

# Maintenance and cleaning

# Paving

# General



For thousands of years various forms of segmental pavers have been used as a flooring solution. In Australia the use of concrete segmental pavers has grown rapidly since the early 1970's. Concrete pavers have revitalised a broad range of residential, municipal and commercial landscapes adding colour and character to every application.

When designed and constructed correctly, concrete segmental paving will generally require less structural maintenance than other forms of surface.

The information provided here is intended to be used as a guide only and BEST Bricks & Pavers shall accept no responsibility for any losses or damages incurred as a result of the implementation of any remedial action as detailed herein.

## Importance of design

In landscape design, aesthetically the architectural style, colours and materials of the structure should always be complemented and be of paramount importance. Ideally house designers and landscape designers would work together to produce cohesive living spaces that take into account both indoor and outdoor environments. In reality landscape design is often neglected and in a practical sense aesthetic requirements may not always provide an optimal solution.

In vehicular applications special consideration needs to be given to the paving bond which is employed as some aesthetically pleasing options are not recommended. In these cases practicality needs to take precedence over design and aesthetic requirements.

Type of paving bond employed becomes less critical in pedestrian applications where virtually any paving bond may be used successfully.

## Trouble-free maintenance

Often the surest way to guarantee ease of maintenance is by selecting the right product for the right application and by ensuring that the project is designed and constructed to industry best standards. For example it is often overlooked that dark or blended colour pavers are to be preferred for use in driveways or areas where food may be consumed as they are effective in disguising any unsightly staining.

Even when consideration has been given to product selection it is generally accepted that a maximum of 2% of paved surface may need replacement every service year. This compares most favorably with alternative surface forms.

## Routine preventative maintenance

### Cleaning

Concrete pavers may be cleaned as can other surface forms. Many materials (eg leaves) will only stain pavers if they are allowed to remain in contact with pavers for prolonged periods. Frequent sweeping and flushing of pavers will help maintain its excellent aesthetic appeal. When sweeping or flushing, precautions must be taken in the early life of paved surface to ensure that jointing sand is not removed. Unless pavers have been sealed, the use of vacuum sweepers and water jets should be avoided until joints have become naturally clogged which normally occurs two to three months into paved surface life.

### Weed control

Most effective when controlled by periodic applications of weedicide. It is recommended that weedicide be applied in dry weather when pavers are also dry.

### Regular inspection

Should be made to establish integrity of paved surface. By identifying and attending to small localised problems then often the need for major maintenance of large areas can be avoided.

### Joint maintenance

Maintaining the jointing sand will protect the structural integrity of paved surface. Segmental pavements develop their structural capacity by the wedging action caused by traffic. It is critical that joints be refilled immediately where any cleaning action has resulted in jointing sand removal and usually this will only be necessary during first few months of paved surface life.

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# Stain removal



| Type of stain               | Suggested removal method  |
|-----------------------------|---|
| Moss, fungi & mould         | Dry brushing with or without application of clean sharp sand.<br>OR High pressure water jetting with or without detergent.<br>OR Apply fungicides.  |
| Leaf mould & wood rot       | Use ordinary bleach or calcium chloride followed by sodium hypochlorite dissolved in water (1kg in 5 litres) then scrub with stiff brush.   |
| Tobacco                     | Use ordinary bleach then scrub with stiff brush.  |
| Tomato sauce, mustard & oil | Apply undiluted liquid detergent for 15–30 minutes, then scrub and wash with hot water.   |
| Chewing gum                 | Scrape off excess material and apply poultice of methylated spirit.   |
| Tyre marks                  | Scrub using stiff brush with aid of water, detergent and scoring powder or sharp sand.  |
| Oil or vehicle grease       | Apply dry absorbents such as Fullers earth, talc, diatomaceous earth or kitty litter for at least 24 hours to remove excess oil, then sweep up.   |
| Dry paint                   | Scrape off excess paint, apply paint remover for 15 to 30 minutes, loosen with gentle scrubbing and absorb loosened material with paper or cloth. Do not rub.   |
| Fresh mortar                | Cover with clean damp sand. Sweep off with stiff broom. Repeat as necessary. Apply clean dry sand and allow to dry.   |
| Hardened mortar             | Remove lumps of hardened material by chiseling, scraping or grinding. Wet surface & apply dilute hydrochloric acid (1 part acid to 20 parts of water) & scrub vigorously for 2–3 minutes. Thoroughly hose down immediately after scrubbing. |
| Clay                        | Scrape off lumps then scrub with hot water and strong detergent.  |
| General grime               | Scrub with poultice of talc and bleach diluted in water (1:5) & wash with water.  |
| Efflorescence               | Please refer to 9ii “Efflorescence – prevention and removal” contained in this kit.   |

When engaging in stain removal always start with a trial in an inconspicuous area. Always observe safety instructions and wear protective clothing at all times.

# Efflorescence

## Description and mechanism



### Definition & description

Efflorescence is the term that describes the formation of salt deposits, usually white, on the surface of concrete products causing a change in appearance.

Apart from the unsightly discolouration, efflorescence is generally harmless. It is described as “a skin trouble and not a deep-seated disease”.

There are three forms of efflorescence that can develop on concrete pavers, primary, secondary and crypto-florescence. Primary efflorescence occurs during the curing or hardening phase of concrete pavers. Secondary efflorescence is the efflorescence resulting from the weathering of the cured concrete pavers. Crypto-florescence is the deposition of salt within the pores of concrete pavers below the exposed surface. The force of crystallisation growth may cause disintegration.

With time, efflorescence becomes less extensive. Efflorescence is most obvious in winter but may be observed throughout the year after a heavy rain and drop in temperature.

### Mechanism – physical process

The formation of efflorescence depends on a number of natural physical processes involving both salt and water transfer in and out of concrete. Specific conditions may dictate the extent to which any of the many processes involved may take place and hence may dictate the extent of efflorescence occurrence. Various physical processes are involved. In practice, these are inter-related creating a complex mechanism.

### Mechanism – chemical processes

Alkalis in the concrete react with carbon dioxide to produce two forms of efflorescence, sodium and potassium carbonate and calcium carbonate. Alkalis and calcium hydroxide in solution in the pores are able to migrate to the surface. This migration depends on permeability, voids and moisture content. At the water-air interface, atmospheric carbon dioxide reacts with these hydroxides to form calcium, sodium and potassium carbonate. Penetration of water can cause efflorescence in the same way.

Sodium and potassium carbonates appear on the concrete products as a soft white fluff that can be easily removed (although it may appear again). This type of efflorescence usually appears if the product is exposed to wetting and slow drying.

Calcium carbonate appears usually as white “bloom” diffused over certain areas. In severe cases it appears as a hard white crust. It is most troublesome and difficult to remove. Calcium carbonate efflorescence is likely to form on concrete products in which hydration is interrupted by premature drying and which has been subsequently wetted.

# Efflorescence

# Prevention, removal and summary



## Contributing factors – general

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

## Prevention

There is as yet no single concrete additive that will reliably prevent efflorescence. It is generally accepted that there are various processes that when employed can reduce the likelihood of efflorescence. These include but are not limited to –

- a reduction in the water/cement ratio of product mix
- produce a highly compacted product which is very dense and thus difficult for moisture to penetrate
- ensure product cures slowly by using curing chambers that are high in humidity
- after production, if only for a short while, product should be stored protected from weather

BEST Bricks & Pavers employs these and other preventative measures and is forever conscious of the need to ensure that efflorescence not become a concern with its products.

## On site causes

Efflorescence may also have its origin in the material upon which concrete pavers are laid. If the material used to construct the base and the bedding sand used for any paving project has a high sodium content then these naturally occurring salts can migrate to the surface of the pavers.

Special consideration should be given to selection of base and bedding material to reduce the possibility of efflorescence.

## Removal of efflorescence

As a rule, efflorescence will weather away naturally within one or two years. If immediate removal is required, this can be achieved by washing with a solution of diluted hydrochloric acid. Generally a 3% solution of hydrochloric acid is used. Before acid is applied, paved area should be dampened with water to kill the initial suction. This prevents acid from being sucked into pavers before it has a chance to react with the surface deposit. Acid washing should be followed by washing pavers with water, in order to prevent continued action of the acid on the pavers.

When acid washing, always start with a trial on an inconspicuous area.

## Summary

Efflorescence is a complex but natural phenomenon which whilst unsightly, is generally harmless and of no risk to the integrity of the concrete product affected.

Efflorescence must be taken for what it is - a natural occurrence in a product made from natural raw materials.