



# High Performance Paint Specification



## PS-C005 REPAIR OF CONCRETE DEFECTS

### INTRODUCTION:

Concrete, although recognised as a durable long lasting structural medium, has a number of problems that give rise to defects that create a problem when being coated. The end application will determine the specific remedy or approach to the repair (E.g. Solid concrete wall, flooring or swimming pools, all have vastly different requirements).

The purpose of this specification is to give a reasonable overview of a complex issue, but it is not complete. Further information should be sought from Coating Technologies Limited's technical department for specific problems.

### PROCEDURE:

Defect types:

#### 1 RUNNING OR WEEPING WATER

Because concrete is used extensively as a structural component on a building, it is often required to withhold the flow of water. Every attempt must be made, prior to painting to divert the water away from the structure so that any internal subsequent coatings do not have a hydrostatic pressure that will eventually push off the coating.

#### RECOMMENDATION:

If water is seen to be flowing on an internal surface, no normal coating will withstand this pressure. The normal course of action is to remove the source of the water by diversion (E.g. Flashings or drainage).

#### 2 POWDERY SURFACE

Where a concrete surface is very smooth there can be a problem of cement fines having been brought to the surface forming a weak layer that can cause the paint coating to break away from the concrete. E.g. Power steel floated paving areas, vibrated smooth shuttered concrete walls, tilt slab construction.

#### RECOMMENDATION:

Either:

- (a) Lightly sandblast to dull the surface, or
- (b) Acid etch with 10% Hydrochloric or Sulphamic Acid. Refer PS-C001 Acid Etching of Concrete with Hydrochloric Acid.
- (c) Light diamond grind

#### 3 EFFLORESCENCE

Concrete or brick work surfaces can produce a white powdery "growth" called efflorescence, which is produced by the "lime" components being drawn from the surface and crystallised with CO<sub>2</sub> from the air. This will continue until the process stabilises. I.e. No more free "lime" migrates to the surface.

Efflorescence is a good indicator that there is constant moisture coming out of the concrete and this is always linked to the ingress of water either from behind the concrete or from leaking flashings on walls.

Coating Technologies Limited, 10 Andromeda Crescent, East Tamaki, Auckland 1013, New Zealand

Phone: 0064 9 837 0897 [www.cotec.co.nz](http://www.cotec.co.nz)

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Freedom from patent restrictions is not implied.

**RECOMMENDATION:**

An acid wash with 10% Hydrochloric or Sulphamic acid, will dissolve the efflorescent build up, which can then be washed away with water. Refer PS-C001 Acid Etching of Concrete with Hydrochloric acid.

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**4 RUST STAINING**

If iron (Embedded fittings or reinforcing steel) is present near the surface or protruding, water will eventually cause the iron to rust resulting in a stain that can penetrate through the coating of plaster.

**RECOMMENDATION:**

The iron that is rusting must be removed, so the rusting process cannot occur. This can be achieved by:

- (a) Removing rust from the iron surface then coating with an appropriate anti-corrosive paint system,
- (b) Chiselling/grinding out the concrete to enable the iron source to be cut out. The cavity must then be made good by re-plastering with a suitable product for the application. Refer to Coating Technologies Limited's technical department for advice.

**5 SPALLING AND DRUMMING**

If reinforcing iron is rusting under the concrete surface the volume of the rusted iron is 3 times the original volume, so that the concrete explodes or spalls. Drumming is where the concrete has been plastered and in patches the plaster has come away from the concrete. If the adhesion is poor, the plaster "drums" when taped with a light hammer or wooden object.

**RECOMMENDATION:**

In both cases the spalled or drumming areas must be chiselled out, made good where iron is a problem, and then repaired with a suitable plaster.

**6 CRACKS**

Cracks can either be superficial or structural, and these are either stable or unstable. Obviously if the problem is unstable the remedy is to seek engineering advice as quick as possible.

**STABLE SUPERFICIAL:**

These usually result in rapid drying out of the concrete and the surface tensile forces produce random hairline cracks.

**RECOMMENDATION:**

These cracks are usually aesthetic and can be hidden by a suitable coating specification. Refer to Coating Technologies Limited's technical department for advice.

**STABLE STRUCTURAL:**

Structural means a movement in the building such as ground subsidence, resulting in a deeper crack of varying dimensions.

**RECOMMENDATION:**

Depending on the size and complexity, the crack can be repaired by a number of flexible or non-flexible systems.

If the crack is stable and only a few millimetres wide the usual approach is to chase out the crack with an angle grinder giving a depth/width of 10mm/4-5mm. This can then be filled with either a flexible or rigid filler, depending on the location. Cotec have a purpose made concrete filler for this. See data on EpoxyPatch concrete patching compound.

Painting over flexible sealants can lead to the paint cracking along the surface and subsequently flaking off.

**7 JOINTS**

Large concrete structures require regular jointing systems that allow for thermal expansion of the concrete. The painting requirements need to be specific for the detail of the type of jointing.

**SWIMMING POOLS:**

If jointing in the pool is of a non-flexible nature such as a 2 pack solid jointing compound, then these can be painted over without the likelihood of cracking. The jointing compound **MUST** be adequately prepared by hard sanding the compound prior to painting. Many of these compounds form a hard smooth skin on the surface and this must be removed prior to painting. Because the joints are usually under water there is very little movement due to temperature fluctuations. This means that a hard, non flexible coatings can be applied without any problems. E.g. Epotec NT, Epotec Aqua 1K or Concrete WB Epoxy Sealer.

Flexible jointing systems are very difficult to paint and not get some cracking of the paint at a later date. Most of these systems either use a silicone/polyurethane based compound or have a flexible membrane as part of the jointing. These

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components can be painted over but because they remain highly flexible any movement in the pool, pressure on the joint from swimmers or water will cause the harder paint coating to crack when the joint moves. These cracks are usually not detrimental and can be re coated at a suitable pool maintenance period.

## 8 VOIDS and DIVITS

Areas of small damage or where concrete has been etched or opened up and exposed air voids need to be filled and faired before painting. Voids, if left and painted over can cause air bubbles when the paint cures.

### RECOMMENDATION:

Fill voids with EpoxyPatch, knife in and allow to cure. Hard sand before painting. Larger areas can be faired using Epoxybog Fairing and Coving Cream.

In extreme cases it is preferable to re plaster the whole surface.

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