



TREADWELL™

Complete Guide to Polished Concrete

**Defines polished concrete and sets expectations for
Owner, General, Concrete and Polished Concrete
Contractors.**

Provision

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About Polished Concrete

Polished Concrete is mechanically treated concrete, treated with diamond grinding tools. Typically polished concrete is defined as treated with 800 grit up to 3,000 grit levels. (Anything ground below 400 grit levels is not technically considered polishing.) Grinding tools are progressive pads building to the desired polish level. Polishing often includes using liquid hardeners and/or densifiers to add durability and serviceability to the surface. Colors and dyes can be used in conjunction with the polished system to further enhance the aesthetics. Now having said that, there are other methods to meet client desires for a polished concrete look. These other methods depend on the existing concrete profile, the contractors experience and expertise, the equipment and the supplies used.

Polished concrete is not to be confused with “stained” concrete or “sealed” concrete. Sealers are applied over plain concrete or stained concrete. These sealers can produce a flat finish or a high gloss finish. Polished concrete is actually changing the surface of the concrete physically by using pads, grits and buffing materials to achieve the finish mechanically.

Polishing Benefits

- A sustainable design flooring option.
- Uses materials already present.
- Eliminates the energy and additional materials to apply other flooring options such as carpet, wood, tile, etc.
- Low maintenance.
- More durable and easier to clean than many other flooring options.
- Reduces the opportunity for dust and dust mites for asthma and allergy sufferers.
- Improves natural lighting with the reflective surface bouncing light around the room.
- Potentially reduces the need for additional interior lighting.

- Hard wearing surface has less opportunity for chipping, denting and wear and tear.
- Cleaner, healthier atmosphere for restaurants, hospitals and medical clinics, etc.

Aggregate Exposure

As defined by Concrete Polishing Association of American, CPAA

Class	Name	Surface Cut Depth	Appearance
A	Cream	Very little	Little aggregate exposure
B	Fine Aggregate (Salt & Pepper)	1/16 th inch	Fine aggregate exposure with little or no medium aggregate exposure at random locations
C	Medium Aggregate	1/8 th inch	Medium aggregate exposure with little or no large aggregate exposure at random locations
D	Large Aggregate	1/4 th inch	Large aggregate exposure with little or no fine aggregate exposure at random locations

Note: FF #'s effect consistency of aggregate exposure

Reflective Clairity and Sheen

Modified version of the Concrete Polishing Association of American, CPAA Chart Gloss can be measured with a Gloss Meter

Level	Name	Reflective Clairity	Reflective Sheen	Grit Range
1	Ground	Flat appearance with no to very slight diffused reflection	None to very low	Below 100

2	Honed	Matte appearance with or without slight diffused reflection	Low to medium	100-400
3	Semi-Polished	Objects being reflected are not quite sharp and crisp but can be easily identified	Medium to high	800-3000
4	Highly-Polished	Objects being reflected are sharp and crisp as would be seen in a mirror- like reflection	High to highest	
<p>Reflective Clarity: When viewed 5 feet above and perpendicular to a surface, the degree of sharpness and crispness of the reflection of the overhead objects.</p>				
<p>Reflective Sheen: When viewed at 20 feet from and at an angle to a surface, the degree of gloss reflected from the surface.</p>				

Highly-polished concrete is when the concrete is polished to the degree where the reflective clarity should be good enough to see a near perfect reflection of the overhead lighting.

Burnished Concrete is an alternative to the 4 grades above identified by the CPAA. The burnished concrete option is not technically polished concrete, but it might be the solution depending on the floor condition and the expectations by the owner. Burnished concrete is done by simply utilizing diamond impregnated pads and using a propane powered burnisher.

Flatwork Contractor

Concrete Mix Designs

1. Minimum 3500 psi (Typical strengths are 3500 psi to 5000 psi).
2. Water/cement ratio < 45.
3. Interior polished slabs should not be air entrained.
4. < 15% total supplementary cementitious materials (SCM's - include fly ash & slag).
6. Optimized aggregate gradations are beneficial in reducing bleed water and for other benefits. Seek advice from experienced ready mix producers and/or mix design engineers for help designing a concrete mix. Optimized mixes can often reduce the need for more joints.
8. Admixtures in moderation are very useful, especially in controlling the water/cement ratios.
9. If an integral color is used, the minimum batch size should be 3 cubic yards.
10. Target slump is 4 inches +1 inch.

Jointing and Repairs

1. Joints are always at right angles if possible.
2. Saw cutting should be done as soon as possible after the slab has been
3. placed without causing raveling at the joint or premature micro-
4. cracking.
5. Typical joints on interior slabs for polished floors:
6. Jointing concrete always creates curling slabs (often not visible to the eye). Curling creates highs and lows within each panel. Any “uneven” slab will polish differently in the high spots and the low spots.
7. Not jointing can be a problem because the slab is going to crack. At least with joints the “cracks” are aesthetically pleasing and usually acceptable to all. Random cracks are perceived as not acceptable most of the time.
8. Seek help from an experienced mix design engineer to optimize concrete mixes to reduce the need for as many joints or in some cases, no joints at all (with highly engineered designs with low shrink concrete, optimized gradations, etc.).
9. Know that jointing affects FF and FL numbers.
10. Repairs need to be completed before the polish. There are a multitude
11. of products on the market to repair slab defects.

Curing

1. Cure for a minimum of 28 days before starting polishing procedures.
2. Follow ACI 308R-01 Guide to Curing Concrete for evaporation control
3. and wet curing.
4. **The Flatwork Contractor and the Polishing Contractor need to agree on**
5. **the curing agent to be used on the actual slab pour, as it has a huge effect on the Polishing Contractors job.**
6. If using densifiers and hardeners, do not apply them at this time. The polishing contractor should handle this during his scope of work.
7. Flatwork Contractor signs off slab to Polishing Contractor.
8. ix. Flatness/Levelness Tolerances
9. F_F numbers of at least 50. (See F_F and F_L section below.)
10. F_L numbers of at least 30. (See F_F and F_L section below.)
11. The F_F and F_L numbers specifications will vary greatly from polished concrete countertops to highly technical floor slabs with pneumatic tired computerized systems for filing and retrieval in many warehouse environments.
12. F_F and F_L Tolerance Chart:

	Specified Overall Value	Minimum Local Value
F_F Floor Flatness	50	35
F_L Floor Levelness	30	20

General Contractor / Owner

1. The responsible party for the slab during the transition from the flatwork contractor until the polishing contractor commences work.
2. Keep other trades off the slab if possible.
3. Cover the slab with a non-chemical laden cover to protect it from oil spills, gouges, contact with metals, protected from mastics/glues, etc.
4. Keep chewing tobacco juice from contaminating the floor, especially if it is to be an architectural featured floor, as the tobacco will inhibit color, stains, hardeners, etc. from working properly.
5. Keep vehicle traffic completely off the floor.

Polishing Contractor

Mock-Ups

1. Provide mock-ups for all projects.
2. Provide color mock-ups for color approval.
3. Square footage or size of the mock up is between the architect/owner
4. and the polishing contractor. Some estimates are: between 10 and 20 sq. ft. for small projects, 100-200 sq. ft. for larger warehouse or big box type floors. (Depends on job size)

Polishing Process

1. Remove paint, mastics, oil spots (as best as possible), dirt, etc.
2. Scrub slab with soft brush or pads.
3. Use neutral pH detergent and rinse well.
4. Protect adjacent areas to prevent damage by polishing machines and/or materials.
5. Repair and fill any surface cracks.
6. Follow the recommendations of the equipment manufacturer in increments of various heads or pads for grinding, honing, and polishing to the desired level.
7. Apply the densifiers and hardeners as necessary for maximum performance
8. Surface color application is debatable as whether to apply before or after the honing and/or polishing steps. This needs to be worked out in the mock-up stage for approval.
9. Cleanup the site.
10. General Contractor or Owner provides protection from construction trades until the project is turned over to the owner. This needs to be discussed in the pre- construction conference.
11. Edges are harder to polish because they are perpendicular to the wall. The
12. corners are challenging to get into with large polishing equipment. As a result they rarely are polished to the same degree as the main part of the floor. Discuss this ahead of time in the pre-construction conference and agree on an edge “solution” that satisfies all involved.



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