

## Grinding & Polishing Concrete

### The Mix, Pour & Finish

Polished concrete is strong, durable and low maintenance and comparable to traditional polished terrazzo. Both can either be ground flat to fully expose the aggregate, the aggregate can be partially exposed or lightly ground to expose no more than the fine sands at the surface (salt and pepper)

Where the aggregate is the main feature special supplies can be added to the wet mix such as coloured pebbles, metals and glass to enhance the appearance. Select your sand, cement and aggregate and ensure there is enough for the project. It is advisable to do a test panel

The mix and trowelling of the concrete is important. You cannot turn poorly batched and mixed concrete into a uniform stone like finish (pig's ear into a silk purse). Concrete that has been mixed in a free fall cement mixer will not be uniform; there will be soft and hard areas also patchy areas of aggregate. The concrete should be mixed in a forced action mixer with consistent batching of the materials to give the concrete a uniform finish when ground and polished. Soft and hard floors also produce different results when ground

The wet concrete should be flattened with a long handle bull float and then be power floated to get a uniform finish and bring the fat and fine sand to the surface. The floor should be as flat as possible at the application stage as it is far more time consuming to rectify any unevenness later. If the wet concrete has been walked over, boot marks can appear during grinding because they have depressed the aggregate

If the surface is to be polished without exposing the aggregate, then only the finer grit diamonds need to be used. This will result in a polished floor without showing the pattern and texture of the exposed aggregates within the concrete which is quicker and less expensive.

If the concrete is not thoroughly mixed, there will be some areas that are softer than others. The concrete should harden to least 35 newtons to get a decent finish. Floors can normally be ground after 7 to 10 days, after this the concrete will become harder and more difficult to grind

Finally note the difference between concrete and a sand and cement screed. Screed is very abrasive and not suitable for polishing

### Densifiers, Sealers & Fillers

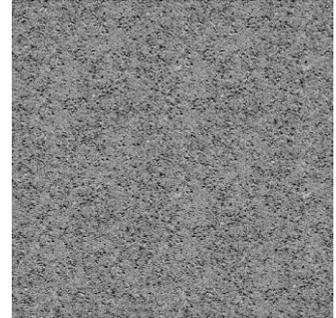
Polished concrete floors usually have the surface hardened with a chemical polymer densifier at the 800 grit polishing stage. The chemical soaks into the floor to a few millimeters and causes a chemical response that makes the floor harder and easier to polish. Densifiers are used in concrete to help the durability of the surface, reduce dusting and wear, take a better final polish and make the surface less permeable to liquids so the slab does not require sealing

After grinding has removed the top layer of concrete paste, it will expose small air holes. The holes should be filled with a polymer adhesive mixed with either the grinding dust or cement

Sealers can be used to coat a concrete floor after the 400 grit honing stage. The appearance will be good but as with all coatings the floor will need to be recoated periodically

### Stages for Grinding & Polishing Concrete

The standard method is to grind the floor flat with coarse metal bond diamonds (40, 80 & 120 grit) until any high spots have been removed and the aggregate has been partially or fully exposed. Then use resin bond diamond puck discs (100, 200 & 400 grit) to remove any scratch marks or swirls and hone the



surface. At the 800 grit stage apply the polymer densifier; let it harden and go over it again with the 800 grit. For the final polish use the 1500 & 3000 grit resin bond discs/pads to get a gloss finish. At this stage a 380mm buffing machine with larger pads can be used for quicker polishing

A variation of the above can be done if the coarser aggregate is not to be ground but only the finer sands at the surface to be exposed leaving a salt and pepper finish. Start with the 80 grit metal bond then go to a 120 grit. Then use the resin bond puck discs from 100 grit up to 800 grit. This method will hone and polish the top of the concrete without removing much of the cement paste

Finally a gloss finish can be achieved by grinding with metal bond diamonds up to 400 grit to get a smooth matt finish and then over coating with a clear polymer sealer. This finish can be buffed up but will need recoating and maintenance

Only polished floors will retain their appearance because all coatings will scratch and wear losing their shine

Large diameter polishing pads that contain very fine diamonds used on a floor buffer/polisher machine will restore the polished concrete surface to a gloss finish

### **Flooring Machines & Power Tools**

Traditionally terrazzo grinding was done with large floor grinders using carborundum stones, the Terrco machines being one of the originals. In the 1980's single and double head diamond grinding machines were introduced from Europe and in the last ten years triple head planetary multi head machines have become available. Each of these machines has its own advantages

Single head diamond floor grinders are ideal for grinding the surface away to leave the concrete slab with a smooth surface which can be taken on to a polished finish or coated with an epoxy paint or sealer



A larger diameter buffing machine can be used to take the concrete from a honed to a polished finish

Hand held diamond polishers are used for edging. Do the edges first going through the grinding/polishing stages; when the floor machine follows on over it gives a seamless finish that goes all the way to the wall

### **Diamond Abrasives**

Diamond abrasives are produced from 16 grit (coarse and aggressive, a Denis Wise) to 3000 grit (fine for polishing). The first stage is to level and grind the surface to expose the aggregate (40 to 80 grit); the second stage is to hone the surface to a smooth matt finish (120 to 400 grit); the final stage is the polishing to achieve a semi or gloss finish (800 to 3000 grit)

Metal bond discs and segments are used for the initial grinding. The 40 grit will take off the first 1mm to 2mm; the 80, 120, 250 & 400 grit will smooth the surface further but still leave abrasive scratch/swirl marks. Metal bond discs are harder wearing than the resin bond. Metal bond discs should be used dry

The metal bond abrasives are available as a 230mm disc or as mini plates plate for use with a quick change magnetic 230mm backing disc

Resin bonded diamonds are used on later stages of smoothing and polishing and are available in 50, 100, 200, 400, 800, 1500 & 3000 grit. Start the resin bond stage at the same grit that you leave off the metal bond. The resin bond discs can be used wet or dry, normally dry for the initial stage and wet for final polishing. The resin bond puck discs are supplied with a metal mini backing plate for use with a quick change magnetic 230mm backing disc