorative jointing in concrete surfaces with diamond blades to match pattern indicated. Rinse until water is clear.
   1. Joint Width: 1/8-inch maximum. Joint width shall be consistent within each area.

3.4 MAINTENANCE

A. Spills: When they occur, clean with neutral or preferably an alkaline cleaner making sure to scrub and rinse with clean water and cleaning solution recommended by manufacturer.

3.5 ADJUSTING AND CLEANING

A. General Cleaning: Use a walk behind scrubber equipped with medium to soft nylon brushes. Clean on a daily basis with neutral or preferably an alkaline cleaner, like making sure to scrub and rinse with clean water and .

B. Polish to higher gloss those areas not meeting specified gloss levels per mock-up.

C. Upon completion, General Contractor shall remove surplus and excess materials, rubbish, tools and equipment.

D. Maintenance Cleaning: Perform when a more thorough cleaning is desired. This should be based on based on individual traffic areas and isles or departments and the overall cleanliness of the facility.

3.6 PROTECTION

A. Prepare substrates using the methods recommended by the protection mat manufacturer for achieving the best result for the substrate under the project conditions. Do not proceed with installation until substrates have been properly prepared. Commencement of protection mat installation constitutes acceptance of conditions.

B. Protect installed product from damage during construction in accordance with polished concrete finishing product manufacturer's recommendations.

C. Protect finished surfaces from damage and soiling and other construction activities. Without damaging completed work, provide protective cover.

D. Restrict foot traffic as recommended by manufacturer for a minimum of 12 hours.

E. Fresh concrete must have a maximum pH of 10 which, which usually requires a 7 day cure, prior to the application of the protection mat.

F. Install protection mat in strict compliance with manufacturer's installation guide and recommendations including the following:

1. Apply liquid base coat (primer) using roller or airless sprayer, approximately 160 to 200 square feet per gallon.
2. Roll out coated top mat over the base coat and press into primer while it is still wet.

END OF SECTION