Diamond Polishing Specifications

For concrete and cement flooring

Most bids for commercial and residential polished concrete flooring projects are based on architectural, aesthetical or diamond tooling manufacturer specifications, not on the ASTM Standard. Since October 2013 an ASTM standard for floor diamond refinishing has been implemented by CSDA (CSDA-ST-115 Measuring concrete micro surface texture). These following guidelines integrate the ASTM guidelines with the classic surface preparation and refinishing system.
DelGrosso Design is a Certified Superabrasives Floor preparation and polishing contractor. *Superabrasives* (www.superabrasives.us) is the leading manufacturer of polishing equipment and diamond tooling in the USA. The following specifications are a guideline, each concrete slab is different and requires adjustments in the process, diamond tooling, machines and chemicals used.

Our process

The diamond polishing process on concrete floors is divided in three phases: ***grinding, honing and polishing.***

Grinding – This operation levels the high spots on the slab, removing the top layer of cement (called "cream") which in many cases contains sealants, paints, stains and other contaminants. This phase is very important because prepares the surface for honing and polishing. Eliminating the high/low spots insures that the diamond tooling is always in contact with the concrete surface. The grinding is performed with specifically designed planetary floor grinders with a minimum of three rotating heads. The heads are mounted on a rotating main plate. The rotation of the main plate in combination with the rotation of the single heads creates the correct motion necessary for properly grinding and polishing concrete. On each head are mounted diamond encrusted metallic buttons, called "***metal bond diamond buttons***". Most grinding is performed with 30 grit buttons. The grinding is often a very slow process and can easily take hours even for small areas. The machine should be properly sized considering the project's square footage, accessibility and other details. The grinding marks are usually removed with 70 and 120 grit diamond buttons. The grinding process exposes the stone aggregate contained just below the surface, creating the classic look of polished concrete. During the grinding phase, occasional defects (such as air bubbles, buried debris and other objects) may be exposed as well.

Honing – This phase refines the surface to a very smooth but not yet reflective finish. It is usually done with transitional ceramic matrix diamond pads, with grit between 100 and 200. After this phase the surface can be diamond polished or directly sealed and burnished (honed finish)

Polishing – This phase is performed with resin matrix 400 and 800 grit diamond pads. Because of the higher compression strength, on our Diamond Polished Cement Toppings the polishing can be increased up to 1800 and 3500 grit (mirror reflectivity). During the polishing phase, additional operations such as coloring, densification and stenciling (art work) can be performed.

Burnishing – Once the surface is fully polished (or honed) a protective clear coat is applied (sealer) and burnished. The burnishing process generates heat triggering a transformation in the sealer, somehow like a glaze. As the manufacturer explains, the sealer creates "**a window of opportunity that allows cleaning of spills**". Whenever additional protection is needed (like on industrial floors subject to chemical spills) the surface can be easily treated to become water and oil repellant, as well as acid resistant.

Color dyes – It is important to use color dyes that are especially manufactured for polished concrete. Only very finely milled pigments will penetrate the dense and smooth surface of honed and polished concrete. Acid stains are not recommended when diamond polishing. The acid will corrode the concrete creating a rougher, less reflective surface.

Stenciling – This is a highly specialized operation that allows creation of custom art work on the floor surface. The process starts by determining the different layers of color needed for a specific art work, then manufacturing a vinyl masking for each color layer. The vinyl stencils are temporarily applied to the surface as penetrating color dye is applied. Once the last layer is removed the full graphic is revealed.

Diamond tools – The quality of the diamond tools is extremely important for quality results. In addition, experience is needed to properly select the correct diamond tool for a specific concrete surface and phase.

Personnel – Grinding and polishing machines need to be operated by trained personnel only. Experience is a very important factor when looking for quality results.

Maintenance – Our polished floors are beautiful and very durable and can be cleaned and maintained much more easily than any other finish on concrete. Use of floor waxes on our diamond polished floors is not necessary and not recommended.

Maintenance schedule

Daily - Weekly As necessary	Dry mop surface with dust removal microfiber pad (such as Bona white pad)
Weekly – As necessary	Wet mop surface with microfiber pad (such as Bona blue pad) dampened in clean water. Do not leave puddling water on the surface. Prosoco Daily Klean can be mixed with cleaning water for increased cleaning action – On colored floors avoid using concentrated bleach.
Burnishing (commercial floors): every 6 months to one year	After cleaning the floor, apply one coat of Prosoco Polish Guard and burnish with propane powered floor buffer equipped with diamond encrusted nylon pads.

Refer to our website Maintenance page for more detailed instruction and information.

DelGrosso Design

Diamond Polished Concrete & Restoration

Technical tips for pouring diamond polished concrete slabs

Concrete mix specs – Use a minimum of 6 sacks Portland Cement per yard, whenever possible. Power-screed or hand-screed twice to ensure a very flat surface. Power-trowel or hard trowel the slab to make the densest, hardest possible surface. Do not exceed slump 5. Do not use admixtures other than retarder up to 1/%. Do not use fibers in the mix. 3/8" aggregate is recommended.

Fly ash - ***If possible avoid any Fly Ash in the concrete mix*****.** Fly ash is a pozzolanic material recycled from industrial coal furnaces and used on concrete mixes to lower the amount of Portland cement, therefore making the mix more environmentally friendly (LEED points). Fly ash is often poorly mixed with the other components and tends to form clumps that are hidden below the surface, until the grinding operation exposes them. That will result in blotchiness and uneven coloration through the slab. Even when properly blended, fly ash often lowers the glossiness of the finished floor and can cause discoloration.

Control joints – To minimize cracking saw cut control joints as per architectural specifications and to a 6'x8' maximum interval. Tooled control joints are not recommended. Joints can be backfilled during the grinding/honing phase with elastomeric polyurea joint filler (recommended) or after the burnishing with polyurethane caulking.

Mock-ups – When pouring new concrete, it is recommended to construct mock ups for later use on color and finish preview. On existing older concrete, we recommend preparation of three swatches for proper color preview and selection.

Protection – During the construction operations preceding and following the polishing operations we recommend protecting a newly poured slab (after leaving the surface exposed for at least 4-5 days during the initial curing) with rosin paper or Ram board. Avoid using plastic sheeting, vapor barrier, rubber mats and other non-breathable materials for prolonged time since it might cause discoloration. On older slabs, preventive covering is not necessary but spilling of acid, solvents (e.g. purple primer for PVC welding, solvent based degreasers) and oils (motor oil, transmission oil…) and other penetrating substances (coffee…) must be avoided. When protecting the floor after the polishing is completed ***avoid taping any masking directly to the floor***. The tape often cures into the finish and when removed may leave pronounced marks extremely hard if not impossible to repair.

Specs for pouring Diamond Polished concrete slabs

Concrete Mix Design And Finishing Crew	Properly plan the mix design and the installation procedures. Size the crew and each pour sq. ft. so that enough time is allowed for properly finishing the concrete.
Reinforcement	Use 4"x4" mesh gauge #4 welded wire sheets on topping slabs and radiant heat pipes.
Hydronic heat systems	Allow at least 1-1/2" concrete cover over piping
Fly ash	Do not use fly ash in the mix, if possible. Fly ash may causes blotchiness and uneven sheen. Most ready-mix supplier use 20% fly ash in the mix. **MUST SPECIFY "NO FLY ASH" WHEN ORDERING.**
Slump	Do not exceed slump 5; do not add water to increase workability, 1% retarder is ok.
Portland cement	Use 6 sacks per yard minimum. Adjust color pigment as needed.
Integral pigments	Davis Colors and Ameripolish OS are recommended – do not use color hardener.
Finishing	Hard trowel to a flat, smooth and dense surface. Power trowel whenever possible
Curing	Use acrylic curing agents such as Davis W1000, single application right after placement. We do not recommend curing blankets or other curing methods
Protection	Protect newly poured slabs and after completion of polishing operation with rosin paper or Ram board – **DO NOT TAPE MASKING DIRECTLY TO THE POLISHED FLOOR** – do not use plastic sheeting and rubber mats for prolonged time.
Control Joints	Saw cut joints as per architect specifications or at a 6'x8' maximum interval. Joints can be backfilled with colored polyurea joint filler or colored sanded caulking.