

Health and Safety Office

Guidance Note – Emergency precautions for Chemical splashes

Topic:	Provision of Eye and Skin washes, and Emergency Drench showers
Date:	August 2010
Version:	1.3
Scope:	This guidance aims to provide clarification on the following: <ul style="list-style-type: none"> • Why eye and skin washes are needed; • The requirements for providing them; • Inclusion on risk assessments; • The training necessary; and • Procurement
Relevant Legislation:	Health and Safety at Work etc. Act 1974 Control of Substances Hazardous to Health regulations 2002(COSHH) ¹ The Health and Safety (First Aid) Regulations 1981 ²
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1. Introduction:

This Guidance Note is designed to assist users of hazardous substances, and those responsible for their local management, including procurement and storage, in formulating a strategy for emergency arrangements.

COSHH requires every employer to carry out risk assessments for the use of hazardous substances at work, and to mitigate the risk to as low as is reasonably practicable by using all practical controls if it cannot be eliminated entirely. This planning (the assessment) must include actions in case of emergency.

2. Scope of the guidance:

- For the purposes of this Guidance Note, **Hazardous Substances** can be considered to be those chemical materials that may be corrosive or irritant to skin or eyes, or that may be toxic or very toxic by skin absorption.
- The substances may be hazardous in their own right, or they may be dissolved in solvent to produce a solution; they could be liquids or solids (dusts). Gases and vapours may also have an effect once in contact with the eyes or skin (as well as when inhaled).

- Insoluble particles are also considered eg grit, sawdust etc. due to their aggressive physical nature.
- This guidance is based on Codes of Practice issued by the Health and Safety Office and as such do not reflect statutory requirements; if followed, it should demonstrate safe practice, and so will comply with the regulations.

3. **Specific hazards:** (see CHIP Regulations ³)

3.1 Corrosive:

By definition these are substances, or concentrated solutions of the same, that may cause severe and irreversible tissue damage. The extent of the effect on body tissue will be increased with the duration of contact so it is imperative that emergency equipment is kept close at hand for immediate dilution and clearance off the skin and washing out of the eyes. The location should allow easy access for the affected party to readily use the equipment on themselves, or with the assistance of close colleagues.

When purchased, corrosive substances should currently carry the following hazard warning Pictogram (soon to be replaced by GHS labels, see Appx.3) . This should be repeated onto secondary containers into which the materials may have been transferred.



Examples: Sulphuric Acid, Concentrated Bleach, Drain Cleaner, Paint stripper, cement.

3.2 Irritant

Such substances may cause a severe irritant (stinging) effect in the eyes, or on the skin, and can be much more than the implied 'itchy' feeling. Although the effects are going to be less severe than from corrosive substances (above) the precautions should be the same, but can be applied with a lesser degree of urgency.

The following Pictogram should be used for these substances (See Appx. 3 GHS)



Examples: Many household cleaners including some bleaches, some paints, varnishes, and domestic pesticides.

3.3 Toxic and Very Toxic

As such these substances may not exhibit acute (instant) reactions on the skin or in the eyes, but their presence in both instances may cause absorption into the body whence their toxic effect may then take hold. As such, they should be washed off by dilution as soon as possible. This general group of substances may be identified by the following Pictogram (See Appx.3 GHS), and their potential for absorption into the body can be found in EH40 ⁴



Examples: Many pure chemicals or biochemical (eg drug) precursors, and some domestic pesticides.

3.4 Other substances:

The physical presence of particulate matter in the eye can be extremely painful, and the removal of such items can be assisted by a flushing effect.

Examples: Sawdust, metal grinding debris, sand

3.5 Persons at risk (examples)

- All people responsible for storing new or waste hazardous materials, or going into an area where they are stored
- Anyone using hazardous materials in a way that could emit droplets, dusts or fumes either as part of the process or under emergency or accidental conditions (also be prepared as contractors may raise dust)
- All persons within reach of splashed or spilled materials as they are being used ie entering areas listed below

3.6 Areas of risk (examples)

- Laboratories
- Workshops
- Property maintenance and housekeeping (refurbishment/ building)
- Kitchens

NOTE: 1. Properly fitting eye protection ⁵ should always be worn to prevent injury if there is a significant risk due to emitted substances – see Appendix 1.
2. Accidents should be formally reported to a local manager/Safety Advisor.

4 Equipment and Maintenance issues:

All significant risks should be eliminated at source, but where this is not practical they should be controlled to an acceptable level ¹. This should be by means of physical

separation, engineering methods (extraction etc.), managerial controls (shift rotation etc) and Personal protective equipment (PPE) ⁵. Emergency procedures are not considered to be a form of control, but should be held in place to mitigate the effects should the controlling mechanisms fail for any reason, including human error.

4.1 Eye splashes:

In the event of a chemical splash, on no account should anyone attempt to rinse out the eyes with anything other than water without prior written approval of their Head of Department (in the form of assessment, local rules or policy) planned in advance with advice from the Health and Safety and Occupational Health advisors.

4.1.1 Clean mains tap water at a clean outlet is the preferred option ³. It must be capable of being directed into the eye(s) possibly from an uncontaminated hose (kept clean inside and out) at such a rate as to not cause harm. It is imperative that such units are kept clean and are run regularly to check their operation and to ensure no build-up of Legionella-type bacteria. They must also be rigorously disinfected every 6 months, and this must be recorded.

Users of **Contact lenses** must assume responsibility for the necessary cleanliness; tap water is not sterile, and may cause infection if trapped under a lens. If such people are at significant risk of chemical splashes or particle ingress, then they should consider the additional risk posed, and this should be addressed as part of local assessments.

4.1.2 If mains tap water is not readily available in a clean condition for eye irrigation, a litre or more of proprietary sterile water or sterile normal saline (0.9%) in sealed, disposable containers should be provided ³. Once the seal has been broken, containers should not be kept for reuse. Containers should not be used beyond their expiry date which must be clearly displayed. At least one of the above (4.1.1) or this facility must be available wherever corrosive or toxic materials are held or used. Where bottled eyewash is selected, it should be stored safely and kept clean; commercial “eyewash stations” can be obtained, and these could be integral with first aid stations.



4.1.3 More advanced alternative products (⁶ and Appendix 2, see also skin wash below) are available and should be seriously considered if the potential exposure is to either Hydrofluoric Acid or Phenol, or any other substance considered to present such significant risk from physical contact (not inhalation or ingestion) that the victim may suffer either severe burns and/or poisoning by absorption through the eye tissue.

4.1.4 Eye-bath or spray stations should be planned into new buildings or may have been installed as part of a refurbishment. These are dedicated units, available only for emergency use, that are plumbed into the mains water and drainage systems; they may consist of (i) a free-standing or wall-mounted bowl with two upward facing nozzles that when operated will provide a continuous spray of clean water into each eye, or (ii) may be a single spray head. Their location should be clearly and appropriately signed.



Whichever type, it is imperative that such units are kept clean (eg cap over the nozzles) and are run weekly and tested to check their operation and to ensure no build-up of Legionella-type bacteria and other micro-organisms.

4.2 Skin splashes:

In any workplace, substances may get splashed onto the skin in the form of small droplets during transfer between vessels, or as a deluge after catastrophic failure of a container. In either case, the risk will be determined by both the level of hazard inherent in the substance and the circumstances by which a person is exposed. The level of risk will dictate the appropriate action to be taken, and should be documented in risk (COSHH) assessments or local rules (good safe practices) before embarking on any new procedure.

4.2.1. Large splashes of corrosive or toxic materials to the face or body should immediately be washed off by profuse amounts of water, continued for at least 15 minutes so as to both cool and dilute. This can be supplied by a safety drench shower which may have been fitted close to the vulnerable workplace as a result of the risk assessment. Contaminated clothing should be removed simultaneously otherwise exposure to the skin may continue unabated. If the material splashed is oily or water-insoluble then soap should be applied during the drenching process in an attempt to dissolve it off the skin.

The drench shower should be clearly labelled as such, and as with all mains water-fed equipment should be run and disinfected regularly to assure efficiency and to stop accumulation of Legionella-type bacteria.

It is not always practicable to fit drainage where such showers are required, but the potential flooding when used in an emergency is an accepted risk being outweighed by the benefits afforded. An alternative portable type of shower (⁶ and Appendix 2, 2.1) may also get around this potential problem, and offers increased flexibility around the workplace.



4.2.2 Smaller splashes to the skin may be held under any available tap with clean running water for at least 15 minutes for both cooling effect and dilution of the contaminant. The COSHH or risk assessment will identify whether soap should also be applied to help remove the contamination. First Aid advisors should always be consulted following an incident, and may advise further hospital treatment. An accident form should be filled in and sent to the Health and Safety Office via the Head of Department (who should comment on actions needed to prevent recurrence).

4.2.3 Non-proprietary (self-formulated) acid/alkali neutralisers are not recommended for application to the skin in the event of a splash, as water is the preferred practicable option. A commercial product has been assessed by the higher education sector as being suitable for both cooling and withdrawing contaminants from the skin (for details of procurement at University of Bristol see Appendix 2). This is particularly relevant and is the recommended option for specific corrosive and toxic materials, especially Phenol. There is a closely related product for use with Hydrofluoric Acid.

4.3 Maintenance:

All mains water fed equipment must be registered with Estates Operations so that they will carry out regular planned testing and maintenance, including the 6-monthly function test, lime descaling treatment, and Legionella disinfection. This is not a substitute for local management of the outlets, where the water should be flushed out weekly (see Estates guidance).

Even the most potable mains water may always contain a small proportion of both Legionella Spp. (the potential source of Legionnaire's Disease) and Amoeba (can cause a serious eye infection) along with other microorganisms. As the water is not sterile, stringent management of cleaning regimes and personal hygiene with contact lenses is essential.

Proprietary products should not be kept after the date marked when their use expires.

Any equipment that is used or damaged should be reported to a local manager.

5 Training:

- It is essential that anyone responsible for the management of personnel who handle hazardous materials ensures that they all receive relevant training in emergency procedures. The COSHH/ risk assessment must identify the proper course of action in the event of a spillage or splash, and anyone who might be affected must have been made aware of not only the risks, but also the precautions and procedures. Specific training events should be held for the use of Hydrofluoric Acid, Phenol, and any materials with similar toxic or corrosive properties.
- A responsible person should be nominated to take charge and monitor the maintenance of all permanently fixed emergency equipment, and they should seek out instruction on this from Estates Operations. This would normally be coordinated by the Superintendent or Building Manager.

6. References:

1. The Control of Substances Hazardous to Health Regulations 2002
General guidance <http://www.hse.gov.uk/coshh>
Approved Code of Practice - <http://www.hse.gov.uk/pubns/priced/l5.pdf>
2. The Health and Safety (First-aid) Regulations 1981
Approved Code of Practice - <http://www.hse.gov.uk/pubns/priced/l74.pdf>
3. Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4) to be replaced by Globally Harmonised System (Appx.3)
General guidance - <http://www.hse.gov.uk/chip/index.htm>
4. Workplace Exposure Limits
Guidance note EH40 - <http://www.hse.gov.uk/pubns/priced/eh40.pdf>
5. Personal Protective Equipment - PPE
General guidance - <http://www.hse.gov.uk/pubns/priced/l25.pdf> (p26-30, 39)
6. Commercial UoB approved alternatives -Diphoterine and Hexafluorine
Manufacturers' general guidance and data
<http://www.prevor.com/EN/index.php>
UK suppliers (see Appendix 2)- <http://www.diphex.com/>

APPENDIX 1

Personal Protective Equipment (PPE) – Skin and Eye protection ⁵

See also BS 7028:1999 – Eye protection for industrial and other uses - Guidance on selection, use and maintenance, and

[INDG 330](#) [Selecting Protective Gloves for Work With Chemicals](#)

[HSG 206](#) [Cost and Effectiveness of Chemical protective Gloves for the Workplace - Guidance for Employers and health and Safety Specialists](#)

NB Personal Protective Equipment will only protect the wearer, and in the event of damage will “fail to danger”.

- (i) PPE is not considered a substitute for properly selected mechanical protection ie Guarding, shielding, and LEV. Its use can only be justified where other measures are not found to be practicable.
 - (ii) When selecting PPE it is essential to take account of the requirements of both the equipment and the operator (good fit, no increased risk eg visibility), and must be capable of offering sufficient protection as to reduce the risk to acceptable levels.
- Eyes/face protection – Must comply with the BS EN 166.2002 for specification, and will be marked as such (see supplier brochure).
 - for protection against High-speed particles this may be spectacles, goggles, or a face-shield according to the extent of the risk.
 - For protection against chemicals, the European standard covers only goggles and visors, but does not include any safety spectacles. It is however accepted that for practical purposes these can be worn for general protection against lower risk (hazard x exposure level) substances. If specific circumstances elevate that risk then the assessment must identify that a higher level of protection must be employed eg physical barrier or goggles/visor.
 - Gloves – must be selected so as to allow sufficient dexterity while still affording the required protection. The type and material must be able to withstand exposure to the substance(s) being protected against for a sufficient time; the selection must be recorded as part of the COSHH assessment.

Either consult the UoB preferred PPE supplier, BOC for advice, or see

<http://www.bestglove.com/site/chemrest/> or

http://www.ansellpro.com/download/Ansell_7thEditionChemicalResistanceGuide.pdf

to select gloves for chemical resistance.

APPENDIX 2:

Alternative decontaminant products.

1. It is accepted that the use of running water and/or eyewash bottles are a practicable measure to alleviate the effects of many chemicals on the skin and in the eyes, but there are elevated risks that require a higher level of first aid before professional medical advice can be sought, or treatment initiated.
2. The University of Bristol and the Higher Education sector in general have received extensive presentations on two products supplied on behalf of the manufacturers, Prevor. Each is effective either on the **skin** or in the **eyes**.

<http://www.prevor.com/EN/index.php>

Departments are responsible for assessing their own risks and for providing mitigation accordingly.

2.1 Diphoterine: This product is supplied in various formats for use as either a skin or eye wash. The size or number of containers selected will be chosen as a result of local risk assessments. The large vessel similar to a fire extinguisher can be a practicable alternative to a drench shower eg field trips or mobile workers.

The product is effective against most chemicals including concentrated acids (not Hydrofluoric, see below) and alkalis, and draws contamination out from the skin, rather than just washing off the surface. This is particularly important in deep chemical burns, or for toxic contamination, especially Phenol.

2.2 Hexafluorine: A very similar product to Diphoterine, but in this case effective against the extremely corrosive and toxic Hydrofluoric Acid (HF). The present advice to apply Calcium Gluconate gel (as supplied by the Health and Safety Office on request and on receipt of a risk assessment) still applies for intermittent and very low quantity usage.

At least one such emergency treatment **must** be available close at hand wherever HF is to be used, and all people potentially affected **must** be fully instructed about the risks and trained and in the use of precautions.

Procurement:

The University has sought an agreement with DipHex Ltd that they will supply Departments direct on receipt of orders mentioning the University of Bristol.

<http://www.diphex.com>















In the first instance though, please contact Andy Macquiban (Chemical Safety Advisor) on (0117 92) 89080 for advice, and to register your intention to use these products, and any intended use of HF with the corresponding Risk/COSHH assessment.

APPENDIX 3:

The **Globally Harmonised System (GHS) of Packaging and Labelling of hazardous substances** will gradually be replacing the current CHIP labels, and the significant change in pictograms will be noted as similar graphics, but a change in shape, background and outline. There will also be two new labels.

New GHS Chemical Hazard Labels: 2009

The Globally Harmonised System (GHS) will be phased in by suppliers over 15 years. So both types of labels will be with us for the foreseeable future.

Old		New
	→ Corrosive	
	→ Flammable	
	→ Health Hazard	
	→ Acute Toxicity	
	→ Oxidising	
	→ Explosive	
	→ Hazardous to the Aquatic Environment	
	Compressed Gas	
	Respiratory Hazard	