



Pattern Imprinted Concrete

– How to correctly install it



ARMCON
CERTAINTY: IN CONCRETE

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Top Tips

Prepare the site

Prepare the site by stripping away topsoil and/ or existing surface to a depth of 200mm.

Set out the form-work, taking care to allow for falls to drainage areas and ease of access if the concrete has been manually wheel barrowed to site.

Level the sub base and then fill with 100mm of backing stone (in hot weather we also recommend using “blinding sand” to retain the water in the wet concrete). Compact the surface using a vibrating plate or heavy roller.



Protect all existing vertical and horizontal surfaces by use of “Isolation Tape” and/or polythene sheets. For all domestic situations, we recommend using a 100mm thick concrete slab.



Lay-out & Design



The lay-out, colour, design and finish should be discussed and agreed with the customer prior to starting the preparation.

When the pattern has been chosen (as with tiling or wall papering) a great deal of thought must be given to the placement of the first mat, subsequent placement & alignment.

All water run off points should be designed well in advance (these may form part of the formwork).

Thought must be given to the crack control joints, where they are to be placed and how they can be incorporated into the overall design.



Consideration must be given to the time taken to print in restricted areas (grids, drains, etc.) so that the concrete surface is receptive to printing throughout the overall pour.

It is easier to take 2 half loads if the concrete had to be placed manually of if hot/dry weather is forecast.



Concrete Mix Design

Most 'Ready Mix Concrete Plants' carry mix designs, especially for Pattern Imprinted Concrete.

The basic variables are:

- Cement content
- Aggregate size
- Slump
- Fibre content
- Added air – entrainer

The choice of mix design is dictated by the predicted weather conditions, season and to a lesser extent site situation.

Placing & Levelling the Concrete

Prior to placing the concrete, all formwork should be sound and set to the correct levels. If using wooden forms, treat with a mould release agent, rigid and firmly anchored into the sub-base. Allow for expansion joints in the slab at measured intervals.

Consider the accessibility of the site for the concrete truck, time and man power required if the concrete needs to be hand barrowed from the truck.

Concrete rakes should be used to pull the concrete roughly into position then screed to levels.

The "Rollerbug" should now be used to depress to aggregates into the concrete and full 'fats' to the surface.

Slab is now ready for trowelling. The **Magnesium Bull Float** should be used in preparation for the first application of colour hardener.

Using Colour Hardener

A mixture of pigments and chemicals in a sand/cement carrier. Pigment, chemicals and cement are bound onto the surface of the sand so as to prevent the mix separating when thrown or "Broadcast" onto the wet surface. It is a concentrate of the pigment and chemicals required to harden and colour the concrete.

Colour Hardener is applied by the "**Broadcast Method**", similar to applying grass seed by hand. Apply the Colour Hardener as evenly as possible across the slab using 1 bag (25kg) per 10m².

Use a **Magnesium Bull Float trowel** for the first application mixing into the surface fats.

DO NOT USE A STEEL FLOAT AT THIS STAGE!



Random Effects

Using Colour Hardener (Continued)

If the color is not uniform, a second application of Colour Hardener may be required/applied only onto the lighter areas.

Tip: When using lighter shades it is advisable to apply a full second coat.

At this stage, the edges of the slab need to be treated with an **Edging Trowel**. A local application of Colour Hardener may be required to fill in any tearing of the edge surface.

A complimentary Colour Hardener may be applied at this stage to bread up uniformity.

Finally, the surface should be 'closed' using a **Blue Steel Trowel**. This will remove trowel marks and leave a uniform surface in preparation for printing.

Finishing

Slab should be left for a minimum of 48 hours to harden.

Lightly brush the surface, removing excess Antiquing Release Agent.

Water onto the surface, Release Agent Wash, to wet out the residual Antiquing Release Agent.

Wash the surface using a Light Pressure Washer or hosepipe and brush.

Allow the slabs to dry!

When applying the final sealer, treat the concrete as you would when painting new wood.

Remember: concrete only requires 50% of the water added to obtain workability to cure/hydrate. The remainder needs to escape by soaking away or evaporation.

The first sealer must be able to penetrate into the slab. This product is a *sealer* not a varnish!

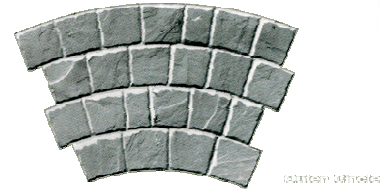
- Dilute the sealer 1:1 with Xylene and apply using a short mohair roller on light pressure sprayer. Take care not to let the sealer 'pool'
- Let the first application of sealer dry thoroughly
- Apply a second coat.

To obtain a professional finish, take care, do not rush and always read the instructions on the sealer can carefully.

Be aware of prevailing weather conditions!

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Technical Information



Concrete Mix Design

- Ordinary Portland Cement (OPC) reacts chemically with water and hydrates to form a cement paste that coats the particles of sand and aggregate within the mix.
- As the paste hardens, the aggregates are then bonded together and the concrete's strength is achieved.
- Addition of water to the mix is needed to achieve hydration and aid workability. Less than half the water added is taken up by hydration, the remainder needs some form of escape route from the cured concrete.
- Choice and proportion of sand and aggregate are critical to the overall density, compaction and subsequent strength of the cured concrete.
- Increasing the proportion of cement in the mix, increases slump, accelerates setting time and improves final strength. This is important when working in cold weather.
- Decreasing cement content assists working in warmer weather. If the water addition is kept constant, the higher cement content mix will stiffer i.e. lowering slump.

Use of Admixtures

Air entraining agents, as the name suggests, assist in retaining tiny air bubbles within the mix.

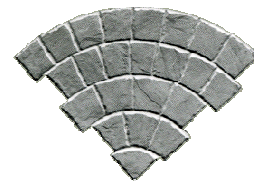
The action of these products improves workability, reduces water bleed and once cured, provides small expansion chambers within the structure to accommodate water expansion due to freezing.

These products must not be confused with the use of soaps to improve workability of mortars!

Accelerators and Retarders are not recommended when the curing environment cannot be predicted or controlled.

Fibre reinforcement i.e. Polypropylene short staple fibres, is commonplace in the mix design for pattern imprinted concrete.





Prevention of cracks in concrete

In imprinted concrete cracks will always be the most common cause for complaint! Quite often the job has to be dug out and replaced. It makes sound economic sense to install the correct type and sitting of crack joint in the slab. There are 3 types of crack control joints used.

Contraction control joints

- Necessary because concrete shrinks as it dries/hardens.
- The concrete slab is not able to flex freely during curing. The flexing is resisted by the sub-surface.
- The tensile strength is relatively weak at this stage, therefore the slab will relieve internal stresses by uncontrolled cracking.
- Cracks can be controlled with planned joints.
- Contraction control joints are formed, sawed or tooled grooves that weaken the concrete surface, thereby forcing the concrete surface to crack at that point.
- Joints should be placed according to the following formula:
 - Spacing must be no more than 3 times the thickness of slab.
 - Domestic PIC @100mm (4") thickness should be jointed every 12 feet.
 - Keeps slabs as square as possible
 - Length should never be more than 1.5 times the width
 - Joints must be cut to 25% of slab depth. i.e. 25mm/1".

Isolation joints

- To prevent random cracking.
- A newly poured slab must be able to move independently of any adjacent wall, column, insert or previously existing slab.
- Expansion foam is commonly used as a bond breaker.

Construction Joints

- Sited where the placement of concrete is interrupted (e.g. at the end of each day).