EST 1854
JOHNSONS WELLFIELD

Natural Stone Care Maintenance & Safety

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1.0 Scope

The information provided within this document is not intended to be exhaustive and should be considered general guideline for cleaning, maintenance, and care of natural Yorkstone paving. It is not possible to cover every eventuality and each installation will require specific individual consideration and attention. It is advised that a specialised cleaning company be consulted before embarking on any of the cleaning procedure described herein.

2.0 General

All surfacing paving materials made from natural product will, to some degree, experience a change in appearance during their lifespan. A well-maintained surface will provide years of service over the life of the product. Weather it is desirable to allow a natural patina to develop gradually across the surface or, to preserve a “new look installation” for as long as possible it is essential that regular maintenance and good cleaning practice should be observed. Hard Landscaped areas should be designed & laid in accordance with the current British Standard BS 7533 - Pavements constructed with clay, concrete, or natural stone paving units - Part 101 Code of Practice for the structural design of pavements using modular paving units (available from bsigroup.com).

3.0 Health & Safety

Working with silica-based stone requires careful attention to safety measures due to the potential health risks associated with silica dust exposure. Silica, a naturally occurring mineral found in stone such as granite, quartz, and sandstone, can pose serious health hazards when it is airborne and inhaled. Therefore, cutting or working with silica-based stones, should only be conducted under effective safety protocols.

The use of appropriate personal protective equipment (PPE) such as respirators, goggles, and gloves. Respirators equipped with high-efficiency particulate air (HEPA) filters are particularly important for filtering out silica dust particles, preventing them from entering the lungs and causing respiratory issues. Additionally, wearing goggles protects the eyes from any flying debris generated during the cutting process, while gloves help minimize direct skin contact with the stone and reduce the risk of cuts or abrasions.

In addition to wearing appropriate PPE, employing engineering controls such as wet cutting techniques and local exhaust ventilation systems help mitigate silica dust exposure. Wet cutting involves continuously spraying water onto the stone surface during cutting to suppress dust formation and keep it from becoming airborne. Local exhaust ventilation systems, such as dust collectors or vacuums equipped with HEPA filters, capture dust particles at the source, preventing them from dispersing into the air and contaminating the work environment. By combining these safety measures with proper training and awareness, workers can effectively minimize the health risks associated with cutting and working with silica-based stone.

In all cases we advise an appropriate Risk Assessments should conducted, and a Method Statements be produced and adhered.

Some of the cleaning methods described within this document may involve the use of chemicals. It is vitally important that safety warnings issued by the product suppliers be carefully read and strictly adhered to.

In general, the following precautions should be taken:

When using chemicals, protective clothing such as gloves, goggles, face mask, safety footwear and overalls should be worn.

Adequate ventilation is required when using chemicals in confined spaces.
When using flammable materials all sources of ignition and naked flames should be removed from the area to be cleaned. Smoking ***MUST*** be prohibited.

When diluting acids, ***ALWAYS*** add acid to water and not water to acid.

Any clothing that is contaminated with chemicals should be disposed of safely.

When using any chemicals, care must be taken not to damage, contaminate or stain any adjoining materials, landscaping, or finishes.

Care must be taken to protect personnel in areas where cleaning is being undertaken from any injury or hazard created by the cleaning activity. The appropriate First Aid must be available on site.

NOTE: Before undertaking any cleaning operation, a trial should be conducted on a small, preferable inconspicuous area, to determine the effect before progressing with a large area.

4.0 Maintenance of Paving

4.1 Early trafficking of unbound surface laid paving

Once the surface layer is complete (including complete filling of all the unit-to-unit joints) it can generally be opened to traffic. If the underlying bedding layer has been saturated by heavy rainfall, either during or immediately after compaction of the surface layer the trafficking should be delayed.

If saturation has occurred, the paving should not be trafficked by construction vehicles and no other traffic should be allowed until the laying course has been allowed to drain.

4.2 Initial Maintenance

During the early life of an unbound laid pavements, the joints between the units may be relatively porous. Ingress of water can consolidate jointing material therefore it is important that joints are regularly ‘topped up’ to replace areas where jointing aggregate consolidated by rainwater or removed by other factors.

The joints will soon become semi-impervious as the build up of surface detritus seals the joints. Until this has occurred the paving should only be brushed by hand. Mechanical Sweepers, and in particular sweepers with high suction forces should not be used, as there is a risk of further loss of jointing sand.

4.3 Autumn Maintenance

Maintaining the appearance and functionality of the paving in an ongoing process however this is heightened as winter approached and plants defoliate. Attention is required to the removal of falling leaves and organic detritus on a frequent basis as composting/rotting vegetation left on the surface of the stone will increase the likelihood of staining on the pavement surface. The following measures should be undertaken.

1 Clear away any fallen leaves & vegetation as it appears
2 Remove worm casts and weeds from the joints
4 Ensure all joints are appropriately filled and in good order
3 Swish the surface with clean water
4 Brush the paving with a stiff bristle yard brush

4.4 Winter Maintenance

As with all all-natural stone, Sandstone is a porous material that will absorb water into the surface layer in wet conditions. This will dry out naturally through evaporation as dry conditions prevail in a process called breathing. As such, the use of soluble de-icing salt is not recommended for sandstone as is may result in salt crystallisation damage to the stone. This is typically exacerbated by prolonged exposure where salt can accumulate and become concentrated under the surface layer of the paving. Coarse grit sand can be used as an alternative to add traction underfoot and attract light thus accelerating the melting process. Alternatively, kitty litter can be used to add additional grip however the light colour may not increase the rate of melting. After thawing, the grit should be removes from the paving surface. Care must also be taken around drains and grids to reduce the risk of blockages. Using grit that is the same colour of the paving will reduce the need for excessive cleaning to remove sand detritus left on the paving surface.

4.5 Cold Weather

Cleaning procedures using water: Do not use when air temperature is at or below 5°C. Protect damp surfaces from frost.

Chemical cleaning agents: Do not use when surface temperatures are below those recommended by manufacturer.

5.0 Cleaning of Paving

5.1 Routine and Periodic Maintenance

It is recommended that all natural stone installations are regularly inspected to assist with developing a suitable maintenance regime. The maintenance needs for each installation will be determined by multiple factors, indeed some areas within a single installation may require differing levels of attention. This should be done routinely and periodically based on the needs and circumstances of the area in question.

5.2 General Dirt and Detritus

Stone floors should only be washed when required. Contaminants including oil, grease, grime, and rubber can be remove using Weiss Professional Paving Cleaner (pH-neutral) which is suitable for routine cleaning of all types of natural stone, porcelain, and concrete paving elements. This product helps break the bond between the paving surface and organic/inorganic contaminants. Weiss Professional Paving Cleaner can be used for both general cleaning and intensive spot cleaning.

Application Instructions & Coverage.

Type of use	Dilution ratio of Product to Water	Approximate Coverage
Regular Cleaning	1 part product to 30 parts water	25-75m2
Infrequent maintenance	1 part product to 20 parts water	10-30m2
Heavy Soiling	1 part product to 10 Parts water	5-15m2

Spot Cleaning intense staining	1 part product to 1 Part water	3-5m2

Ensure all the area has been thoroughly washed with any surplus being removed. On completion of the cleaning the resulting run-off should be carefully channelled to either drainage points or containers where it can be safely disposed. The stone should be allowed to dry naturally.

5.3 Moss, lichens, and algae

Moss, lichen, and algae can become prevalent on hard surfacing where the area is heavily shaded, is under trees or is not laid to a sufficient fall to provide adequate surface drainage (See BS 7533 part 101). If such growths do occur and are considered undesirable, then the area should be treated with a proprietary weed or moss killer used in accordance with the manufacturer's instructions. Such products take some days to be effective and will be most effective when applied during dry weather conditions. The washes will work best if any thick growths are scraped off first and the wash is well brushed in. Some treatments leave a residue to discourage the re-growth of the moss and algae, but this will only be of limited value if the surrounding conditions leave the paving damp and in shade.

Weiss Organic Stain Remover is a high performance, long lasting advanced Bleach based solution which offers an instant cleaning reaction to Algae, Moss, and all organic staining from the likes of leaves, animal matter, and cigarette staining. This product is ideal for paths, patios and beneath tree foliage, effective on roofs, walls, and balconies. Handle with care, use appropriate PPE. Avoid getting on clothes. NB Ensure that a small sample area is treated before embarking on a large highly visual area.

NOTE: Products containing Ferrous Sulphate can chemically react with the natural stone products resulting in a brown stain to the surface. Please check with the manufacturers of the weed or moss treatment for further advice on this matter.

5.4 Rust Stains

Initially action must be taken to identify and eliminate the sources of staining.

To remove the rust stain, the surface should first be wetted with clean water and then the affected area treated with a suitable dilution of an appropriate acid solution. Please refer to 7.0, Acid Washing.

Weiss Rust remover removes deep rust stains from hard stones such as granite, natural stone, ceramic tiles, porcelain, and terracotta. Prevents re-formation of rust.

Suitable for most types of granite and some sandstone, if unsure testing a small area is recommended. Not suitable on calcareous stone like marble or limestone such as Travertine. It may also be used for rust staining caused by metal items left on the stone.

5.5 Oil & Bitumen Stains

Oil can penetrate readily into hard surfacing materials, but it should not stain if any spillages are removed promptly with an absorbent material ie. paper towels, cloth, or absorbing granules.

Do not attempt to wipe the stain as this will drive the oil into the surface of the units and spread it over a wider area.

If the stain persists, then an emulsifying degreaser should be employed.

Fresh bitumen should be allowed to cool down before removing it with a paint scraper or similar. If it is particularly resistant, the use of ice to make the bitumen brittle may be required prior to scraping it from the paving. Any residue should be removed with Weiss Oil & Grease stain Remover is a paste that draws deep and stubborn staining from all types of concrete and natural stone surfaces, porcelain, and precast Concrete paving elements.
The special solvents within Weiss Oil & Grease Stain Remover draw oil and other contaminants to the surface which have migrated beneath the surface level of the paving units.
Ideal for Oil, Grease, mastic, bitumen, solvents, BBQ Grease and Candle wax.
Available in 250ml and 750ml tin. (30 litre Buckets - Available on request)
Solvent based product.

5.6 Graffiti & Paint Stains

Both paint and graffiti are difficult to remove from most hard surfacing materials. Fresh wet paint should be soaked up with an absorbent material without wiping the paint, as this will spread the stain. It should then be treated with a suitable solvent such as Weiss Resin & Paint Remover which steadily breaks down the chemical compound found in acrylic polymers, solvent, or water-based products. It strips out old fashioned stone sealants, polish, paints, graffiti, felt tip pens and all similar chemicals from stone surfaces.

NOTE: The manufacturer may be able to offer detailed advice on the removal of paint and graffiti and so should be consulted directly for specific recommendations.

5.7 Epoxy & Polyester Resin Stains

Areas of solidified epoxy or polyester resin can be removed by carefully burning off the area with a blowtorch. Care must be taken not to inhale any fumes given off.

If after burning a black stain remains, this can be removed by scrubbing with detergent and hot water. For larger areas grit blasting may have to be considered, however the effect of such treatment on the micro texture of the surface should be carefully considered. Again, it is advised that a small area be tested before any large-scale operations are undertaken.

5.8 Smoke, Fire and Tobacco Stains

Normally such stains can be removed by scrubbing with Weiss Professional Paving Cleaner (5.1) and hot water. Where the stains persist, a mixture specialist stone cleaning company should be contacted.

5.9 Beverage Stains

These can normally be removed by applying Weiss Organic Stain Remover (5.2). Rinse the area with clean water taking care to dispose of the run-off safely.

5.10 Chewing Gum

Chewing gum is a particularly difficult substance to remove from hard surfaces.

Newly discarded gum can be scraped off by using mechanical scraper, but hardened gum can only be removed by either freezing the gum and chisel it from the surface of the paving or use a hot water/steam cleaner.

For specific advice on chewing gum removal, it is recommended to contact specialist contract cleaning companies directly for further details.

5.11 Cement and Lime Staining

Both types of staining can occur on paved surfaces usually because of contamination from other sources such as concrete street furniture or the use of onsite mortars and concrete.

Cement and lime deposits are generally insoluble and therefore require treatment by a suitable acid cleaner to fully remove the staining. **Please refer to section 7.0, Acid Cleaning.**

6.0 Efflorescence on Natural Yorkstone

Efflorescence or lime bloom is a transient phenomenon of ordinary Portland cement being deposited on the surface of the stone. It may be displayed as a lightening to the colour of the stone and can appear as a white deposit covering part or the entire surface. Alternatively, it may penetrate from the edges commonly called picture framing. Except in severe cases, the deposit should disappear completely when the stone sub straight dries out.

Efflorescence is not a manufacturing fault but is a result of moisture evaporating through the surface of the stone leaving. If this is experienced for a prolonged period or appears seasonally it can be detrimental to the long-term performance and durability of the stone and the cause should be investigated buy a qualified specialist.

In light cases, efflorescence can be removed chemically by using a suitable acid cleaner. **Please refer to section 7.0, Acid Cleaning**.

7.0 Acid Washing

Stubborn and persistent stains that will not generally weather away naturally will require the application of a specific acid cleaning treatment to remove them.

The cleaning product will contain specific application instructions however the basic principles will be as follows:

The stone should be dampened prior to treating. As the staining begins to dissolve, some frothing may be apparent which should be followed by agitation of the surface using a stiff bristle brush to completely remove all trace of the stain.

Once this process has finished, the whole surface should be rinsed thoroughly with clean water, taking care to dispose of the run-off safely. In most cases one treatment will be sufficient, however, in some cases re-treatment may be required.

Weiss Cement Stain Remover (CSR) removes cement stains & efflorescence from internal and external paving surfaces. Suitable for most types of granite and acid-resistant natural stone and synthetic paving and flooring elements such as porcelain, ceramic tiles, and terracotta. Do not use CSR on marble seek advice before applying to limestone and some types of porous sandstone.

Weiss Cement Stain Remover is less severe than more commonly used brick acid and is specially formulated to assist with the removal of staining suggested in section 5.91 and 6.0.

When using any form of chemical treatment, the following guidelines should be strictly adhered to:

- With deeper stains the degree of acid treatment may result in an acid etched appearance.
- Protective clothing (gloves, boots, goggles etc) should be always worn when using chemicals and the appropriate first aid measures must be available on site.
- Take care to ensure that surrounding materials and landscaping are protected. Soft landscaping and exposed metals can be severely affected by chemical treatments.
- It is better to treat several times with the correct dilution than to use concentrated acid which may damage the surface of the unit.
- **Extreme care *MUST* be taken when using chemical cleaners on wet stone products as these are less resistant to such treatments.**
- When diluting acids always add acid to water and not water to acid.

8.0 Impregnating Sealants

Determining whether a paving stone should be treated with a stone impregnator depends on several factors, including the type of stone, its location, and the level of protection required. Different types of natural stone have varying levels of porosity and susceptibility to staining. Stones such as limestone, travertine, and sandstone are more porous and may benefit from impregnating sealants to prevent staining and damage.

Consider the intended use and traffic volume on the paved surface. High-traffic areas such as driveways, walkways, and outdoor entertaining spaces are more prone to staining from spills, oil, and dirt, making them good candidates for impregnating sealants.

Assess the paving stone's exposure to environmental elements such as sunlight, moisture, and freeze-thaw cycles. Stones exposed to harsh weather conditions or located near swimming pools, BBQ areas, or garden beds and overhanging vegetation may benefit from the added protection of an impregnator.

Impregnating sealants can reduce the need for frequent cleaning and maintenance by repelling stains and debris, making them suitable for homeowners or businesses seeking low-maintenance solutions.

Conduct a small test area to assess the effectiveness of the impregnating sealant on the specific type of stone. Apply the sealant to a small, inconspicuous area and observe how it interacts with the stone and whether it provides the desired level of protection without altering the appearance.

By considering these factors and conducting thorough assessments, property owners can make informed decisions about whether to treat their paving stones with a stone impregnator to enhance their durability and longevity. Consulting with a stone care professional or supplier can also provide valuable guidance based on the specific characteristics of the paving stone and its intended use.

Products can offer short-term as well as long-term protection depending on the product & installation requirements. The use of sealants and enhancers is subjective, and benefits must be measured against potential disadvantages.

It may be of benefit for the impregnating product not to affect the surface slip resistance however this may not be the case for internal flooring applications where the abrasive nature of untreated natural stone may contribute towards the frequency in cleaning cycles. Impregnators allow the stone to breath without allowing liquid to penetrate the coating. These should be sufficiently robust to withstand regular cleaning methods such as chemical, steam cleaning.

Short term protection.
Generally used to protect against pre-construction building site contaminants and common stains associated with construction sites (i.e., oil, diesel, cement). Short-medium term protection can offer advantages during installation and during the Jointing process. We recommend Weiss Install Protect, which is a pre-construction protection impregnator for natural stone, porcelain (some porcelain is low absorbent) and precast concrete paving elements.

Medium-Long term protection
Again, general daily dirt and detritus can be provided using Weiss Stain Protect Pro which is an impregnator for natural stone, porcelain, and precast concrete paving elements. Forming a transparent and breathable finish to the paving unit to which oil, grease and debris are unable to adhere too. For Medium-Long term protection the product creates an easy to clean pavement surface through which moisture vapour can pass normally. The paving is simply easier to clean which reduces long-term maintenance costs.

Alternatively, as a colour enhancing option, we can recommend *Weiss Wet look colour enhancer which* is a wet-look Matt finish for natural stone, porcelain, and precast concrete paving elements. It also provides breathable high resilient subsurface stain protection against marks made by grease, oils, fats, fast food, tyre rubber and footwear. This product should only be used when the paving surface is dry. Note if applied to a damp/wet paving surface could lead to a whitish surface staining.

We recommend it should be applied to paving before it is laid, or within weeks of paving that has been freshly laid on water permeable bedding, such as tuffbed or tuffbed 2-Pack.

For longevity it is always advisable to avoid the use of a jet wash which limits the life expectancy of impregnators and sealants, instead we suggest using a cleaning regime which includes the use of Weiss professional paving cleaner (5.1).

If any other form of surface sealing is used on the pavers it must be applied in strict accordance with the manufacturers instructions and it must be accepted that is may influence the colour and appearance of the paving, its slip/skid resistance and may require on-going maintenance during the life of the paving. It is important that the surfaces of the pavers are dry and clean before any sealer is applied.

In all cases, a sample area should be used to assess the effectiveness and number of applications required to create the desired protective finish.

Important note that the application of a sealant will not remove the need for maintenance, it will only reduce the ability of contaminants/detritus to penetrate the stone’s surface.

9.0 The Use of Mechanical Sweepers on Paved Areas

The following recommendations deal with vehicles and associated equipment of use on paved footways /footpaths/pedestrian areas and roads.

The equipment should be purpose designed to sweep the area and surfacing product. If there is any doubt the vehicle manufacturer should be consulted.

Where possible low ground pressure tyres should be fitted to reduce the risk of breaking or cracking of flags.

Tyres should be inflated according to the manufacturer's recommendations, again to ensure minimum weight distribution per square mm.

Polypropylenes brushes and ***NOT*** wire brushes should be used for sweeping to prevent damaging the stone surface.

Sweeping brush pressures should be set to the minimum required to suit the task, which is surfaces swept regularly will require a lower setting than those swept infrequently or those covered with heavy deposits.

When sweeping, engine revolutions should be set at the minimum required to maintain vacuum (suction) pressure.

Operators, including reliefs, should be trained to manufacturers' recommendations and tyre and brush pressures should be regularly checked.

Advice should be given to operators that, when equipment is stationary of left unattended, suction, brush rotation and water jetting equipment should be switched off to avoid the risk of damage to the area below the stationary equipment.

In new or re-laid areas, agreement should be reached on a period of manual cleaning (at least four weeks) to allow the paving to settle and the joints to seal. This period may be reduced by using either a water-based boning agent or electrometric prepolymer sealant and by agreement with the cleansing authority on an appropriate sweeping regime.

Following the use of mechanical cleaning operations, resanding of the joints in flexibly laid areas may be necessary.

10.0 The Use of Power Washing Equipment on Paved Areas

To aid in the removal of surface staining power washing equipment is often considered. Whilst such techniques offer certain benefits, particularly for larger areas, it is important that care is taken in their use to avoid damage to the structural integrity of the paving.

When using any form of Power Washer, the following guidelines should be strictly adhered to: This method should not be used in freezing conditions.

The power washer should be used on a setting which is sufficient to remove the dirt without causing any further distress. A low-pressure setting is recommended.

Do not direct the power lance directly down onto the paving as this can result in loss of jointing material.

Ideally a spraying movement should be adopted holding the power lance at a shallow angle, not greater than 30 degrees across the diagonal (i.e., not parallel to the joints).

Certain high-pressure jetting machines have been known to mark/damage the surface of certain types of paving material, it is therefore prudent to conduct a small test area before commencing on a larger area.

The area should be inspected after cleaning to ensure that joins are full.

11.0 High Temperature Steam Cleaning

This method uses equipment that superheats water to temperatures up to 150^{o}C. Most commonly these systems are used for the purpose of masonry cleaning, paint removal and coatings removal on heritage and other structures where a light touch is required.

These systems may be appropriate the removal of brittle soiling's and coatings such as carbon sulphation, lime encrustation and lime-wash. Flexible coatings can deform elastically and are thus abrasion resistant. Thinner brittle coatings can be removed with the assistance of an abrasive attachment kit that is connect to the gun and can be used up to 100°c.

Vac Recovery may be appropriate as this enables the application of superheated water to the surface within an enclosure and for the wastewater and residue generated to be drawn away from the substrate. Solids and liquid are separated within the vacuum unit and a pump contained within periodically transfers the wastewater to storage vessels for later transfer/treatment or to the foul drain as appropriate.

English Heritage and Historic England do not offer blanket approval of any cleaning system or technique and so it may be prudent to contact them ahead of cleaning paving around a listed property.

For further information contact www.restorative-products.com

12.0 Further Reference

For specialist technical advice and information on approved suppliers of products and services contact:

Stone Federation of Great Britain,
Channel Business Centre,
Ingles Manor,
Castle Hill Avenue,
Folkestone,
Kent, CT20 2RD.
T: 01303 856123
Website: www.stone-federationgb.org.uk

NOTE:

In all instances, reference should be made to current British Standards and Codes of Practice as appropriate to the work to be performed.

Weiss specialist stone care products are available from Johnsons-wellfield.co.uk/Stonecare