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TECHNICAL INFORMATION B19

SITE PRACTICE AND TROUBLESHOOTING
INDUSTRY ADVICE ON CLEANING BRICKWORK – CHEMICAL CLEANING OF CEMENTITIOUS STAINS

This document has been produced to collate information currently provided by the Brick Development Association and can be used as the basis of considerations regarding the safe cleaning operation of new buildings.

The Brick Development Associations Cleaning Clay Brickwork offers advice on cleaning of a number of common brickwork stains however this guidance document is aimed specifically at cementitious staining on new brickwork.

WARNING

This document refers to the use of substances and/or procedures that may be injurious to health or damaging to the environment if adequate precautions are not taken.

It relates only to the technical suitability and does not in any way absolve the user from any legal obligations relating to health and safety at any stage.

Hydrochloric acid is only used to remove mortar stains from clay brickwork. Generally, hydrochloric acid should not be used to treat any other stains or at any other time during the life of your brickwork. If used incorrectly, it can cause unsightly staining that is more difficult to remove.

Often, clean water and a brush will remove most cementitious staining.

HEALTH & SAFETY

Some of the cleaning methods described involve the use of chemicals that could be dangerous if not used correctly. It is important that any safety warnings issued by the chemical suppliers should be carefully read and strictly adhered to.

a) When using chemicals, protective clothing such as gloves, suitable face protection, safety boots and overalls should be worn.

b) Adequate ventilation is required in confined spaces when using chemicals.

c) When using flammable materials, cigarettes, naked flames and other sources of ignition should be carefully controlled.

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

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

f) When using any chemicals, care must be taken not to damage, contaminate or stain any adjoining material.

g) Care must be taken to protect personnel operating in the area of the cleaning from any hazard created by the operation.

It is particularly important with all cleaning methods that trials should be carried out on a small, preferably inconspicuous area, to determine the effect of the chemicals before treating a large area.

Hazardous materials should be used in accordance with The Control of Substances Hazardous to Health Regulation (COSHH) and, if applicable, the current edition of HSE publication EH 40, Occupational exposure limits.

The public should not be admitted to any cleaning operation areas.

The least hazardous product and system of working should be selected for any cleaning operation.

PROTECTION OF OPERATIVES

It is essential to recognise that when chemical methods are used, protection for the operative is of prime importance. Thus, protective clothing and face protection should be provided, and the appropriate First-Aid measures should be available on site. When chemical cleaning is being carried out internally, or in a confined space, adequate ventilation is vital.

PROTECTION OF OTHER BUILDING MATERIALS

Protection of other materials and components used in the building may be necessary. Some chemicals may cause staining or corrosion. Masking of surfaces is recommended.

LEGISLATION RELATING TO THE DISCHARGE OF TRADE EFFLUENT

The water companies and the Environment Agency may regard building cleaning waste products as trade effluents (i.e. non- domestic discharges). Before cleaning operations can start therefore, consent must be obtained from the appropriate regulatory body, although the definition of trade effluent may vary between different authorities.

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CHEMICAL CLEANING AND RINSING

A contractor that uses a system involving water or chemicals, or both, has to consider the means and effects of disposing of effluent containing pollutants.

This must be done by consultation with, and under the control of, the appropriate regulator. The basic chain of events that leads to the production of waste effluents is:

- The principle cleaning method is applied.
- The bond between the soiling and the substrate softens.
- Water is used to rinse off the effluent or is applied as an abrasive.
- The water becomes the carrier of chemical compounds as waste products.
- The softening and rinsing stages of cleaning require considerable quantities of water that may drain into local soft ground or into local surface water drains. There is obviously a risk that the effluent either contaminates the waste water system directly or affects the supply of watercourses beneath soft ground.

DISCHARGE OF CLEANING EFFLUENTS

Building cleaning invariably produces residues.

Specifications should detail the types of waste likely to occur and the contractor's proposed methods of disposal. The details should include all solid wastes and dusts, chemicals and the water used for abrasive cleaning and rinsing purposes. (The fine dusts produced by abrasive cleaning methods constitute trade waste).

Information should be requested from contractors about the production of gases and air-borne particles resulting from their cleaning methods and the possible dangers to people, animals and the environment.

Specifications may require that water used as part of a cleaning regime, or to rinse residues from surfaces, needs to be trapped and disposed of safely. Allowing waste water to disperse through the ground is not acceptable.

Waste can be disposed of through surface water drainage systems; however, each individual authority has policies to cover these matters and its consent will be needed. (In some regions of the UK, responsibility for water supply, surface water drainage, and sewage disposal and treatment are separated; sometimes they are combined in one authority).

Different water authorities may have different policies on what trade effluents may be discharged into the drains.

In general:

- An individual authority's policy may completely prohibit disposal of petroleum spirits (such as white spirit) and non-biodegradable detergents. Some building cleaning products contain these chemicals.
- Water authorities may limit the pH value of cleaning water discharged into their drains. This will directly conflict with the use of acidic and alkaline cleaning chemicals unless additives are used to neutralise waste in trapped water. Dilution of acidic and alkaline chemicals does not necessarily change the pH value significantly.
- Many cleaning chemicals contain organic solvents. Discharges of these may be prohibited by water authorities or subjected to consideration on an individual basis.
- Other solid and chemical waste can be disposed of through drains provided consent is obtained from the appropriate regulatory body. The consent is likely to be based on the type, dilution, and total amount of the waste, which may be difficult to determine unless water residues are trapped.

PROPRIETARY CLEANING AGENTS

A considerable number of such compounds are available. The majority are based on hydrochloric acid but may contain other chemicals as modifiers. Should the application of proprietary cleaning agents be considered, it is strongly recommended that their use be discussed with their manufacturer, both as regards the nature of the material to be cleaned, and the nature of the stain or deposit to be removed. Trials should be carried out on small areas, strictly in accordance with the manufacturer's instructions.

SUPPLY OF CHEMICALS USED FOR CLEANING

The majority of the cleaning chemicals should be obtainable from laboratory supplies or trade outlets. In most cases, commercial grades will be satisfactory, but their manufacturer's advice should be sought in cases of doubt. Absolute priority must be given to protection against, and safe handling of, these materials.

Where reference is made to dilute hydrochloric acid, e.g., 10% solution, this is obtained by adding one part of the concentrated solution of hydrochloric acid (35% w/w) to nine parts of water. Similarly 5% hydrochloric acid is obtained by adding one part of concentrated acid solution to nineteen parts of water.

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It is strongly recommended that competent personnel should carry out the dilution and mixing of chemicals off site.

It should be noted that some grades of hydrochloric acid intended for other uses might contain an inhibitor, the nature of which may make it unsuitable for cleaning.

Do not use acid stronger than the recommended ratio.

For stubborn staining, if there is little improvement after 2 or 3 attempts then it is unlikely further attempts will succeed.

There are an increasing number of 'Eco-friendly' products on the market which perform satisfactorily but may require longer to apply and remove. It is the responsibility of the contractor to establish the contents of these cleaners and seek advice from the local authority over their disposal.

CLEANING NEW BUILDINGS

Normally cleaning of brickwork is the responsibility of the contractor and is usually carried out as a final operation before scaffolding is struck. Preparation and trials should be carried out well before the main cleaning operation.

Trials should be carried out on limited areas of brickwork and once established as successful, work should continue at the earliest opportunity to avoid additional costs.

Ensure the mortar has cured sufficiently. Dependent on weather conditions, a minimum of 7 days should elapse after bricklaying is completed before cleaning cementitious stains is attempted. Cleaning too early could result in excessive damage to mortar joints and increased cementitious material released over the face of bricks.

Carry out an assessment identifying the order of work, access considerations and protection of elements not to be affected such as windows and frames.

Consider other operatives who may be working in the vicinity and their vulnerability to spray or fumes.

Ensure operatives are fully conversant with the product used and the H&S implications as well as how to achieve the best results with that particular product.

Work from the highest point of the building down thoroughly wetting with clean water prior to application and after to remove residue. DO not use a high pressure hose.

Clumps of mortar should be knocked off with a wooden implement.

Treat a small area at a time, i.e. 1m2 to ensure all residue is removed before brickwork dries.

Do not work in freezing weather. Try not to work in direct sunlight.

Agitation of stubborn stains may be required, a bristle (not metal) brush is normally adequate. Care must be taken with sand textured bricks.

If the cleaning is not successful with coloured mortars specialist advice from the coloured mortar supplier should be sought.

If the sand used in the mortar has appreciable clay content, the clay may enter the brick texture.

It may be possible to remove it by applying hot soapy water. A scrubbing action may be necessary, but care must be taken with sand textured bricks.

EFFECT OF WEATHER

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 to be cleaned should be shaded from sunlight, in order to prevent the areas being treated from drying out prematurely.

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CHECK LIST

DO Carry out a risk assessment

DO Obtain method statements, COSHH Certificates, etc. from chemical suppliers and specialist cleaning companies.

DO Ensure that all safety measures are taken when handling and using chemicals, and that First-Aid measures are immediately available.

DO Identify the nature of the surface to be cleaned and the type of stain or deposit to be removed.

DO Consult the brick or paver manufacturer for suitability of chosen method.

DO Carry out trials on small areas before the main cleaning operation is started.

DO Ensure that the area is adequately wetted before surface application of chemicals, and unless stated to the contrary, remove all trace of the chemical afterwards.

DO Allow efflorescences particularly vanadium efflorescence, to weather away naturally whenever possible.

DO Ensure a high level of ventilation when chemicals are used in a confined space.

DO Protect vulnerable metalwork, and other materials from chemical liquids, fumes and spray.

DO Wash thoroughly after handling chemicals or after undertaking chemical cleaning.

DO Ensure the building is protected during construction from the elements as this will reduce staining and efflorescences at the outset. Once the building is watertight brickwork is more resilient to saturation.

DO NOT Mix chemicals on site.

DO NOT Allow untrained personnel to handle or use chemicals.

DO NOT Clean areas that are exposed to hot sunlight or to frost.

DO NOT Use wire brushes or other abrasive methods on brick or paver faces.

DO NOT Allow chemicals and washings to contaminate surrounding areas.

Under no circumstances should other inorganic acids, e.g. phosphoric and sulphuric, be used.

DO Ensure the building is protected during construction from the elements as this will reduce staining and efflorescences at the outset. Once the building is watertight brickwork is more resilient to saturation.

References: Brick Development Association Cleaning Clay Brickwork, BDA Site Safety – Cleaning, BRE Digest 448 Cleaning Buildings -Legislation and good practice.

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