



GUIDELINES FOR POLISHED CONCRETE FLOORS

A Guide for Integrally Colored, Dyed and Stained Polished Floors

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This is a guideline to be used for both architects and the construction specifier. When using this guideline there should be room for project modifications, provided there are approved mock-ups.

Note: Color should be grey or white Type I/II unless other wise noted, or approved integrally colored concrete systems that meet ASTM C 979.

PART ONE

- A. Provide drawings and contract provisions that apply to this type of work, include both normal and supplementary working conditions.
- B. Integral colored concrete {slabs-on-grade} and interior colored dyed and stained floors.
- C. Provide proper curing of floor slabs. Mock-ups should be poured and cured for approval.
- D. Ensure that curing methods will not affect final surface appearance. Avoid use of plastic at all costs!

REFERENCES

- ◆ PCA PA/124 Finishing Slabs with Color and Texture
- ◆ PCA SP/021 Color and Texture in Architectural Concrete

- ◆ ACI 301 Specification for Structural Concrete for Buildings
- ◆ ACI 302 Practice for Concrete Floor Construction
- ◆ ACI 303 Specification for Cast in Place Architectural Concrete
- ◆ ACI 304 Practice for Measuring, Mixing, Transporting and Placing of Concrete
- ◆ ACI 305 Hot Weather Concrete
- ◆ ACI 306 Cold Weather Concrete

- ◆ ASTM C309 & ASTM C1315 Liquid Membrane Curing Compounds
- ◆ ASTM C 494 Chemical Admixtures for Concrete
- ◆ ASTM C 979 Pigments for Colored Concrete

- ◆ AASHTO M194 Chemical Admixtures

SUBMITTALS

Provide product data

1. Color
2. Acid Stains
3. Dyes
4. Curing Compounds
5. Hardeners and Densifer

Mix Designs

1. Submit mix designs for integral colored concrete.
2. Use same cement source on all projects.
3. Large products should consider the same aggregate source.
4. Provide mock-ups for mix-designs containing slag or fly-ash mixes.
5. Provide manufacturers color charts for approval.
6. Provide product data for grinding machines and heads; data on polishing equipment and both dust control and run-off from wet polishing, and joint and crack fillers, or any chemicals that might be used during the process.

QUALITY ASSURANCE

1. Review manufacturer and installer qualifications, length of time and experience in products.
2. Installer {_____} years of experience in polished application, with references.
3. Floors should be poured according to ACI 301. Installers should have ACI Flatwork Certification and preferred ACI Industrial Certification.
4. Materials should be from the same lot and batches.
5. Installer should provide two written references.
6. Require pre-installation meeting to comply with requirements.
7. Require two 10x10 mock-up pads for accurate color and polishing. Pour should not be less than 3 cubic yards, with an approvable mix-design.
8. Require both color and chemical representatives visit job site.
9. Must have samples of cement, sand, coarse aggregate and color additives. Must also test aggregate to insure it will polish.
10. Finished concrete floors shall have:
 - ♦ FF numbers of at least 50.
 - ♦ F/L numbers of at least 30.
 - ♦ Concrete should have 28 day cure time and should be closed to traffic during installation.

DELIVERY, STORAGE, HANDLING

Colored admixtures should be delivered in un-opened containers and stored in dry conditions (if liquid color is used it must be protected from freezing and be re-mixed before use). Chemical admixtures should be properly stored and protected from elements that could affect their use.

PROJECT CONDITIONS

Concrete and colored Concrete

1. If possible, placement should be done to avoid exposure to hot sun or wind. If placed in these conditions consider use of fog-sprayers and evaporation retardants
2. Avoid placement if rain, snow, frost is forecast. Protect concrete from both moistures and freezing.
3. Must comply with both ACI 305R and 306R.
4. Schedule delivery of concrete to avoid long waits and provide consistent batching (NEVER ALLOW DIFFERENT BATCH PLANTS TO SCHEDULE UNLESS NOTIFIED IN WRITING AND APPROVED BY DESIGN TEAM).
5. Mixing and transportation times should not exceed 90 minutes.

Reference: ACI 301 302 360

PRODUCTS

Acceptable Manufacturers:

Coloring Systems for Integral Concrete

- ♦ Prism pigments
1251 Arundel Street
St. Paul, MN 55117
888.440.4250
www.prismpigments.com

(Color shall conform to ASTM C 979, ACI 303.1, ASTM C494)

Acid Stains

- ♦ Engrave-A-Crete, Inc.
P.O. Box 90
403 N. Oak Ave.
Mansfield, MO 65704
www.engagecrete.com

Water Based Stain Colorant (Color Juice)

- ◆ American Deco Concrete
120 Commercial Ave.
Lowell, AR 72745
www.adcsc.com

Curing and sealing compounds

- ◆ TK Products
11400 West 47th Street
Minnetonka, MN 55343
800.441.2129
www.tkproduct.com
- ◆ DCS Hardener
8329 Monticello Rd. Ste E
Shawnee, KS 66227
913.422.4443

(Cures and sealers shall conform to ASTM C 309 & ASTM C 1315)

POLISHING EQUIPMENT AND PADS

1. Provide necessary electrical supply. Note: Large jobs will require a 3 phase outlet and generators may be required.
2. Use a 3-4 head counter rotation variable speed polishing machine with a minimum of 600 lb per down pressure.
3. Use dust system extraction or squeegee equipment for pick up.
4. Use 1st step metal bonded pads 16, 25, 40, 60, 150, and 300 grits (grit size may vary with manufacturer).
5. Use Resin diamond pads 100, 200, 400, 800, 1500, and 3000 (grit size may vary with manufacturer).

Note: It is often good to step back down in pad grit when moving from metal to resin pads.

CONCRETE MIX DESIGNS

1. Minimum cement content {6} [_____] sacks per cubic yard.
2. Take slump of concrete per ASTM C 143. Standard tests for hydraulic concrete set minimum and maximum slump $\pm 1\frac{1}{2}$ ” (preset a water to cement ratio). Set separate standards if plasticizers or water reducers are to be used.
3. Do not add calcium chloride as it will lead to un-even color and surface discoloration.

4. Do not add water on job site unless water is held back when mixing (but not to exceed preset water to cement ratio).
5. Perform standard field tests on concrete:
 - ♦ Take cylinders per ASTM C/31. Minimum of 4 cylinders per 100 yards of concrete cast.
 - ♦ Take air tests when needed per ASTM C231.
 - ♦ Take slump test per ASTM C143.
 - ♦ Take temperature of fresh concrete per ASTM C 1064.

Note: These tests should be done by qualified personal with an ACI certification of Field Grade I Testing and taken to a certified lab. (When cylinders are required, both temperature and slump test should be conducted and results recorded.)
6. Color added to concrete on job site or at ready mix plant should be done according to manufacturer's guidelines.
7. AVOID Fly Ash & Slag in the mix.

POLISHED CONCRETE FLOOR APPLICATION

1. Contractor should first check work area and conditions and evaluate floor for flatness and levelness. If floor conditions appear to be detrimental to progress and satisfactory completion of the floor, the general contractor and architect should be contacted before work proceeds.
2. Grind floor to within 2-3 inches of the interior walls with 16, 25, 40, 80 and 150 grit pads. Use of hand equipment may be used against existing walls.
3. Fill all joints and cracks as instructed by architect.
4. Apply any approved materials such as hardeners, dyes, or stains following recommended guidelines.
5. Apply densifying material at proper coverage rates, covering the entire floor. Allow to dry and squeegee off excess material if needed. Allow to dry.
6. Begin polishing process by removing any scratches from previous grinding. If wet grinding, remove excess and squeegee vacuum clear before going to next step. Use of an auto scrubber can speed up the process. Use clean water to rinse. If dry method is used, be sure excess dust is properly disposed of.
7. Concrete polishing should be uniformly done in the proper steps by qualified personal.
8. Use of a high speed burnishing machine and hog hairs burnishing pad can also be used to create a higher shine. Special compounds may also be used.
9. Upon completion of these steps the floor should be inspected by the owner, architect and general contractor for acceptance before the floor is opened.

Note: Minor variations in the look of colored, dyed, stained and un-colored concrete are acceptable and should and can be expected. Many of these variations are seen in many natural materials as well.

TOLERANCES

1. Tolerances should be addressed at the pre-job meetings and conferences, not when the job is completed. It is normal for colored concrete to lighten as it ages and cures, in most cases most changes should be complete at the end of the 28-day cure time.
2. Work area should be under polished contractor's guidelines and no other work should be allowed until both the general contractor and polished contractor are satisfied that no damage will occur to the floor.
3. Tolerances and service of said floor should be addressed at pre-job conferences and NEVER after work has began, any changes should be noted and delivered to both architect and owner.