

REMOVING Stains from Concrete

SCOPE

This data sheet sets out procedures for removing common stains from concrete surfaces. For advice on general cleaning, see Data Sheet [Cleaning Concrete](#).

INTRODUCTION

With spillages that may result in staining, it is always better to remove the contaminant and clean the concrete surface as soon as possible to avoid the substance penetrating into the concrete surface, making it more difficult to remove. Also, preventing the spill from spreading will reduce the area to be cleaned.

Absorbent materials such as paper towels and cloths should be used to soak up contaminants; wiping the surface should be avoided as this tends to spread/drive contaminants such as oil into the concrete. To reduce the risk of contaminants penetrating into the concrete and make stain removal easier, a suitable sealer can be applied to the concrete surface when new or after cleaning. Refer to Data Sheet [Sealers for Exposed Concrete Flatwork](#).

Before commencing removal of any stain, provision should be made for the removal and/or disposal of any wash water and contaminants generated by the cleaning operation.

GENERAL CONSIDERATIONS

Pressure washing

A variety of common stains can be removed by pressure washing with equipment that allows the introduction of a range of detergents and cleaning chemicals into the water stream. Suppliers of pressure washing equipment will usually have a range of appropriate products available for specific stains. Chemicals are used to either dissolve the stain or break/reduce the bond between the contaminant and concrete surface, making removal easier. Some pressure washers may also allow higher temperature water to be used to improve the performance of the cleaning chemicals. Refer to Data Sheet [Cleaning Concrete](#).



PREVENTING the spill from spreading will reduce the area to be cleaned

Surface appearance

Mechanical methods of stain removal such as abrasive blasting and grinding, and some chemical methods such as acid etching, remove stains by removing the affected concrete. This will change the surface appearance (both texture and colour) and should be considered when selecting an appropriate cleaning method.

Before attempting to remove a stain from concrete, a small trial area in an inconspicuous location should be treated to assess the effect of the cleaning method and any chemical products proposed. As cleaned areas may differ in colour and texture to the surrounding concrete surface, the entire area and not just the stained portion may need to be treated in order to maintain a consistent appearance.

Poultices

To apply liquid chemicals to localised stains or specific areas, a poultice may be used. A poultice consists of the cleaning chemical mixed with cat litter, talc or similar inert absorbent material to form a wet substance or paste that can be applied to the concrete surface at a thickness of about 10 to 12 mm. This allows the chemical to be contained and held in close contact with the stain, and to be transferred into the concrete where it can dissolve and/or draw out the staining material. Poultices are normally allowed to dry prior to removal as the drying process draws the chemical and contaminants back out of the concrete surface.

Use of acids and other cleaning chemicals

The following points should be considered when using acids and other cleaning chemicals:

- Diluted hydrochloric acid, chlorine bleach, trisodium phosphate and other chemically-based cleaning agents can be hazardous if used incorrectly. The supplier's instructions and recommendations concerning safety and dilution rate should be followed.
- When diluting acid, the acid should be added to water, not water to the acid. A large amount of heat is released when strong acids are mixed with water. If water is added to acid, an extremely concentrated solution of acid is initially formed. Enough heat may be generated to cause the solution to boil very violently, splashing concentrated acid out of the container. If acid is added to water, the solution that forms is very dilute and the small amount of heat released is not enough to vaporise and spray it.
- Hydrochloric acid should not be mixed with other chemicals as the reaction may also be violent and cause acid to splash out of the container.
- Suitable protective clothing should be worn at all times and work undertaken only in well-ventilated areas. Fans should be used to provide fresh air to the work area.
- A neutralising agent and source of water should always be available. A readily available neutraliser is bicarbonate of soda mixed at the rate of 50 grams per litre of water. This can also be used for both the pre-wet and final rinse.
- Only diluted acids should be used and washed off immediately after use. Acids are typically diluted to a mixture of 1 part acid to 10–20 parts water for cleaning purposes. Stronger acid solutions may be more efficient at removing stains but could result in salts being produced (as a by-product of the chemical reaction) which are even more difficult to remove.
- The suitability of acid cleaning should be considered for each particular situation as it may affect built-in components such as pre-formed metal joints, dowel bars, termite shields, lintels and window/door frames.

REMOVAL OF SPECIFIC STAINS

Chewing gum

For isolated spots, solidify the gum with ice cubes and scrape off as much as possible. Then apply a poultice saturated with methylated spirits and leave until dry. This should turn the residue gum brittle, making removal possible with a stiff bristle or wire brush. Finish by washing the affected area with hot soapy water, then rinse with clean water.

For areas requiring significant amounts to be removed, or for applications where the gum has been walked into the concrete surface, the easiest method is high-temperature steam cleaning. The high temperature dissolves the gum and allows it to be washed from the surface. Note that this method can also be used for isolated spots if the equipment is available.

An alternative method is to scrape off as much chewing gum as possible and then remove the rest with a solvent such as amyl acetate. Amyl acetate also aids in the removal of similar substances such as plastic glues and adhesives, most candle waxes, lacquers, polyurethane and paint stains. Note that while amyl acetate is commonly used in the dry cleaning industry to remove chewing gum stains, it is not generally available in small quantities; a similar product suitable for the removal of adhesives and lacquers may need to be used.

Also, while water or steam cleaning can be used for rinsing afterwards, they should not be used in combination with amyl acetate for cleaning.

Clay soil and common beverage stains

Scrub stain vigorously with warm soapy water and then rinse with clean water. Stubborn stains may require scrubbing with chlorine bleach: first wet the surface, then apply bleach, scrub and rinse.

Steam cleaning may provide an effective method for large contaminated areas.

Coffee stains

Scrub stain vigorously with warm soapy water and then rinse with clean water. If this is not effective, try a poultice saturated with a solution of 1 part glycerol to 4 parts water. Allow to react with the stain for at least 24 hours before removing and hosing affected area. The area may need to be scoured with abrasive cleaning powder to remove the remains of the poultice.

Efflorescence

Efflorescence is the formation of salt deposits (usually white) on or near the surface of concrete. The often subtle change that these white deposits cause to the surface appearance of coloured finishes can be mistaken as fading. Once cleaned, the appearance should be restored. The cleaning method will depend on whether the deposits are soluble or insoluble.

Soluble salt deposits can be removed with a stiff bristled broom or brush, especially if this is carried out soon after the salts have been deposited on the surface. Excess salt should be totally removed from the surface by sweeping, vacuum cleaning or other means. If the result is not satisfactory, the surface can be scrubbed with clean water then lightly rinsed. However, washing with water may result in deposits appearing again as the washing water evaporates. Repeated dry brushing as the deposits appear is therefore likely to be the most successful treatment.

Insoluble salt deposits are typically hard, white, scaly or crusted deposits that cannot be removed by water washing. Pressure washing can be effective, sometimes augmented by the addition of an abrasive media such as fine sand into the water stream to assist with difficult to remove deposits. However, the effect of the more abrasive media on the surface finish (texture and possibly colour) should be considered. Light abrasive blasting is also effective but may have the same effect on the surface appearance. It may therefore be necessary to treat the entire area to maintain a uniform appearance.

An alternative method which appears to be successful in most cases, and possibly the only one for calcium carbonate efflorescence, is to wash the surface with a dilute hydrochloric acid solution. The recommended proportions are 1 part hydrochloric acid to between 10 and 20 parts of water. For coloured concrete, a more dilute acid solution consisting of 1 part acid to 50 parts of water (ie 2% solution) is recommended. Less-concentrated solutions will require more applications to remove hard crusted salt deposits but will be less likely to result in an acid-etched appearance.

Since hydrochloric acid will etch or remove the concrete surface, its impact on the appearance (texture and colour) should be assessed on an inconspicuous area first. Also, acid cleaning and abrasive blasting are not recommended for coloured surfaces where a dry shake topping product has been used to provide a thin coloured surface layer to the concrete.

The surfaces to be treated should be saturated with water before applying the dilute acid solution. When applying the acid solution, ensure the surface to be treated is moist but without any free water being present.

The applied solution should be allowed to react on the concrete surface for 10–15 minutes. The surface should then be thoroughly rinsed and scrubbed with sufficient clean water. Rinse at least twice or until all traces of the acid solution have been removed.

Fungal growth

Wet the surface, apply chlorine bleach, scrub vigorously and then rinse thoroughly. A deposit of dead fungal residue will usually be noticeable within a few days. This can be removed by brushing with a stiff bristled broom and the cleaning process repeated as necessary.

Alternatively, pressure wash the surface, apply chlorine bleach and after a few minutes remove any dead fungal residue and rinse thoroughly with further pressure washing.

Phosphate-based cleaning products such as sugar soap may also be used for removal of mould. Wet the concrete surface, apply sugar soap (neat or diluted), scrub the surface and pressure wash or thoroughly rinse.

Grime and dirt

See Data Sheet [Cleaning Concrete](#).

Oil and grease stains

These can be difficult to remove completely because of their rapid penetration of the concrete surface. If an oil spill occurs, stop it spreading by encircling with sand or dirt, sawdust or cat litter. Soak up as much surface oil or grease as possible with an absorbent cloth, paper towel or powder. Apply an engine degreaser or other specific cleaning product and rinse surface thoroughly.

Alternatively, cover the residual stain with a poultice made of 1 part lime to 2 parts mineral turpentine. Spread a 5-mm layer of the paste over the stained area ensuring a margin of 50 to 100 mm around edges. Cover with plastic sheeting and leave for 24 hours. Remove cover and scrape off the powder. It may be necessary to repeat this process again within a day or so to remove any deeply ingrained oil or grease that sometimes continues to rise to the surface. Scrub with warm water and laundry detergent then rinse with clean water.

Phosphate-based cleaning products such as sugar soap may also be used to remove light oil and grease stains.

Paint (dry)

Scrape off as much excess paint as possible and cover any residual paint with a commercial paint remover for 20–30 minutes. Observe the product manufacturer's safety and handling instructions, wear protective clothing and use only in well-ventilated areas. Scrub stain gently to loosen paint film then wash surface thoroughly with clean water. Stubborn-to-remove surface paint films may require additional scrubbing with abrasive cleaning powder.

Alternatively, pressure washing may be used to remove most surface paint films. The addition of an abrasive media into the water stream will assist with difficult to remove paint films. However, the effect of the more-abrasive media on the surface finish should be considered.

Ingrained paint may be further treated with acid cleaning as described under *Efflorescence*. Note that this method removes the paint by removing the surface layer of concrete. Its effect on the surface finish should therefore be assessed in an inconspicuous location prior to application over the entire area.

Paint (wet)

Soak up excess paint with absorbent cloth or paper towels. Do not wipe or rub as this will only spread the paint spill and drive it further into the concrete. The method of removing the remainder depends on whether the paint is water or oil based.

For water-based paints, immediately scrub the affected area with abrasive cleaning powder and rinse with water until all traces have been removed.

For oil-based paints, allow the paint to dry for at least three days and then use one of the dry-paint removal techniques given above. Paint removers or solvents used to remove wet paint film deposits in less than three days may result in spreading the stain and increase the risk of deeper surface penetration.

Rubber or tyre marks

Initially try pressure washing. If this fails to remove the marks, use a proprietary rubber-removal compound available from hardware stores. The use of a brake-cleaning product may also be effective. Any chemicals used should be thoroughly rinsed from the surface and their effect on the finish assessed prior to general use over the whole surface.

Seek advice from the supplier regarding manufacturer's recommended preparation and application and what effect, if any, the rubber removal compound or brake cleaner might have on the concrete surface.

Rust deposits

Remove excess rust with a stiff brush then apply a proprietary cleaning chemical suitable for rust stains to the affected area. These will typically contain oxalic or phosphoric acid solutions and the manufacturer's safety and application instructions should be followed. Any chemicals should be thoroughly rinsed off after treatment and applied initially to an inconspicuous area to assess their impact on the surface appearance.

Deep rust stains usually require the use of a poultice. Cover the stain with a poultice impregnated with a solution of 1 part sodium citrate to 6 parts warm water (sodium citrate is also known as tri-sodium citrate and is available from chemical suppliers). Remove the poultice when dry, scrape off any residue then scrub with warm soapy water. Finish by rinsing with clean water.

For vertical surfaces, the sodium citrate can be mixed with an equal volume of glycerol (glycerine) into a stiff poultice that will adhere to the surface. Leave for two to three days before removal and repeat if necessary.

Smoke stains

Remove any surface deposit by pressure washing or vacuum cleaning. Treat any residual staining by mixing sugar soap powder with hot water (typically 100 g to 4 litres but may need to be stronger) or

diluting sugar soap liquid (can be used neat) and applying it to the surface with a brush, followed by scrubbing with a scouring cleanser. Alternatively, bicarbonate of soda and household bleach are also effective products for removing smoke stains. If there are any concentrated stains, a poultice impregnated with household bleach (essentially sodium hypochlorite) is recommended. A thorough rinsing with fresh water is the final step.

If these methods are unsuccessful, painting may be necessary to restore an acceptable appearance.

Timber stains

Scrub vigorously with chlorine bleach then rinse the surface. Cover stain with a cloth soaked in bleach, repeating this process until a satisfactory result is achieved. Scrub regularly between bleach treatments. Rinse thoroughly.

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FURTHER INFORMATION

Further information on good concreting practices can be downloaded from the Cement Concrete and Aggregates Australia website at www.ccaa.com.au.

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