Chemical Safety Guidance

February 2020

Eye Protection for Handling Chemicals:

Guidance for Provision and Use

Occupational Health and Safety Service
HSD071C (rev 2)

UNIVERSITY OF CAMBRIDGE

Guidance for the Provision and Use of Eye Protection When Handling Chemicals

1. Introduction:

The Personal Protective Equipment at Work Regulations cover a wide range of equipment to protect employees from the risks arising from their work. It is the moral and legal duty of the University to provide suitable eye protection free of charge to its employees (including post graduates) and where necessary visitors, members of the public and undergraduates where it has been identified as a control measure in a risk assessment and it is their legal duty to wear it in accordance with the risk assessment.

ORDINARY PRESCRIPTION GLASSES DO NOT PROVIDE ADEQUATE PROTECTION

2. Range of Activities Potentially Requiring Eye Protection:

Chemicals

Any activity involving the handling of chemicals hazardous to health, as defined by the Control of Substances Hazardous to Health Regulations, would require eye protection.

This includes most work with chemicals. The only exception to this principle would be if the concentration and/or quantity of the chemicals were very low, so as to render them 'non-hazardous to the eye' and a written risk assessment had identified all those chemicals in use in the work area / laboratory as being 'non-hazardous to the eye'.

However it should be remembered that the eyes are the most vulnerable part of the body and even small quantities of organic solvents, toxic or corrosive chemicals could permanently damage the eyes. In addition a chemical 'splash' may arise from other activities in the work area; which should be considered in the risk assessment.

The designation of any work area / laboratory handling hazardous chemicals as a compulsory eye protection zone is the most effective way to ensure eye safety.

Compressed gases

Appropriate eye protection should be worn when working with compressed gases, including the moving, connecting and disconnecting of gas cylinders.

Cryogens

It would be expected that any activity involving the handling of cryogenic liquids, whether in open vessels or under pressure, would require eye protection to be worn.

Sharps and spatter

Eye protection should be worn where there is the potential for the eye to be injured by ejected sharps or spatter, i.e. metalworking (including molten metal and welding), woodworking, working with glass etc, in particular working with glass under elevated or reduced pressures with the potential to explode or implode respectively.

Biological Materials

Requirements for eye protection when handling biological materials are subject to the University's '*Safe Biological Practice (SBP) for Prevention and Control of Exposure to Biological Agents in the Laboratory'* guidance.*

Radiological Materials

Requirements for eye protection when handling radiological materials are subject to the University's '*Management of Work with Ionising Radiations'* and *'Safe Use of Artificial Sources of Ultraviolet Radiation' guidance.**

***** *However, Biological and/or Radiological Materials are often handled simultaneously with hazardous chemicals, cryogens, sharps and occasionally compressed gases etc.*

3. Eye Protection for Chemicals; General Requirements

For most laboratory work with chemicals, a pair of close fitting safety glasses provide adequate protection from small splashes to the eye.

All Eye Protection should**:**

- conform to the UK / European standard BS EN 166and be CE marked,
- be properly assessed before use to ensure its suitability for the work,
- cause minimum discomfort to the wearer,
- be maintained, cleaned and stored properly,
- have adequate instructions on how to use it and
- be worn correctly by the user.

Whilst the COSHH regulations require the use of any Personal Protective Equipment (PPE) to be the last resort after other engineering controls have been put into place, often the residual risk in a research laboratory will require the use of eye protection when handling chemicals. However eye protection must not be adopted as an excuse for failing to supply and use appropriate engineering controls, screens and guards.

A similar but potentially lesser degree of protection is provided by the looser fitting 'over glasses' type of eye protection worn over prescription glasses. The looser fit increases the potential risk of splashes going between the glasses and the face and entering the eye. Depending upon the type of activity, the duration of that activity, the aggressiveness of the chemicals and the findings of the risk assessment a more suitable solution might be the provision by the Department / Institution of prescription safety glasses, which are now available in close fitting wrap around styles.

The types of activity justifying the provision of prescription safety glasses would include, 'close' work requiring good glare-free vision, microscope work involving chemicals etc. If the work was of extended duration, more than just a few minutes, it would be expected that prescription safety glasses would be provided. In addition if the individual had a genuine case that the over glasses were detrimental to their wellbeing / comfort there would be a strong case for the provision of prescription safety glasses. If safety glasses are not comfortable or impede the work then there is always an increased chance of them not being worn.

Contact Lenses
There is conflicting evidence as to the desirability of wearing contact lenses in the laboratory, which in itself is dependent upon the chemicals being handled and the type of contact lenses in use. **Therefore, where appropriate, the use of contact lenses in laboratories should be discouraged in favour of prescription safety glasses**.

If contact lenses are used, they should be considered in the risk assessment for the specific chemicals in use and suitable eye protection must still be worn. In cases of doubt prescription safety glasses should be used.

Remember: Any PPE, including eye protection, only protects the wearer(s) and NOT other 'unprotected' persons in the workplace. Furthermore, eye protection will only give maximum protection to the wearer if it is chosen correctly, maintained **and used!**

4. Types of Eye Protection:

Safety Glasses

There are numerous makes, models and styles of safety glasses (aka safety spectacles) available. It is essential that the safety glasses chosen for a task are suitable, compatible with any other PPE required and comfortable to wear.

For many people the modern ‘wrap around’ safety glasses offer good visibility, a close fit, impact resistance lenses, comfort and even ‘style’. Whilst these types maybe slightly more expensive than the cheapest basic safety glasses that cost differential is outweighed by their many advantages. **Your eyes are invaluable!**

In addition to the ‘traditional’ safety glasses there are currently available, from UVEX, a type of safety glasses that combine the simplicity of the glasses ‘slip on fitting’ with a flexible edge seal more commonly seen on safety goggles. These should significantly reduce the gap between the face and the glasses and represent a higher level of protection from splashes, however they do not form the direct face to edge seal fit achieved with elasticated straps (see safety goggles below).

For those who normally wear prescription glasses, there are two choices:

a) Safety ‘over-glasses’

This type of eye protection fulfills the basic minimum requirements for protection.

However, wearing potentially bulky, potentially awkward/uncomfortable and potentially poorly fitting over-glasses ‘on-top’ of the persons existing prescription glasses is only a suitable for work with small quantities of chemicals and for short periods of time and where the potential lack of ‘optical clarity’ is not an issue.

b) Prescription safety glasses

Prescription safety glasses, preferably of the close fitting wrap around style, are the preferred option for extended work with chemicals that may pose a risk to the eyes or where the work requires a high degree of ‘optical clarity’. Conventional prescription safety glasses to not afford the same level of protection given by the modern wrap around style.

Safety Goggles

Good quality chemical safety goggles offer a higher level of protection against splashes than a simple pair of safety glasses, largely because of their close fit to the face and elasticated straps. When fitted correctly they should prevent chemical splashes getting around the ‘edges’ or running down the forehead into the eyes.

However, by their nature chemical safety goggles would normally only be specified for work with high risk aggressive chemicals, high risk / high energy activities or work with significant quantities of chemicals where the risk of a ‘large splash’ to the face is reasonably foreseeable. Under these circumstances the COSHH hierarchy would normally indicate the need for, and use of, engineering controls. Therefore the use of chemical safety goggles in most laboratory situations would be restricted to those circumstances where engineering controls are not reasonably practicable.

There are many specifications of safety goggles, often designed for impact resistance rather than chemical resistance, and therefore care should be taken to purchase the appropriate specification. In addition, when purchasing chemical safety goggles it is important to have splash proof side vents to reduce misting whilst preventing splash penetration.

All safety goggles that use elasticated straps should be subject to regular inspection, and replaced if the elastic properties of the straps deteriorates.

Face Shields

Laboratory face shields protect the whole face from direct splashes. However, they may not fully meet eye protection standards and it would be prudent to wear close fitting safety glasses under the face shield when handling aggressive chemicals.

The real value of face shields is their ease of use when carrying out a short duration high risk procedure, such as pouring a large volume of corrosive liquid, filling or decanting from liquid nitrogen dewars etc.

Specialized face shields for welding, working with molten metal or working with UV etc, whether or not they are incorporated in other protective devices, are largely beyond the scope of this guidance.

5. Standards for Eye Protection:

The British Standards for eye protection are:

BS EN 165 Personal Eye Protection: Vocabulary
BS EN 166 Personal Eye Protection: Specifications
BS EN 167 Personal Eye Protection: Optical test methods
BS EN 168 Personal Eye Protection: Non-optical test methods

Other British Standards are applicable to a range of specialist eye protection

Impact resistance of glasses, goggles and shields

Impact resistance is important for any type of eye protection. All safety eyewear issued in the UK must conform to the British Standard European Norm 166:2002 which includes different levels of impact resistance, each allocated a symbol:

S - Increased robustness
F - Low energy impact
B - Medium energy impact
A - High energy impact
K - Resistance to damage by fine particles
N - Non-fogging properties
(9 - Non-adherence of molten metal and resistance to penetration of hot solids)

If there is a need for protection against, electrical arcs or welding materials then prescription safety spectacles will not be sufficient and goggles or visors carrying the appropriate EN specifications must be used. Furthermore, visors or face shields will be required for high-energy impacts as defined by EN166A.

6. Provision of Eye Protection:

It is the responsibility of Departments and/or Institutions of the University to provide eye protection free of charge where required by a risk assessment.

The expectation would be that any employee / post graduate working with chemicals would be supplied with their own ‘personal’ safety glasses, which they would then be responsible for maintaining and using. Additional eye protection for specific short term tasks could be shared / communal, taking into account any potential hygiene issues.

Departments and/or Institutions should have sufficient eye protectors available to provide for any persons not directly employed by the University and a procedure to clean / maintain communal eye protection used for this purpose.

It is the responsibility of Departments and/or Institutions to establish a written policy on the use of eye protection, based on risk assessment of the procedures and areas under their control. In some cases Departments and/or Institutions may adopt a mandatory policy for eye protection in all work areas / laboratories handling chemicals, in others there may be justification for a laboratory by laboratory approach[§]. Both approaches must be based on risk assessment, documented and require stringent management.

[§] Designated areas may require signage indicating the need for eye protection to be worn.

7. Care and Maintenance of Eye Protection:

When not in use eye protectors should be stored in a clean easily accessible environment out of direct sunlight.

A quick visual examination should be performed before each use to ensure that they are not damaged, warped, scratched, pitted, cloudy or dirty. Damaged or scratched eye protectors should be replaced immediately. Dirty eye protectors should be cleaned with either commercial lens cleaners or with a mild liquid soap and water solution, but always following manufacturer's instructions.

Any ventilation openings on goggles etc. should be unclogged and secure in the frame, if fitted, side shields should be secure and undamaged.

If disinfection is required between uses, i.e. when using shared/communal eye protectors, then the manufacturers' advice should be sought.

Elasticised straps and headbands should be checked for wear and loss of elasticity and replaced or discarded as necessary.

Plastic lenses and shields etc. may become brittle with age, particularly in aggressive chemical environments or if left in direct sunlight for extended periods, they require replacing at reasonable intervals or when specified by the manufacturer.

Departments and/or Institutions should include checks on the condition of eye protectors when carrying out their regular laboratory inspections to ensure that devices that are damaged or scratched are discarded and replaced. It is worth noting that eye protectors are available with 'anti-scratch' coatings, that can be surprisingly effective.

More complex maintenance and repair should be carried out by trained individuals or the manufacturers using only manufacturer's replacement parts. Improvised repairs must **not** be carried out under any circumstances, if eye protection is 'safety critical', additional spare replacement eye protectors should be readily available.

Manufacturer's maintenance instructions and schedules should be followed.

8. Information, instruction and training

Users should be provided with sufficient information, instruction and training to use eye protection effectively (this will usually be provided by the supervisor or Departmental Safety Officer). It should include; why the eye protection is needed, when to wear it and how to maintain / store it.

9. Users' duties

Employees, postgraduates, undergraduates and visitors are duty bound to use the eye protection provided according to instructions and to take reasonable care of it. Faulty or sub-standard eye protection should not be used and defects or loss should be reported to a supervisor or Departmental Safety Officer.

10. Supervisors' duties

Supervisors have a duty and responsibility to ensure that eye protection is provided free of charge to protect those at risk and that the eye protection is used, maintained and stored properly.

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