

What Is Efflorescence?

This is an issue that most tilers and builders will come across at some stage. Often it can be avoided with care, but it is not always the sign of a poor trades-person.

Signs

"Whitish powder or crusty deposit which appears on the surface of the joint or along the edge of the tile. In porous tiles, efflorescence may appear on the surface of the tile".

The appearance of this on coloured grouts is either in patches or as an overall lightening of colour. Since the salt deposits are white, efflorescence is more noticeable in darker coloured grouts. Efflorescence in grouts can become apparent either immediately after application - primarily efflorescence, or at a later time - secondary efflorescence.

It is important to note that not just grouts are affected. Products made from Portland cement e.g. masonry, brick and plasters are also prone to this phenomenon.

Whilst it is difficult to predict when efflorescence will take place, certain weather conditions i.e. cold/damp weather increase its likelihood. Therefore, efflorescence is more common in winter months and in coastal areas.

What causes it

"Efflorescence is caused by a multiple of factors acting in combination and usually catalysed by climatic and environmental conditions. Views vary as to which facts are the major culprits and it is impossible to determine the exact cause of a specific case with any certainty".

Basically it is the migration of soluble salts from the grout or backing material to the surface. When it comes in contact with the air, it reacts with carbon dioxide forming a white salt.

Most of these soluble salts come from the cement itself. The source of efflorescence is "free" lime (calcium hydroxide) which is "an inevitable by-product of the hydration of Portland cement".

Other sources of soluble salts are unwashed sand, contaminated water or water with high salt content. In some cases soluble salts are present in the tile itself or concrete slab which has not cured fully.

Excessive amounts of water used in mixing or clean up will contribute to efflorescence. Air entrapment due to improper mixing also increases moisture absorption into the grout.

How to avoid it

Efflorescence is an age-old problem for which there is no guaranteed solution. There are preventative measures that will help reduce the likelihood of efflorescence.

Surface preparation

When tiling over concrete ensure the concrete is at least 7 days old prior to applying ceramic tiles. (longer in temperatures below 20°C and relative humidity greater than 50%).

Check that the concrete slab is not subject to rising damp. If rising damp is a problem the slab will need an epoxy coating (eg. Shelter Hydrostat).

Allow the adhesive to set before grouting. This is generally 24 hours (at 25°C and 50% relative humidity) there are however faster setting adhesives - check the manufacturers instructions.

Application

Use clean drinkable water when mixing the grout. Keep the amount of water used to a minimum - follow manufacturer's recommendations. Ensure that the mix is firm not soupy. Mix the grout well, allow to stand for 10 minutes and re-stir before applying.

Compact the grout into the joint. Reduce the amount of water used to clean up grout residue from the tile surface. Allow the grout to fully cure (this takes longer than setting of the grout) before subject it to water or cleaning solvents. When grouting outdoors, the installation must be protected from the weather (primarily rain) whilst it cures.

How to fix it

Depending on the situation, the remedy will vary. Therefore it is best to test a small area.

If attempted soon after the deposits have formed, efflorescence can be removed using a stiff bristled brush. The dry brushed material should be swept off or vacuumed.

Note that whilst this removes some of the salts it may cause efflorescence to appear again. Repeated over time, the salts will stop forming on the surface.

In some cases it may be necessary to clean with 15-20% solution of hydrochloric acid. Care must be taken during clean up, as acids will also attack the underlying grout. After cleaning, the acid would need to be neutralised with an alkaline solution eg. Household ammonia. Or, rake out the joints and re-grout.

If efflorescence is due to the environment eg. Humidity, cold temperature, damp concrete then the problem is likely to re-occur.

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