

Cleaning of Clay Brickwork

General Guide

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The Brick Development Association

The Brick Development Association is the national authority on clay bricks and pavers.

The membership accounts for almost 99% of the bricks produced in the UK; the BDA members are committed to manufacturing products of outstanding quality and developing one of the nation's most productive and sustainable supply chains.

The BDA Guides and Technical Guides are continually updated to take account of the latest materials, systems and products developed in the clay brick and paver sector.

We are grateful to our various team of experts, contributors, staff as well as our membership whose support, we are eternally grateful for.

Keith Aldis

Chief Executive Officer
Brick Development Association

Scope of Document

This document provides a summary of the common staining issues which may occur during or post-construction. Recommendations are made with regard to staining and there is a summary of key information for each cleaning technique.

There is also a general cleaning section, a brief introduction to how good design, workmanship and site management can minimise the likelihood of 'building in' long-term issues. More detailed information on good practice in design, workmanship and construction can be found in further BDA documents and building standards

The BDA are committed to providing impartial and authoritative information.

We make every effort to ensure the accuracy and quality of information and guidance when it is published. However we can take no responsibility for the subsequent use of this information, nor for any errors or omissions it may contain.

UK Brick Manufacturers



Bulmer

www.bulmerbrickandtile.co.uk
Sudbury (7)

Forterra

www.forterra.co.uk
Accrington (1), Claughton Manor (13), Cradley (14), Desford (16), Howley Park (24), Kirton (27), Measham (31), Whittlesey (47), Wilnecote (49)

H.G. Matthews

www.hgmatthews.com
Bellingdon (23)

Ibstock

www.ibstockbrick.co.uk
Aldridge & Atlas (2,3), Ashdown (4), Cattybrook (9), Chailey (10), Chesterton (12), Dorket Head (17), Ellistown (18), Eclipse (19), Laybrook (28), Lodge Lane (29), Parkhouse (34), Ravenhead (36), South Holmwood (39), Swanage (41), Throckley (42), Union (44)

Ketley

www.ketley-brick.co.uk
Brierley Hill (25)

Matclad

www.matclad.co.uk
Wreham (30)

Michelmersh

www.mbhplc.co.uk
Michelmersh (32), Blockleys (6), Charnwood (11), Carlton (8), Freshfield (21)

Northcot

www.northcotbrick.co.uk
Blockley (33)

Raeburn

www.raeburnbrick.co.uk
Blantyne (35)

Sussex Handmade Brick

www.sussexhandmadebrick.co.uk
Sussex Handmade Brick (40)

W.H Collier

www.whcollier.co.uk
Marks Tey (48)

Wienerberger

www.wienerberger.co.uk
Denton (15), Ewhurst (20), Hartleybury (22), Kingsbury (26), Sandown (37), Smeed Dean (38), Todhills (43), Waresley (45), Warnham (46)

York Handmade

www.yorkhandmade.co.uk
Alne (50)

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Introduction

This document provides an introduction to the cleaning of clay brickwork. Prevention is better than cure and by following good practice during the design and build process many staining issues can be avoided.

Post construction it may be necessary to address issues arising from follow-on trades, water ingress, dirt and detritus which will require cleaning and treatment.

This is an initial guidance document aimed at the general public and members of the construction profession.

As brickwork staining can result from many sources, this document is not intended to be a comprehensive document for cleaning professionals but rather a summary of the key issues and a guide to further information if required.



South Gardens, Elephant Park, Maccreeanor Lavington



Timekeepers Square, Buttress



Dujardin Mews, Karakusevic

Avoiding Issues

Newly Built Brickwork Staining

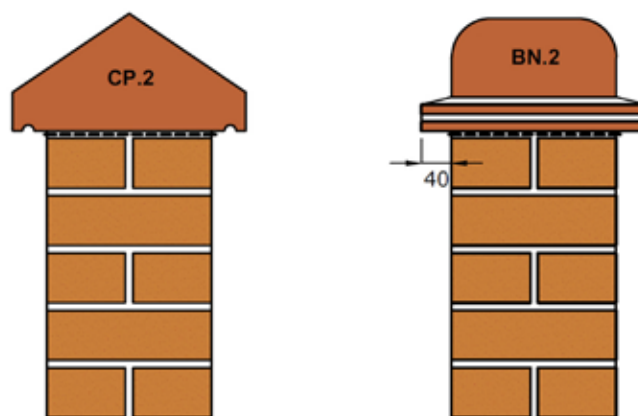
Staining of newly built brickwork can be the result from many causes including poor detail design, saturation of building components, poor site management and sub-standard workmanship. Staining can cause a negative perception with clients and residents which is why prevention is preferable to cure.

Design and Specification

As water is the main mechanism for creating and spreading many stains, good design is essential to prevent areas of brickwork becoming saturated following the completion of construction.

The BDA document 'Severely Exposed Brickwork' is a useful introduction to robust design detailing which will assist in preventing longer-term staining issues.

However, if cleaning is required contact the manufacturer of all the components to be cleaned and the cleaning product to discuss product characteristics prior to embarking on cleaning operations.



Robust detailing will avoid brickwork from becoming saturated



Stored bricks must be protected from inclement weather.

Site Management and Workmanship

Staining during construction is often due to poor site management and sub-standard workmanship, primarily due to the brickwork becoming saturated prior to and during construction.

This can be distressing for the client, increase construction cost and may ultimately risk the final appearance.

Typically, it is the responsibility of the contractor at the end of construction to if necessary, clean the brickwork before the scaffolding is struck.



Bricks protected from rainfall, including stacks.

Avoiding Issues and General Cleaning Advice

Some site management and workmanship considerations:

- Store bricks in a protected area, avoiding standing water and contaminants.
- Protect brickwork from splashes and contamination by passing vehicles and at scaffold platforms.
- Ensure that joints are tidy and avoid dropping mortar on brick faces.
- If mortar is dropped, avoid smearing of mortar across the face of bricks – this is often harder to remove than small dried lumps.
- Correct installation of DPC's and DPM's.
- Fully fill mortar joints so no pockets are left in which water can collect.
- Protect brickwork from potential spills and splashes from other work being carried out after brickwork has been completed.
- Avoid bags and other materials being stacked against or close to brickwork.
- Make all personnel, including other contractors, aware of the importance of the final brickwork appearance.
- Care should be taken with concrete or cast stone which may allow lime to migrate into the brickwork.

General Cleaning Advice

Preparation and trials should be carried out well before the main cleaning operation. Trials should be carried out on a limited and less conspicuous area of brickwork.

Once established as successful, work should continue at the earliest opportunity to avoid additional work and therefore cost.

For a more detailed analysis and recommendations please see the BDA document 'Good site practice and workmanship'.



The result of cleaning brickwork can be spectacular.

Cleaning Brickwork and Efflorescence

The following section offers guidance on issues usually connected with fresh, recently constructed brickwork, however it does not preclude the fact that older brickwork may suffer from similar issues for various reasons.

Efflorescence

Efflorescence is the appearance of salt deposits on the surface of brickwork.

They can derive from the brick body, mortar, contamination from other materials or groundwater. The texture may vary from light and fluffy to hard and glassy depending on the composition.

Salts within brickwork are dissolved in water which can be introduced whilst the bricks are in storage during construction or from the rain. Shrink-wrapped packs of bricks may also be affected when condensation forms. As the brick or brickwork begins to dry out the solution of salts will be drawn to the surface where the salts become more concentrated as moisture evaporates.

This tends to be most prevalent when temperatures reach optimum levels for drying, i.e. Spring onwards. Recurrent efflorescence on older established brickwork can often be taken as an indication that water is entering the masonry as a result of poor design detailing or lack of other protective measures, such as faulty gutters or tanking materials.

Treatment

Preventing bricks from becoming saturated through good design, management and workmanship is the most effective treatment. Efflorescence is a transitory effect that should ideally be allowed to weather away naturally before remedial treatment is considered.

Its removal can be accelerated by replicating weathering conditions, specifically dry-brushing with a nylon/bristle brush (a wire brush should not be used). The residue should be removed so that it does not re-enter the brickwork at a lower level.

A sponge dampened with clean water can be used to draw out salts. Excessively wetting of brickwork may force some re-dissolved salts back into the brickwork which could reappear as it dries.



Efflorescence is the most common form of brick staining



Efflorescence on brickwork under construction

Cement Staining

Cementitious Staining

Cementitious staining can happen during and following construction.

Mortar splashes and smearing during construction can result in a general clean-down at the end of construction being required.

If mortar joints are brushed before the mortar is sufficiently set it will result in smearing on the face of the brick, or if fresh brickwork is not protected sufficiently during wet weather mortar constituents can dissolve readily and stain surrounding brickwork.

After construction, water run-off from concrete components, structures or render can leave a residue on brickwork.

Treatment

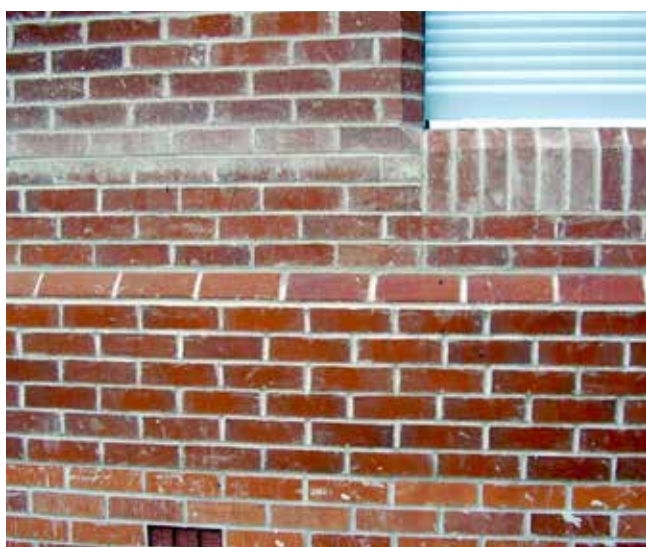
Remove large mortar deposits with a wooden implement to avoid damaging the brick face.

Following the pre-wetting of the wall, a proprietary brick cleaner should be suitable to break down the cementitious components. Careful application using a paintbrush should be sufficient to dissolve cementitious residue followed by thorough rinsing (not at high pressure).

Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.



Staining from runoff over adjacent concrete



Post construction cleaning will be required to clear mortar



Efflorescence on brickwork under construction

Lime Staining

Lime

Lime staining, otherwise known as lime running or lime leaching, may occur on newly erected masonry which has become saturated during construction. It may also develop progressively under certain circumstances on established brickwork.

The free lime originates from mortar joints and stone or concrete components when they become saturated, in a similar fashion to efflorescence.

Lime staining is mostly characterised by stains appearing from the line of a mortar joint, often perpendicular joints, and running down the bricks below in the form of streaks. This generally indicates that the source of the staining is from the mortar.



A severe case of lime staining

When newly built brickwork becomes saturated in its early life and as the Portland cement sets (hydrates) it can release a lime solution. On drying out, calcium hydroxide is precipitated at the surface and converts slowly to insoluble calcium carbonate by reaction with carbon dioxide from the atmosphere. Lime staining will often be accompanied by efflorescence salts, due to the masonry being excessively saturated. However because lime staining is insoluble it will not weather away in the same fashion.



Lime staining caused by runoff from a concrete coping

Treatment

When fresh, lime staining may be removed by scrubbing with water using a bristle brush, taking care not to damage the face of the brick. For stains that have been exposed for longer and have started to carbonate, forming limestone, chemical treatment is likely to be required, similar to cement staining.

Firstly, dampen the wall but not saturating will minimise the brick suction. Then carefully apply a proprietary brick cleaning solution with a paint brush to dissolve the lime. Gently scrub with a bristle brush and water.

Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed

Vanadium

Vanadium

One of the mineral elements found in the raw material of clay bricks is 'vanadium' which normally only occurs as a complex salt in fire clays used in the production of buff coloured products. It can however, on very rare occasions, also occur in red and brown products.

Like most soluble salts it requires saturation to bring it to the surface when it appears as a yellowish stain that may change to a greenish or even light brown colour.

Vanadium does not come and go in the same manner as a white efflorescence and should really be described as a stain.

The discolouration is only on the surface of the brick but its intensity and the speed at which it can appear during construction can be a cause of concern for the user.

Vanadium staining can be largely avoided by the protection of bricks and newly built brickwork to avoid saturation. The stain should disappear in time due to the effect of normal weathering and should not return.



Saturation of light bricks can result in Vanadium staining

Treatment

Under no circumstances should a standard (HCl) acidic brick cleaner be used as this may "fix" the stain and turn it brown in colour.

Once the structure is complete, if removal of the stain is required manually, brush on an oxalic acid solution (100g/litre) and, when the stain is bleached apply a washing soda solution (12g/litre) and leave on the wall.

There are products available that have been found to effectively treat both vanadium and cement stains without causing permanent stains. Advice from a professional is advised, contact the manufacturer of any suggested products, as well as, the manufacturers of all the brickwork components.

Testing in an inconspicuous area is advised and all health and safety guidelines from the cleaning solution manufacturer should be strictly followed.

It is important to stress that the setting of the mortar joints and the protection offered within a completed building will eliminate any repetition of the problem.



Vanadium staining visible on light brickwork

Iron and Manganese

Cementitious Staining

Most clay bricks contain at least trace amounts of Iron and Manganese, they are normal constituents of raw clay. Staining from these constituents is not a common occurrence, however, this can occur if brickwork has not been protected sufficiently from the elements during construction.

Iron staining can appear in several forms, from orange through to dark brown in colour, manganese is generally a black or brown stain; both emanate from the brick body and can impact both the brick face and surface staining of mortar joint.



Iron staining visible on a mortar joint

Treatment

Where staining is present on the brick face, it is best left to weather away naturally.

In severe cases, if waiting is not acceptable then removal from the face of the mortar joint is best achieved by rubbing with carborundum abrasive (similar to sandpaper) or a rounded file. Where overall cleaning is required, it is recommended that a reputable brick cleaning contractor is consulted.

Proprietary brick cleaners may be effective on iron and manganese. Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.



Staining on saturated brickwork



Staining from iron fixings into brickwork

'Peacocking' and 'Picture Framing'

Stain on Blue Brick

A particular stain associated with blue bricks is commonly called 'peacocking' as it often has the appearance of male peacock plumage.

Staining on blue bricks generally takes the form of an iridescent discolouration, often around the edges of the bricks, and is created by light diffraction through a very thin surface layer of colloidal silica or cementitious material originating from the mortar.

When staining is apparent around the perimeter of the face of the bricks it can be known as 'picture framing'. The staining is superficial and not detrimental to the performance of the brick.

As the stain emanates from a thin layer of cementitious material it is imperative that good site practice, protection of fresh brickwork from wet weather, and correct mortar consistency is employed during the construction phase.



Iron staining visible on mortar joint



Picture framing likely due to saturation during construction

Treatment

Picture framing and peacocking are extremely difficult to remove. Cleaning the brickwork down with a proprietary brick cleaner at the end of construction may lessen the effect. If the stain has accumulated to the extent where it takes the form of white calcified material, it is recommended that a reputable brick cleaning professional is consulted.

Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.

Cleaning Established Brickwork

Cleaning Brickwork

Providing that the design and construction are correct, one of the benefits of brickwork is that it requires minimal maintenance during its long lifetime. However due to general atmospheric conditions, organic growths, vandalism or other events, there can be a need to clean brickwork later in its lifespan.

Identifying the cause of staining and the material to be cleaned can be difficult but is essential to ensure that the correct cleaning technique is applied.

If there is any doubt then a cleaning professional should be consulted. Before carrying out any cleaning you must always refer to the manufacturers' recommendations and consider the health, safety and environmental requirements.

Dirt, Grime and Soot

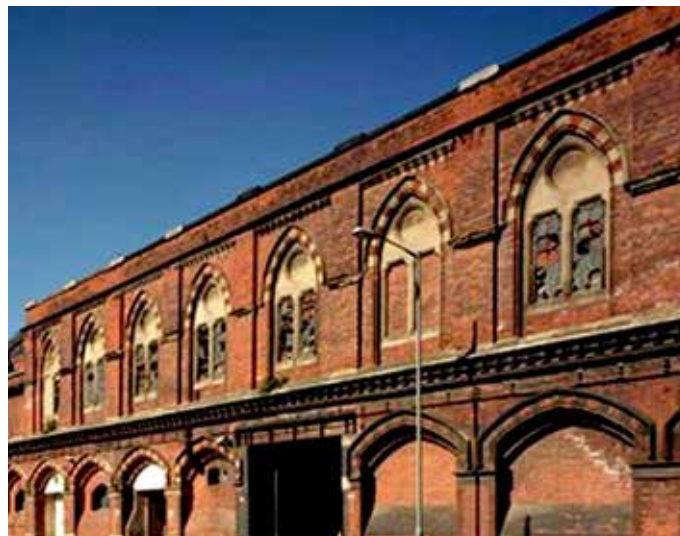
Dirt, grime, soot and smoke on brickwork can build up over time. Such deposits are generally the result of long-term airborne deposition.

City centre pedestrian routes are particularly susceptible to this type of staining; bricks are often specified in these locations because of their robust nature. The texture and colour of the brick will have an impact on how visible and ingrained the stain becomes.

Treatment

The first step is to scrub the brick with a stiff nylon brush and detergent solution. Due to the texture of handmade and thrown bricks, extra care is advised during treatments. If the result is not satisfactory then it is likely that the techniques used by specialist cleaning contractors will be required. This may subsequently involve cosmetic tinting to restore the original colouring.

Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.



St Pancras Station before restoration



Detergent solution used to clean an internal fireplace

Oil, Grease and Tar

Oil Staining

Oils, greases and tar can be difficult to remove from brickwork. They can look similar but the treatment is quite different, so it is important to understand the material that is to be removed.

Oil will often penetrate into the face of the brick making it extremely difficult to remove completely.

Traditional 'tar' products were all oil-based, however many modern materials used in the same situations are acrylic based. If there is any doubt then a specialist cleaning contractor should be consulted.

Treatment

If fresh, oil can be 'soaked' off with absorbent materials. Surrounding areas of brickwork should first be dampened to reduce the likelihood of the stain spreading and care must be taken to prevent contamination of surrounding structures, ground and watercourses. Ensure an adequate supply of absorbent material for the collection of residues.

Fresh grease can be scraped off, care should be taken to not damage the brickwork or to further spread residues. Following this, a proprietary cleaner may be used on oil and grease stains. The nature of this type of contaminant may leave a permanent stain that will require subsequent remedial 'tinting' to blend the appearance of the affected area back into the surrounding brickwork.

For bitumen and tar, the best method of removal is to leave the bitumen until it has cooled. A paint scraper or a similar mechanical device can then often remove it. If it is particularly resistant bitumen can be cooled (with an ice bag) making the material brittle, prior to scraping.

For older and deep-seated stains, it is recommended that a specialist cleaner is consulted, as some older tar products contained compounds that are hazardous to health.

Older stains may be cleaned using proprietary cleaning products. The heavier deposits should be removed as far as possible by absorbent materials or scraping with wooden or similar implements to avoid damaging the brick face.

Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.



Tar stain on a textured brick



Oil stain on a light brick

Paint and Graffiti

Graffiti Staining

Both paint and graffiti are difficult to remove. Correctly identifying the paint to be removed is essential as it will determine the cleaning product to be used. Modern paints are generally acrylic. However, polyurethane and epoxy paints are also in use. Aerosol paints, generally used in graffiti, are particularly difficult to clean.

The nature of the brick surface will also affect the cleaning complexity. Handmade and thrown bricks, with a heavily textured surface, allow the paint to penetrate further into the brick body.

Where the painted areas are extensive, or where the paint film is particularly stubborn, it will be necessary to consult with a cleaning specialist.



Vandalism on a building site



Specialist paint removal



Further layers of paint may require an alternative treatment

Treatment

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 compatible solvent and then the area washed with limited amounts of hot water and detergent, taking care in the disposal of the run-off material.

With dried paint, the paint should be scraped off as much as possible and then a proprietary paint remover should be applied. In many cases, numerous layers of paint are applied of differing formulations, requiring a different solvent for each layer. Tinting of the bricks will often be required following paint removal.

Testing on an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.

Organic Growth and Ivy

Organic Growth on Brickwork

Moss or algae growth may appear as a green stain on brickwork and should not be confused with vanadium staining as, although it can at times look similar, vanadium salts are only visible in buff bricks, whilst algae can occur on any brick type and the mortar joints.

Such growths do not survive in direct sunlight or dry conditions and therefore tend to be more of a problem in the winter and early spring, in colder, shaded areas.

Ivy by its nature can be extremely difficult to remove, especially where the brickwork is of a textured variety. Due consideration must also be given to safe working requirements as an elevated platform is likely to be required rather than working from a ladder. New growth should be treated at the root but can normally be carefully pulled away from the brickwork without leaving any significant residue.

Established growth can embed itself into the open texture of the brick and mortar through aerial roots and will almost always leave small tendrils of residue which can be extremely difficult, if not impossible to remove.



Ivy can have a serious impact on brickwork



Picture framing likely due to saturation during construction

Treatment

Physically remove any loose growth then apply an algacide to kill off the remaining growths. Dead vegetation can then be removed by careful pressure washing. The application of weed-killer will help to slow down any re-growth. See pressure washing rules before proceeding.

Extreme care must be taken to avoid damaging the brickwork during the removal of ivy, including the mortar joint. The supporting branch should be cut from a trial area and allowed to weaken for one to two weeks before pulling carefully away from the brickwork with any residue being removed with a wooden implement such as a spatula or a nylon brush.

Should the ivy still prove difficult to remove, it is advisable to cut the root near the ground and leave the ivy to die over up to two years before attempting removal by the above method.

Testing in an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.

Cleaning Techniques

Water Cleaning

Hot water and detergent will likely be the appropriate cleaning solution for most stains.

Water cleaning should not be carried out in frosty conditions unless adequate measures are taken to protect the wet brickwork from becoming frozen.

During hot weather, it is preferable that brickwork is shaded from direct sunlight in order to prevent the areas being treated from drying out prematurely and potentially drawing in the dissolved stain.

Water cleaning is generally low risk, but some simple rules must be observed:



Hot water, detergent and a bristle brush

- Avoid using metal tools to clean brick surfaces.
- If brushing, use only a stiff-bristled brush, never a wire brush.
- Never use excessive pressure (see jet washing), especially on sand faced bricks, as this can change the appearance and texture of the brick.
- Make sure that mortar is matured so that it is not spread across the brick face and always test in an inconspicuous area first.



Chemical Cleaning

When using any chemical solutions, it is important to follow the manufacturer's directions (on the packaging) and be certain that the product is suitable for the desired application. If there is any doubt, then a specialist cleaning contractor should be consulted.

Some simple rules must be observed:

- Always test on an inconspicuous area first.
- All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed.
- Normally brickwork should be dampened before application.
- Never use standard acidic solutions on brickwork that may have Vanadium stain present without further investigation – see vanadium.
- Ensure that there is an adequate supply of absorbent material to control runoff.

Cleaning Techniques

Jet Washing

It is tempting to reach for a pressure washer when undertaking cleaning operations, although without due diligence this could result in permanent damage to brickwork.

Pressure washing of older brickwork is never recommended without a detailed survey of its condition. There are several ways in which pressure washing can severely and irrevocably damage brickwork:



Jet wash with caution

- If the mortar is not fully hardened, high-pressure jets can eat into the joint. Never use pressure washers on lime mortar.
 - It is very easy to blast off the surface of sand faced bricks, especially handmade or soft mud. This sand is bonded onto the face of the brick but may not resist high pressure.
 - The face of heavily textured bricks can be physically broken leaving chips.
 - Damp penetration may occur through solid or even cavity walling.
 - Always test in an inconspicuous area first.
 - Never apply too closely and always maintain a constant distance from the brickwork face.
 - Spray jets should be at least 100mm wide when they contact the brickwork.
- If pressure washers are used, then some simple rules must be observed:
- Washers should be set to fan type sprays at the lowest pressure and cold water.



Cosmetic Tinting can completely change the appearance of Brickwork

Cosmetic Tinting

It is occasionally not possible to completely remove staining or discolouration from brickwork and sometimes the finished effect is not satisfactory. Cosmetic 'tinting' can be carried out following cleaning. It is recommended that a specialist is consulted when considering this as an option.

Testing on an inconspicuous area is advised. All health, safety and environmental guidelines from the cleaning solution manufacturer should be strictly followed. Brickwork should be clean, dry and the temperature above 40C before tinting operations commence.

Clay Pavers

Clay Paving

Clay paving provides a durable, hard-wearing surface and should be treated in a similar fashion to facing brickwork. However, there are a number of staining issues and treatment options that are specific to pavers.

As for any other surfacing material, regular maintenance and good cleaning practice will enhance the overall appearance of the paving.

Flexible Laid Pavers

It is essential to consult with the paver manufacturer before applying any form of surface treatment.

During the very early life of the pavement, the joints between the pavers will be relatively porous. The ingress of water will consolidate the jointing sand and it is important that the joints are periodically filled with jointing sand to replace any sand consolidated by the rainwater.

The joints will soon become semi-impervious due to detritus tending to seal 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. If they are used, there is a risk of loss of jointing sand from between the pavers.

There are a number of water-miscible liquids that can help to stabilise the joint filling sand. These can aid the reduction of the removal of sand by suction cleaners, and at the same time, help to prevent the ingress of water during the early life of the pavement.



Rigid clay pavers at the Barbican, London ©

Smoke, Fire and Tobacco Stains

Normally these stains can be removed by scrubbing with hot soapy water. Where the stains persist, scouring powder or household bleach solution has been found to be successful.

Beverage Stains

These can normally be removed by scrubbing the stain with hot soapy water. If the stain is persistent, apply bleach solution and then rinse the area with clean water, taking care to dispose of the run-off safely.

Clay Pavers

Chewing Gum

Chewing gum is one of the most difficult substances to remove from any surface material.

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

There are a number cleaning contractors who specialise in gum removal.

Scuff marks from Vehicle Tyres

These can normally be removed by steam cleaning, or by scrubbing the area with hot water and a detergent solution.



Gum will usually require specialist removal.

Mechanical Cleaning for Clay Paving

The following recommendations deal with vehicles, associated equipment and their use

- Equipment should be purpose-designed to sweep the particular area. If there is any doubt, the vehicle manufacturer should be consulted.
- Tyres should be inflated according to the manufacturer's recommendations to ensure maximum weight distribution.
- Polypropylene, not wire, brushes should be used.
- Sweeping brush pressures should be set to the minimum required to suit the particular task, i.e. surfaces swept regularly will require a lesser 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 vehicle manufacturer's recommendations and tyre and brush pressures should be regularly checked.
- Advice should be given to operators that, when equipment is stationary or 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, an agreement should be reached with the local Highways Authority to allow the pavement to settle and the joints to seal before manual cleaning. Spills and splashes from other work being carried out after brickwork has been completed.
- When water jetting equipment is used, the jets or handheld lance should be directed at the surface at an angle not greater than 30° and across the diagonal (i.e. not parallel to joints) using a suitable detergent solution.
- The area should be inspected after cleaning to ensure that joints are refilled with jointing sand if necessary.

References and Further Reading

EN 771-1, Specification for masonry units Part 1: Clay masonry units

EN 772-5, Methods of test for masonry units Part 5: Determination of the active soluble salts content of clay masonry units

EN 772-7, Methods of test for masonry units Part 7: Determination of water absorption of clay masonry damp proof course units by boiling in water

BS 8000-3, Workmanship on building sites – Part 3: Code of practice for masonry

BS EN 998-2, Specification for mortar for masonry – Part 2: Masonry mortar

BS EN 1990:2002+A1:2005, Eurocode – Basis of structural design

BS EN 1996-1-1:2005, Eurocode 6 – Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures

BS EN 1996-1-2:2005 Eurocode 6. Design of masonry structures. General rules. Structural fire design

BS EN 1996-2:2006, Eurocode 6 – Design of masonry structures – Part 2: Design considerations, selection of materials and execution of masonry

BS EN 1996-3:2006 Eurocode 6. Design of masonry structures. Simplified calculation methods for unreinforced masonry structures

PD 6697:2010 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2

BRE 370 Control of lichens, moulds and similar growths

BRE 418 Bird, bee and plant damage to buildings

BS 8221-1:2012 Code of practice for cleaning and surface repair of buildings – Part 1: Cleaning of natural stone, brick, terracotta and concrete

BDA document - Good site practice and workmanship

BDA document - Severely exposed brickwork

Brick Development Products & Services

Brick Awards

The Brick Awards celebrate the best examples of clay brick in our built environment. Each year the awards attract over 350 entries from leading architects, housebuilders, developers and contractors; across 17 hotly contested categories. It is FREE and simple to enter on our web site: www.brick.org.uk

Technical Publications

The BDA provides a range of technical publications and guides; which are freely available to Architects, Developers, Builders and General public on our web site: www.brick.org.uk

The Fourth Edition of 'Guide to Successful Brickwork' is available at all good book shops.

Brick Works Events

The BDA regularly runs courses and seminars for all those professionals involved with the design and construction of brick buildings. Please contact George Spreckley our Events & PR Manager on email: georgespreckley@brick.org.uk

Brick Bulletin

This widely acclaimed e-magazine features the latest developments in brick design and is recognised world wide as the foremost journal of contemporary brickwork. It is available free through the 'Brick Bulletin' tab our website: www.brick.org.uk.

Brickmakers Quality Charter

Clay brick makes a significant contribution to the UK's safe, healthy and sustainable built environment. The Brickmakers Quality Charter scheme promotes the responsible sourcing of clay brick, through credentialling and the flexibility businesses seek from an established and audited supply chain.

Training and Education

The BDA offers lectures and other educational services for Architects, Engineers, Developers as well as support for students and public interested in creating successful brickwork. We also provide technical input to events for practicing architects, engineers and organisations involved in continuing professional development.

Research and Testing

The BDA identifies specific areas where independent research and testing programmes are required to further the confident use of clay brick and to ensure quality.

Statistical and Marketing Information

The Brick Development Association is an independent body committed to providing authoritative information about the use of clay brick in construction.

We collate statistical information on brick production, UK deliveries, and related supply for imported products together with volume information including testing, research and development.

We provide free technical support on the use of clay brick, and encourage best practice in the use of brick in the built environment.



Published by the Brick Development Association. (BDA).

The BDA are committed to providing impartial and authoritative information. We make every effort to ensure the accuracy and quality of information and guidance when it is published. However we can take no responsibility for the subsequent use of this information, nor for any errors or omissions it may contain.

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