

WESTCRETE

Efflorescence

White patches appearing on the surface of concrete paving naturally cause concern. However, such concern is rarely justified in the long term, as the appearance is normally the result of 'efflorescence'.

This term is frequently used to describe whitish deposits or stains on building materials. However, there are many forms of efflorescence which have little in common other than the fact that they result in discolourations. In particular, it is worth noting that efflorescence on clay bricks is formed by a totally different process from that which occurs on concrete products.

Efflorescence as generally found on concrete paving products can be categorised as 'lime-bloom' which is a deposit apparent either in the form of white patches or as a more general lightening in colour. When the latter effect is seen it is often misinterpreted as a fading or "washing out" of the colour of the concrete.

Lime-bloom, when it occurs, is a phenomenon brought about as a result of the normal chemical reaction between cement and water. A product of this reaction is calcium hydroxide, 'lime' which is slightly soluble in water. Under certain conditions it can migrate through damp concrete to the surface where it in turn reacts with carbon dioxide in the atmosphere to produce a deposit of calcium carbonate crystals.

This deposit gives rise to the white patches or overall lightening referred to earlier, but is normally extremely thin. When it is wetted, the deposit becomes transparent and seemingly disappears.

The occurrence of lime-bloom on the surface of concrete paving products is a spasmodic and unpredictable phenomenon but a significant factor is, nevertheless, the weather.

Lime-bloom forms more readily when concrete becomes wet and dries slowly and therefore occurrences are more frequent in winter months. It is generally only likely to be brought about in the early life of concrete

products. Materials which have been in place for a year or more without experiencing lime-bloom are unlikely to do so. The phenomenon is temporary and will generally disappear with natural weathering. It is superficial and does not affect strength or durability.

Removal of lime-bloom

Lime-bloom can generally be expected to disappear over a period of time, depending on the environment to which the paving is subjected. Rainwater, being slightly acidic, dissolves the deposits and where paving is fully exposed to the weather it could typically be expected to disappear within about a year - longer for a sheltered site. Removal would be accelerated with abrasion by foot or vehicular trafficking.

Treatment with dilute acid provides a means for more immediate removal of lime-bloom. While this is a relatively simple operation, great care must be taken as the use of acids can be hazardous. Appropriate safety precautions are essential and guidance should be provided by the supplier of the acid.

It must also be remembered that acid attacks concrete and its over-application may alter the appearance of the paving.

There are available proprietary acid-based cleaners but a 5% solution of hydrochloric acid is generally satisfactory. A lower concentration would be less likely to alter the basic appearance of the concrete but would require more applications to remove the lime-bloom.

Necessary Equipment

1. Protective gloves and goggles
2. Appropriate footwear
3. Brush/spray/plastic watering can for application
4. Supply of clean water

Procedure

1. Dampen surface of paving with water (to prevent the acid from being sucked into the concrete before it has time to react with the surface deposit).
2. Apply the acid solution at a coverage rate of 1 litre to between 4 and 10 square metres of paving. (Use a spray or plastic watering can). Sweep the solution around with a soft brush to ensure even coverage.
3. Wash off the acid with plenty of water to prevent the deposit reforming.
4. Allow to dry and inspect the surface.
5. Repeat the application if necessary, in the case of stubborn or heavy deposits.
6. Do not forget to give a final wash with water.

Long term experience suggests that it is unlikely that lime-bloom will recur after removal with the acid treatment outlined above. It is not possible however, to give a guarantee against recurrence.

A further possibility which may be considered upon completion of successful cleaning is the use of a polymer coating. Such coatings may enhance the colour and the overall appearance of the paving will be markedly changed. They may inhibit the formation of efflorescence but there have been instances of recurrence of lime-bloom underneath the coating, on paving which has undergone the treatment described above.

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