



Fact Sheet

Concrete Efflorescence

The cause of this phenomenon can vary from one to a combination of issues. This fact sheet outlines some of the potential causes encountered and practical remedies. If you are ever in doubt, contact Nutech Paint for further technical assistance.

What is Efflorescence?

Efflorescence is typically composed of calcium carbonate or soluble salts. It is quite a common issue observed on the surface of concrete slabs, concrete walls, concrete and clay pavers and bricks.

Efflorescence can occur when water vapor carrying either calcium hydroxide or soluble salts migrate to the surface of a substrate. In the instance of calcium carbonate, it can form by the hydration reaction (to become calcium hydroxide) between Portland Cement and water.

When the calcium hydroxide reaches the surface of the concrete, it combines with carbon dioxide in the air to produce calcium carbonate or efflorescence. Conversely, soluble and non-soluble salts are leached from earth in ground water.

Both of which are observed as a dusty white, pale grey, pale yellow or even a green powder deposit or stain (depending on the type of salts present). It can appear immediately after the concrete has hardened or sometimes, in a matter of days or weeks.

Water is the key to triggering the issue, be it the migration of salts or calcium carbonate to the surface. Calcium carbonate deposits may be caused by a range of factors such as; excessive water in the concrete/ mortar mix, water thrown on the surface to assist trowelling, rain on the surface or moist cool temperatures.

There are two main types of efflorescence affecting concrete;

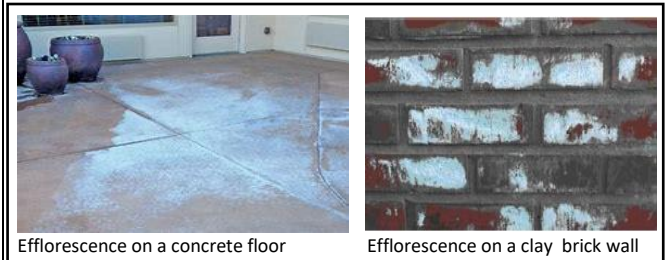
Primary efflorescence – naturally occurring salts in concrete or clay products are carried by water vapour through capillary action, which are deposited on the substrate surface then dries. This type of efflorescence generally occurs over a 2 to 3 year period and reduces naturally as the available salts are depleted.

Secondary efflorescence – salts from ground water or another source are carried to the surface of concrete or brickwork by hydrostatic pressure or osmosis/evaporation (also referred to as evapotranspiration) and deposited on the substrate surface then dry. This type of efflorescence continues as long as the source of the groundwater remains available.

What is Hydrostatic Pressure?

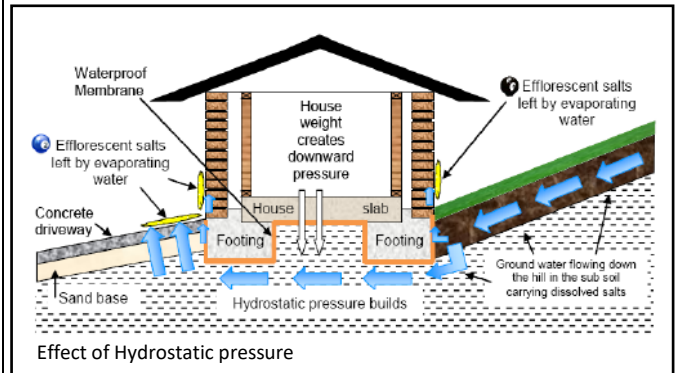
Hydrostatic pressure occurs when ground water travels under a building, the downward pressure from the building's weight forces water through the substrate to the surface.

Other issues ranging from poor drainage of the surrounding area, garden beds, damaged drains and water pipes can contribute to increased levels of ground water and efflorescence. Where ever possible, Nutech Paint recommends consulting an engineer or plumber to determine the source of the ground water and remedy the issue where practical, prior to treatment. Left untreated, these issues may never be resolved.



Efflorescence on a concrete floor

Efflorescence on a clay brick wall



Effect of Hydrostatic pressure

Appearance of Efflorescence

Hard Calcium Carbonate Deposits

Presents as a hard white or yellow efflorescence and note easily removed.

Typically observed on concrete slabs, concrete and clay pavers and bricks.

Powdery White, Crystalline Salts

Presents as a powdery white salt. This can generally be removed easily by washing the surface using a stiff bristled broom, water and a brisk scrub.



Calcium Carbonate Deposits

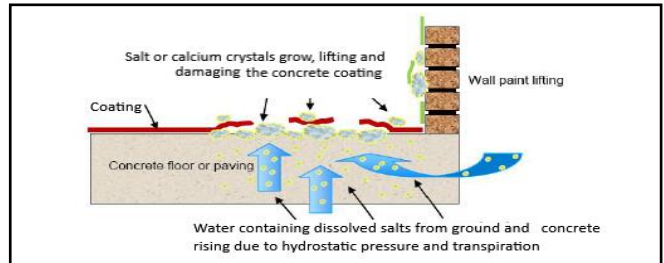
Crystalline Salt Deposits



How Does Efflorescence Affect Sealed or Coated Surfaces?

Single pack acrylic sealers are moisture vapour permeable. This means that Efflorescence salts can potentially permeate through the sealer to the surface leaving the powdery deposits on the surface.

Conversely, 2 pack coatings are typically impermeable to moisture. As the efflorescence develops under the coating, it creates osmotic blisters, ultimately causing top coat failure.



Dealing with Efflorescence (As per AS2311.7.6(a))

Underlying issues associated with efflorescence can cause instability underneath sealers and coatings. If left untreated, catastrophic coating failure will result.

If the issue has appeared under a sealer or coating, Nutech Paint recommends complete coating removal and then treat the efflorescence issue.

Identifying if there is a ground water source or drainage issue is of paramount importance. Nutech Paint recommends professional advice is sought to identify and rectify the issue prior to preparation and application of the sealer or coating.

Most efflorescence can be removed simply by a stiff bristled broom and damp sponge, allowing the surface to dry thoroughly prior to application.

Stubborn efflorescence can be addressed by mixing a mild acid solution in a plastic watering can;

- 1 part hydrochloric acid to 100 parts water (1:100)
OR - 100ml hydrochloric acid to 10 Litres water
- Apply to the affected area and firmly scrub with a stiff bristled broom.
- Flush the area thoroughly after acid washing with clean fresh water
- Where necessary, repeat and flush
- Allow the surface to dry thoroughly

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