
Concrete Advice

Polished/Honed

BGC Concrete's Architectural Range of polished mixes will add value to your building project.

The success of using this range of mixes depends upon planning and attention to detail, an experienced contractor should always be appointed to achieve the best results. The contractor should be aware of the limits and details of the mix supplied, correct ordering and placement of concrete in addition to expert finishing skills are required to ensure that a consistent presentable job is achieved. Remember the trade skills employed are as important as the mix being supplied, don't cut corners. The process is not just good luck on the day!

To assist your selection process all mixes are coded, no names, just codes. It is imperative that you quote the correct code, it will have the appearance of EX2514A222, the detail identifies the type of mix, in this case polished, its strength, aggregate size and type and the cement colour. Without the code we are unable to supply. BGC Concrete personnel are available to provide expert advice once you have made your mix selection.

Accelerators / Retarders

Precautions need to be taken when pouring in hot weather, and to a lesser extent at cold temperatures. The concrete suppliers aim is to design mixes which allow the concrete to remain 'plastic' for the same time period, whether in summer or winter. To do this the supplier uses accelerators and retarders. Firstly accelerators, the only real issue here is that you have enough manpower to place and finish the concrete. Secondly retarders, they present problems that need to be understood, yes you will be able to place the concrete however as the surface dries out the body of the concrete remains plastic. This leads to surface cracking unless it is managed, referred to as plastic shrinkage cracking. The stresses which occur due to concrete shrinkage are greater than the speed the concrete is gaining strength, the stresses cannot be overridden by strength gain. Moisture loss at the surface is a problem, shade and wind breaks will help, the use of aliphatic alcohol sprayed on the surface will also prevent moisture loss, this needs to happen until the body of the concrete is set and the concrete be finished. If moisture is lost at the surface and finishing commences too early the concrete will appear to be spongy, the body of the concrete is still reaching initial set, the surface has set. Once finished the concrete must be cured (refer separate section).

Columns + Inserts + Pipes

Place columns before you pour the slab both centrally and at the perimeter. Place your order early to ensure they are on site when required, you don't want to be patching unsightly block outs. Columns should be attached to the footings not slab. Brass or stainless strips, floor wastes should be fully secured and in position. Check the height of such inserts, remember the polisher will probably be taking 3-5mm off the slab surface. Pipes within the concrete thickness create a weakness, an area subject to cracking, it is imperative that the concrete thickness is uniform, pipes should be placed within the sand pad.

Concrete Grade

25 Mpa strength as a minimum, this can be overridden by the engineers requirements, you may need to use a higher grade of concrete for structural reasons eg: 32 Mpa, a mix design will be required. It is not always possible to use the aggregate you select, not all aggregates comply with AS2758.1 2009 (Aggregates and Rock for Engineering Purposes : Part I Concrete Aggregates) aggregates required in structural elements take precedence over aesthetics, check aggregate suitability with the concrete supplier.

Curing

Curing benefits all characteristics of concrete, it lessens moisture loss, improves the hydration process, the concrete will shrink less, have higher strength, improved durability and long term performance. In hot conditions, compromised hydration due to inadequate curing, resulting in a lower strength and a relatively 'soft' surface, can lead to aggregates popping out during the polishing process. This will affect the appearance of the concrete, a high quality curing product should be used (chlorinated rubber), better still continual wetting for 7 days would be most advantageous in producing a hard surface for polishing. If aggregate popping is experienced during the polishing process, the slab (if relatively new) should be treated with a fluorosilicate, this will improve the surface hardness to such an extent that the polishing process can be completed successfully. Please refer to manufacturers data sheets, any surface membranes will need to be removed before application as the fluorosilicate will need to penetrate the slab. Curing is often overlooked by concreters, it is perhaps the most important aspect of concrete placement particularly in hot environments, strength can be compromised by up to 20%.

Flat Slab/Thickenings

Engineer details have to be complied with, its best to have a flat slab. 'M' and 'S' classification sites with thickenings require special attention. Construction joints may be required at ground beams to ensure cracks do not emanate at the line of the beam. Structural engineers should be consulted to assess the options of such, its probably advisable to increase the overall slab thickness to provide a consistent thickness and maintain the desired stiffness to the slab.

Ordering

Make sure you order enough concrete. Plan the pour, make an allowance for wastage and order the full amount required, you don't want delays in trucks, these lead to cold joints which are unsightly. If it's a part polished slab, over order the polished concrete requirement, adjust the grey concrete quantity to suit, allow a 1 meter overlap to the polished concrete. The same admixtures (shrinkage reducers) should be used in all concrete in the slab. The same concrete grade should be used in the slab, don't pour 25Mpa in the polished area and 20Mpa grey concrete to the balance. Always pour the polished concrete section first to avoid contamination. Codes must be quoted when ordering. If you have poured on site previously, please let the plant staff know, this allows BGC to check our records and ensure that the code being quoted and concrete supplied are correct. Always order sufficient concrete to complete the job, plus loads are to be avoided as the time to batch (remember these are custom loads requiring the plant to individually batch, they are not produced automatically through the batch plant) and deliver (plus loads), particularly in the hot summer months may result in a cold joint. Not all batch plants produce exposed/polished mixes the plus load issue is exacerbated by the distance to site. Further, it is difficult to batch small quantities, ie: 0.2m³ to achieve an accurate match, it is better to divide the job quantity into equally sized loads whenever possible for a consistent finish. As you can see planning and ordering are two key elements in achieving a successful job.

Polythene

Ensure it is secure, taped and most importantly you use two layers, this will allow concrete to slip on the ground, there is less resistance against shrinkage, consequently less likelihood of cracking. Two storey residences with thickenings anchor concrete to the ground profile, two layers of polythene will afford some movement at the ground/concrete interface.

Pumping

As polished mixes contain a higher percentage of coarse aggregates difficulties can be experienced when pumping, especially when long lengths of rubber hose are being used. We highly recommend the use of Viscosity Modifiers in the concrete which will assist, these products are a MUST if white sand is being used. It is important that the correct cement is used as a slurry, ie: for white concrete a use white cement. If you are pouring two mixes on the same day it is imperative that the pump is fully washed out, including the pump hopper before the new mix is introduced to avoid contamination.

Reinforcement

Use a high grade of mesh (SL82), keep the correct cover and make it secure, you don't want the mesh too close to the surface, it may be exposed by the polishing process. It is better to go overboard with re entrant bars than not supplying enough. Overlap and tie the mesh.

Always comply with minimum engineering requirements if heavier than SL82. If electrical underfloor heating is being installed, this must be secured, if tied to the reinforcement there must be enough cover to ensure that the wires are not exposed during the polishing operations.

Screeding

The Contractor needs to take extra care to ensure that the surface has a consistent appearance when polished. If finished uniformly this will be achieved, the slab should be vibrated (refer separate section). Screed marks can occur when the screed is pushed into the concrete surface resulting in lines in the polished slab, similarly feet marks can sometimes be seen in a slab, the contractor must fill feet marks with a uniform mix on stepping backwards out of the concrete. The identified issues are likely to be exacerbated if pouring at a high slump, rectification through additional polishing may be necessary.

Seeding

Expensive aggregates can be hand seeded, be aware this is a subjective issue, supervise the contractor, or seed the slab yourself to the desired level. Make sure you have enough aggregate to seed the slab before you start pouring, divide the aggregate into portions and place it at locations around the slab to ensure that each area is covered and that you don't run out. Seeded aggregates should be soaked 1 hour before using. Always comply with the safety regime on site, wear PPE as required and ensure scaffold is in place on all elevated work areas and above all ask the builders permission to access the site, you will, most likely be accompanied.

Sequence

Plan the pour sequence, pour the polished section first, do not allow contractors to walk in the polished area once screeding is completed. Contamination of black sand, yellow sand, grey concrete, etc. on boots will impact on the final finish.

Shrinkage Reducers

Every effort needs to be made to avoid cracking BGC recommend the use of shrinkage reducers which are capable of achieving up to a 40% reduction in shrinkage. Shrinkage reducers in our opinion are a MUST, a 25Mpa mix typically shrinks 7mm in 10m, this can be reduced to 4mm, going a long way to avoid cracking. All polished mixes are priced including shrinkage reducers.

Slab Detail

- Check and double check dimensions before the pour.
- The mesh is secure and level.
- You have doubled re entrant bars at corners (other than where a control joint is to be located) at all pipes, steel columns and penetrations, narrow sections of slab and risky areas, which may require additional steel to be in position.
- Steel columns in the slab are generally clad with pressings, make sure expansion foam is used around the columns and that the columns are in position on the footing before you pour.
- Full height windows, ensure that the edge board is straight and true, close the cavity 10-15mm at the location of full height windows to avoid unsightly patching at the slab edge once completed.
- Don't rely on the contractor to form up special slab details, it's often worthwhile asking a form worker to place step down forms, steps, drains, grates etc – it will ensure that such forms are secure and accurate making life easier for the polisher.
- Floor heating, make sure that the correct cover is achieved, pipes or wires can be exposed during the polishing operation if they are too high in the slab. They should be securely tied to the mesh and held down.
- Protect the floor during construction, let all the trades know It is a polished floor, if two storey don't let the form worker nail the props in position, they should be placed carefully on a protective plate (ie: fibre cement) you need to minimise any damage to the floor.

Slump

Pour the concrete at the correct slump, don't pour the concrete too wet, water = shrinkage, if the contractor wants to pour >80slump you must look at using a super plasticiser (SP). (You can increase the slump without adding water.) The addition rate of SP must be controlled, the higher the initial slump, the less SP that will be required to achieve the desired final slump. Too much SP or pouring at an excessive slump can result in segregation of the mix and 'sinking' of the aggregate, additional polishing will be necessary to achieve an even appearance.

Stairs

Fully vibrate they are difficult to patch, especially the risers take extra care, don't rush.

Toppings

- Polished concrete can be used as a topping there are however a unique set of problems which should be considered.
- Cracks in the base slab can be reflected through to the polished slab. To minimize the likelihood of such repair the crack first, stitching with epoxy, and mesh over the crack before pouring.
 - Use an epoxy to bond the old concrete to the new topping, you don't want the topping delaminating. Epoxy should be applied to a dry concrete surface progressively as the concrete is placed. Epoxy's have a limited life (20 minutes), thus personnel need to be available to mix and place the epoxy as a separate operation ahead of concrete placement.
 - Aggregate size and selection, may be restricted by the topping thickness, as a rule of thumb the aggregate size should be a maximum of 1/3 of the topping thickness.

Trials

If you are unsure about the mix appearance or selecting a mix outside of BGC Concrete Architectural Range, samples can be arranged. There is a charge for this service.

Vibrator Use

Vibrators will provide better compaction, removing voids. Their use should be consistent throughout the pour. The vibrator should enter the concrete surface vertically and in a set pattern to ensure the whole area is covered. Do not drag vibrators horizontally through the concrete surface, they will leave trails in the concrete void of aggregate, resulting in an inconsistent finish.