



Chemical cleaners

Construction Information Sheet No 24 (Revision 1)

Introduction

A variety of chemicals are used to clean building facades, statues, etc. These may be acid-based, eg hydrochloric acid (HCl), hydrofluoric acid (HF), phosphoric acid (H_3PO_4), nitric acid (HNO_3) or alkali-based, for example caustic soda (sodium hydroxide - NaOH) or caustic potash (potassium hydroxide - KOH). This sheet gives health and safety guidance for anyone who uses these materials or is responsible for managing or supervising their use.

Health effects

Chemical cleaners can cause serious ill health mainly by:

- **skin contact:** acids and alkalis cause burns which are often slow to heal; and
- **inhaling fumes or mist:** concentrated solutions of acids and alkalis may give off toxic and corrosive fumes. Spray application produces a mist which may also be toxic and corrosive.

Concentrated solutions from which the dilute working solutions are made up pose the greatest risk but even dilute solutions can cause serious injury. This is particularly true of HF where skin contact with diluted solution can cause very serious and extremely painful burns which may not be felt until up to 24 hours after contact.

Using chemical cleaners

Work with chemical cleaners is subject to the Control of Substances Hazardous to Health Regulations 1994 (COSHH) which require the health risk to be assessed and then prevented or controlled. Users should get information on risks and precautions from the manufacturers or suppliers who have a legal duty to provide it. Acids and alkalis will attack and corrode a wide variety of materials and a material resistant to one may not be resistant to another. Consult manufacturers or suppliers of any equipment used on whether it is suitable for use with chemical cleaners. With concentrated acids or alkalis written advice should be obtained from the manufacturers or suppliers.

Precautionary measures

Preventing exposure

Consider whether corrosive chemicals need to be used at all. Those who specify construction materials have a duty under the Construction (Design and Management) Regulations 1994 (CDM) to avoid risk and to get rid of hazardous materials. Where this is not possible they should specify the least hazardous products which will perform to an acceptable standard. Contractors, who have similar duties under COSHH to use safer

substitutes, may have detailed knowledge of alternative, less hazardous cleaning methods and materials and can help designers in identifying these.

If corrosive acids or alkalis have to be used, choose the most dilute solution which is effective. Use proprietary brands of cleaner which are diluted by the manufacturer or supplier rather than handle concentrated chemicals yourself.

Controlling exposure

If you have to handle and dilute concentrated acids or alkalis, dilution should take place in a well ventilated area off-site (eg under controlled conditions in the depot) and concentrated acid or alkali transferred using sealed equipment such as a self-priming syphon or pump. When diluting, always add acid or alkali to water, **never** water to acid or alkali. Transfer the dilute material to site in properly labelled, sealed containers. If dilution on site cannot be avoided, it should always be done at ground level. Avoid spray application. Apply the cleaner with a brush or roller, fitted with a splash guard.

Personal protective equipment (PPE)

Wear appropriate protective clothing to protect your skin, face, eyes, etc, from the corrosive material, including:

- eye protection;
- gauntlet gloves which have been properly selected and are suitable for the task;
- protective, chemical proof and waterproof boots;
- protective overalls and, when handling concentrated acid or alkalis, a protective apron (to below top of boots);
- approved respiratory protective equipment (RPE) which could be necessary when handling concentrated acids or alkalis, cleaning by spraying or in confined areas.

Check with the manufacturer or supplier of the PPE to ensure that it is suitable for the corrosive material being used and for the working conditions. Those who need to wear PPE should be trained in its proper use and its limitations. Store the equipment in clean, dry conditions away from chemicals - a locker would be suitable. PPE should be maintained and kept clean.

Hygiene

Ensure that protective equipment is thoroughly cleaned with water after use and checked for any wear, eg pinholes or cuts in the gloves, especially the fingertips. All contaminated clothing should be laundered professionally by fully briefed staff before it is reworn.

Heavily contaminated clothing should be removed at once and washed separately. Clothing contaminated with HF or other concentrated acids should be neutralised with sodium bicarbonate solution (NaHCO_3) before washing (keep solution readily available if HF is being used). Workers should avoid contact with contaminated equipment, eg they should not raise their face protection with soiled gloves as this can result in facial burns.

Welfare facilities should be available on site and workers should wash their hands and face at the end of each job and before eating, drinking or smoking, and wash their hands before going to the toilet. Where possible, showers should be available at the end of the day.

Protecting the public

Members of the public and workers who are not involved in cleaning need to be protected against exposure to the chemicals. The following steps should be taken:

- (a) check all windows, doors, etc, in facades are closed to protect the building's occupants;
- (b) avoid applying or rinsing with a spray or working in windy conditions as this may give rise to fine droplets which could be carried as a mist by the wind;
- (c) create a 'no-go' area with barriers around the base of the facade, statue, etc, at the same time ensuring pedestrians have a safe, alternative path to use. Suitable warning signs should be posted (the local highways authority will need to be consulted if the public pavement or roadway are involved). Drainage gulleys should be covered or fenced off;
- (d) scaffolding should be close-boarded and sheeted to contain splashes, etc. Extra ties may be needed to counter the increased wind loading on the scaffold;
- (e) open ends of scaffold poles should be capped before beginning work;
- (f) overspilt liquid should be directed so that it does not flow over the pavement (the Environment Agency, local authority and local water company should be consulted over any likely or actual pollution of water courses);
- (g) store chemical cleaners in a secure area to prevent them being accessible to members of the public. Always store acids away from alkalis;
- (h) these chemicals need to be disposed of carefully and should not be put down the drain. Make arrangements with the local authority for the safe disposal of them.

After treatment

On the site, the inside and outside of scaffold tubes, fittings and boards should be washed thoroughly with clean water (but see point (h)). Thoroughly clean all equipment with water and examine it for signs of deterioration.

Spillages

Dilute spillages of the acid or alkali cleaners with water unless HF or concentrated acids are involved. In this case neutralise spillages with slaked lime (calcium hydroxide - $\text{Ca}(\text{OH})_2$). Tools and equipment which may be contaminated should be treated similarly. Porous materials such as wood or packaging should be burned or buried in a safe place if contaminated with concentrated acids or alkalis or HF.

First aid

Anyone appearing to be affected by the chemical cleaners should be taken at once into the fresh air to be given first aid and referred to medical care. In most cases, first aid will involve drenching the affected parts, eg skin, eyes, etc, with plenty of cool, clean water. A drench shower should be available. HF burns require special first-aid treatment which involves applying an antidote to the burn. Contractors should inform the accident and emergency department of the local hospital that they are using HF on site. The hospital will then arrange to have the antidote available in case of an emergency. If the antidote is kept on site, first aiders will need to be specially trained in its use.

References and further information

COSHH: The new brief guide for employers I NDG 136
HSE Books 1996

Respiratory protective equipment: a practical guide
HSG53 HSE Books 1998 ISBN 0 7176 1198 1

Provision of welfare facilities at fixed construction sites
CIS18 HSE Books 1996

Provision of welfare facilities at transient construction sites
CIS46 HSE Books 1997

Emergency action for burns INDG260 HSE Books 1997
(also sold in packs of 15, ISBN 0 7176 1444 1)

Protecting the public: Your next move HSG 151
HSE Books 1997 ISBN 0 7176 1148 5

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