

Policy on Eye Protection in Laboratories

(This policy should be read in conjunction with the policy on *Minimum standards of dress and personal protective equipment.*)

Introduction

The type of eye protection required for a worker or student at the University will depend on the hazards that they work with or which they encounter in the specific work activity, and should be determined by undertaking a risk assessment. The risk assessment should take account of the hazards that are present in the laboratory for most of the time, and consider the work of the group as a whole, not just that of an individual.

A minimum standard of dress and personal protective equipment in a laboratory where chemicals and biological substances would be in use include a laboratory coat that covers the front of the body (i.e. with buttons done up for front opening labcoats, or wear side or back opening labcoats), and closed in foot-wear. Gloves and protective eyewear will also be required when handling toxic, corrosive, pathogenic or radioactive substances. This will be determined from the risk assessment and in consultation with the material safety data sheet.

Responsibilities

The following responsibilities should be closely adhered to:

Laboratory Managers/ Supervisors

- Ensure that persons working within the laboratory are supplied with suitable eye protection for the task being performed;
- Ensure that persons who are not wearing the correct safety equipment are removed from the laboratory until eye protection is available and they are able to comply.

Tutors

- Ensure that persons who are not wearing the correct safety equipment are removed from the laboratory until eye protection is available and they are able to comply.

Researchers/ Students

- Wear the appropriate PPE when working in the laboratory;
- Comply with supervisor/laboratory manager instructions.

Types of eye protection

Eye protection selected must comply with the relevant requirements of *AS/NZS 1337: 1992 - Eye protectors for Industrial applications, AS2243.1:2005 – Safety in laboratories (Planning and Operational aspects)* and *AS/NZS 1336: 1997 – Recommended practices for occupational eye protection* and must have Standards markings on them to indicate they are approved.

Where it is not possible to eliminate or control eye hazards, personal eye protectors should be supplied to operators and visitors in areas where eye hazards may exist. For adequate protection against the different types of hazard present in industrial environments, supplementary eye protectors designed for protection against the hazards specific to that workplace must be provided. (See Table 1 – Examples of specific hazards and control measures – *Extract from AS/NZS 1336:1997 Recommended practices for occupational eye protection* in Appendix 1 of this guideline.)

There are three basic types of eye and face protection which will meet the majority of University laboratory requirements. These are: safety glasses (with side shields), goggles and face shields. The type of eye protectors recommended as suitable are set out in Table 2 (extract from *AS/NZS 1336:1997*) in Appendix 1 of this guideline.

Safety glasses

Safety glasses look very much like normal glasses but have lenses that are impact resistant and frames that are much stronger than standard prescription glasses. Safety glasses must have side shields and must be worn whenever there is a possibility of objects striking the eye, such as particles, glass or metal shards. Many potential eye injuries have been avoided at the University by wearing safety glasses.

Safety glasses may not always provide adequate protection from chemical splashes as they do not seal to the face. Safety glasses may be adequate where the potential splash is minimal e.g. opening eppendorf tubes, or where the chemicals in use are of low toxicity.

Ordinary prescription glasses do not provide adequate protection from injury to the eyes and could even be hazardous to the wearer. For further information on prescription glasses, see the section below on prescription spectacles.

Goggles

Goggles come in a variety of styles for maximum comfort and splash protection.

Chemical splash goggles should be worn when there is a high potential for splash from a hazardous material. For example, goggles should be worn when working with glassware under reduced or elevated pressure and when glass apparatus is used in combustion or other high temperature operations. Like safety glasses, goggles are impact resistant. Chemical splash goggles shall have indirect ventilation so hazardous substances cannot drain into the eye area. Some can be worn over prescription glasses.

Bacou-Dalloz supply 'Flex Seal', a lightweight goggle that fits prescription eyewear underneath. See Diagram below

FLEX SEAL

Flex Seal is the ultimate in industrial goggles in the market place today. Featuring a soft silicone body for an individual perfect fit the silicone remains soft & supple in different temperatures. Flex Seal is the most comfortable goggle ever, with personally adjustable pivoting clips, adjustable headband, easily removable lens from silicone body, indirect ventilation and a lightweight, sturdy frame.

The large wraparound frame ensures panoramic vision & the lens provides 99.9% UV filtration.

Lenses available are: clear fog ban, grey fog ban & shade 5



Face shields

Face shields are in order when working with large volumes of hazardous materials, either for protection from splash to the face or flying particles. Face shields must be used in conjunction with safety glasses or goggles. *AS2243.1 Safety in laboratories (Planning and Operational aspects)* provides the following examples where a face shield should be used:

- (a) where glass apparatus is evacuated, recharged with gas or pressurized;
- (b) when pouring corrosive liquids;
- (c) when using cryogenic fluids;
- (d) when combustion processes are being carried out;
- (e) where there is a risk of explosion or implosion;
- (f) when using chemicals that can cause direct damage to the skin; and
- (g) when using chemicals and biological agents that can be rapidly absorbed into the body via any path e.g. Through the skin, eyes or nose.

The level of protection chosen shall take into account any eye and face hazards from other work being carried out in the vicinity that could affect the worker at the distance by which the operators are separated.

Section 6.6.1 from AS2243.3 suggests face shields should be worn when opening an autoclave.

Prescription spectacles

Prescription spectacles (as distinct from prescription eye protectors) are generally inadequate against flying objects or particles and could even be hazardous. For persons requiring eye protection in addition to sight correction, the use of prescription spectacles worn with additional protection, e.g. overglasses, wide vision goggles or clip-ons will be necessary. It is important to note the following disadvantages of wearing these with prescription glasses:

- the majority of prescription eye protectors can provide no more than low impact protection because of their lightweight design. Where medium impact resistance is required, medium impact resistant eye protectors complying with AS/NZS 1337 suitable for use over prescription lenses shall be used over the prescription lenses. Bacou-Dalloz now have a product where the lens can be made to fit inside the medium impact resistance spectacle (see figure below)
- the use of safety goggles worn over prescription lenses will not necessarily provide protection against impact from flying objects. Fracture of the prescription lenses can occur when the safety goggles deflect under impact, even if the goggles are not penetrated.

Information on the requirements for prescription eye protectors is given in Section 7 of AS/NZS 1336.



The RX insert is a practical alternative to the traditional over the glass style safety specs. It fits snugly into the inside of the Pul-safe XC spectacle and when fitted, offers the wearer medium impact resistance under AS/NZS 1337.

Other features include:

- One style of spectacle for the whole facility
- Your prescription will not scratch
- The RX carrier will accommodate a variety of RX bifocals, trifocals & progressive lenses.

Contact lenses

Contact lenses are not eye protective devices and wearing them does not reduce the requirement for eye and face protection. Over the past couple of years, several professional groups and organizations have issued guidelines removing restrictions on the wearing of contact lenses in the industrial environment.

When the work environment entails exposure to intense heat, molten metals, a highly particulate atmosphere, corrosive substances or any of the following substances (acrylonitrile, methylene chloride, 1,2 dibromo-3-chloropropane, ethylene oxide and methylene dianiline), contact lens use should be avoided.

The following safety measures must be implemented should contact lenses be worn by individuals working with chemicals:

- conduct a risk assessment prior to working with any chemicals or biological material to determine what type of eye protection is required, and whether the wearing of contact lenses should be avoided:

- provide suitable eye and face protection for all workers exposed to eye injury hazards regardless of contact lens wear
- notify workers and visitors about any defined areas where contact lenses are restricted:
- identify to supervisors all contact lens wearers working in chemical environments to ensure that the proper risk assessment is completed and the appropriate eye protection and first aid equipment is available
- train medical and first aid personnel in the removal of contact lenses and have the appropriate equipment available
- in the event of a chemical exposure, begin eye irrigation immediately and remove contact lenses as soon as practical. Do not delay irrigation while waiting for contact lens removal
- instruct workers who wear contact lenses to remove the lenses at the first sign of eye redness or irritation

Cost and Reclamation

The University is committed to a policy of providing eye and face protection without cost to employees, researchers and visitors. Each Department or school is responsible for the funding of its eye and face protection program. Undergraduate students are required to supply their own eye protection if deemed necessary by the lecturer. Eye protective devices issued to employees and researchers remain the property of the University and are to be returned when the use of the device is no longer necessary.

Scheduling and payment for eye examinations to obtain prescriptions for safety glasses, and the purchase of prescription lenses for safety glasses is the responsibility of the employee, researcher and/or student.

Eye protective devices are personal items and are issued for the exclusive use of each individual.

Suppliers

For further information on safety eyewear, view the following websites:

www.uvex-safety.com

www.bacou-dalloz.com

APPENDIX 1

TABLE 1

EXAMPLES OF SPECIFIC HAZARDS AND CONTROL MEASURES			
Typical processes giving rise to hazards	Hazard (of the process)	Typical methods of controlling hazards	Suitable type of eye protectors (See Table 4.2)
Manual chipping, riveting, spalling, hammering, handling wire and brick cutting	Flying fragments and objects with low velocity or low mass	Fixed or mobile screens	Low impact NOTE: Medium impact (marked I) and high impact protection
Machine disc cutting of materials, scaling, grinding and machining metals, certain wood-working operations, stone dressing	Small flying particles with medium velocity or medium mass	Fixed or mobile screens exhaust systems, dust extractors, water	Medium impact (marked I) NOTE: High impact (marked V) will give greater protection
Use of explosive powered tools	High velocity particles	Fixed or mobile screens	High impact (marked V)
Road work, coal handling, textile trades, some chemical works, leather buffing, timber sanding	Airborne dusts	For indoor work— exhaust systems, dust extractors, suction conveyors	Dust resistant (marked D)
		For outdoor work— damping down of work area, sealing of dusty surfaces, use of large fixed or mobile screens	Gas resistant (marked G)
Hot bitumen, pickling baths, metal cleaning, plating, handling corrosives	Liquid splash, harmful liquids and corrosives	Screens, catchments, splashguards, overflows, tilting apparatus and splash trays	Splash resistant (marked C)
Chemical processes spray painting aerosols	Gases, vapours	Enclosures and exhaust systems, screens, catchments	Gas resistant (marked G)
Chemical processes spray painting aerosols	Liquid splashes	Splashguards, overflows, tilting apparatus and splash trays	Splash resistant (marked C)
Metal casting, molten slag, molten metal, hot solids, galvanising baths, lead joining	Splashing metals	Screens, catchments, splashguards, overflows, tilting apparatus and splash trays	Molten metal resistant (marked M)
Welding, cutting, brazing, furnace work	Non-ionizing radiation only (see Section 5)	Fixed or mobile screens	Marked in accordance with AS/NZS 1338 Parts 1, 2 or 3 as appropriate
Overhead cutting and welding, metal gouging, forging	Non-ionizing radiation with hot solids	Fixed or mobile screens	Welding goggles or welding helmets complying with AS/NZS 1338.1
Gas welding producing flying sparks	Non-ionizing radiation with hot solids	Fixed or mobile screens	Welding goggles or welding helmets with rearward facing indirect ventilation, with lenses complying with AS/NZS 1338.1

Typical processes giving rise to hazards	Hazard (of the process)	Typical methods of controlling hazards	Suitable type of eye protectors (See Table 4.2)
Outdoor work	Sunglare and glare from visible radiation	Suitable screens or sunshades	Low impact or medium impact (marked I), tinted
Outdoor work (cont)	Solar ultraviolet radiation	Suitable screens or sunshades	Low impact or medium impact (marked I) if tinted, or outdoor untinted (marked O)
Dental treatment * (hazard to patient)	Flying particles, liquid droplets, dental instruments	High velocity evacuation	Low impact spectacles (with side shields) of close fitting design, and wide vision spectacles
Dental treatment * (hazard to dentist, dental assistant)	Flying particles, liquid droplets, blue light cure	High velocity evacuation	Low impact (with side shields if spectacles)
UV radiation of substrate	Germicidal lamp UV weathering tests	Fixed or mobile screens	Those with filters complying with AS/NZS 1338.2

**TABLE 2
RECOMMENDED EYE PROTECTION**

Identification of eye protector	Type of eye protector	Eye protector marking-Lens identification* (See AS/NZS 1337)	Purpose and application of eye protection
Low impact	1 Safety spectacles	HT* or CT*	Frontal protection to the eyes from low energy flying fragments and objects. Tinted lenses will provide a degree of protection from glare. Metal frames not suitable for electrical hazards.
	2 Safety spectacles with side shields	HT* or CT*	As for 1, but additional protection provided.
	3 Wide vision spectacles		As for 2 but additional protection required.
	4 Safety clip-ons	HT* or CT*	As for 1
	5 Eye cup goggles		As for 2
	6 Coverall goggles direct ventilation	HT* or CT*	As for 2, can be worn over prescription spectacles.
	7 Wide vision goggles with direct ventilation	-	As for 2, some types may be worn over prescription spectacles.
	8 Eyeshield	-	Protection to the eyes from low energy flying fragments and small particles. Tinted lenses will provide a degree of protection from glare.
	9 Faceshield 10 Goggles all types (5, 6 and 7) with indirect ventilation 11 Hoods and helmets incorporating an eyeshield or a faceshield	- HT* or CT* C, D optional HT* or CT* C, D optional	Protection provided to eyes, face, forehead and front of neck from low energy flying fragments and small particles. Tinted lenses will provide a degree of protection from glare. As for 7, Splash or dust protection where marked. 'All round' protection to the eyes, head and neck from flying fragments and small particles. Respiratory protection may be provided (see AS/NZS 1715 and AS/NZS 1716). Splash or dust protection where marked.
Medium impact	12 Wide vision spectacles	I	Frontal and side protection to the eyes from medium energy flying particles. Tinted lenses will provide a degree of protection from glare.

	13 Wide vision goggles with direct ventilation	I	'All round' protection to the eyes from medium energy flying particles. Tinted lenses will provide a degree of protection from glare.
	14 Wide vision goggles with indirect ventilation	I	'All round' protection to the eyes from medium energy flying particles. Tinted lenses will provide a degree of protection for glare.
	15 Eyeshields	I	Provide protection to the eyes, upper face, and forehead from medium energy flying particles. Tinted lenses will provide a degree of protection from glare.
	16 Faceshields	I	Provide protection to the eyes, face, forehead and front of neck from medium energy flying particles. Tinted lenses will provide a degree of protection from glare.
	17 Hoods and helmets incorporating an eyeshield or faceshield	I	'All round' protection to the eyes, head and neck from medium energy flying particles. Tinted lenses will provide a degree of protection from glare.
High impact	18 Faceshields	V	As for 16. Also from high energy flying fragments and small particles.
Molten metal	19 Faceshields and wire mesh screens with plastics lenses	M	See impact protectors 16. Also providing protection from molten metal and hot solids.
Splashes	20 Wide vision goggles With indirect ventilation	C	Protection as for Item 10, and also providing protection from harmful liquids.
	21 Eyeshields	C	Protection as for Item 8 or 15, and also providing protection from harmful liquids or splashing materials.
	22 Faceshields or hoods	C	Protection as for Item 9, or 11, and also providing protection from harmful liquids and splashing materials.
Dust	23 Goggles all types with indirect ventilation	HT*, CT* and D	Protection as for Item 10, and also providing protection against dust particles and aerosols.
Gas	24 Goggles all types without ventilation	HT*, CT* and G	Protection as for Item 10, and also providing protection against harmful gases and vapours.
Non-ionizing radiation	25 Safety spectacles with filter lenses and opaque side shields	HT* or CT* and shade No.	Depending on filter used will provide protection, e.g. for welders' assistants against ultraviolet or infrared radiation. (a) AS 1338.1, Table 2.2 for gas welding filters (up to shade 3).

			<p>(b) AS 1338.2 for ultraviolet filters.</p> <p>(c) AS 1338.3 for infrared filters.</p>
	26 Goggle all types with opaque frames and with indirect ventilation	HT* or CT* and Shade No.	<p>Depending on filter used will provide protection for gas welding and ultraviolet or infrared radiation. For recommended filters, see-</p> <p>(a) AS 1338.1, Table 2.2 for gas welding filters</p> <p>(b) AS 1338.2 for ultraviolet filters</p> <p>(c) AS 1338.3 for infrared filters</p>
	27 Welding helmets all types and handshields	HT* or CT* and Shade No.	<p>Depending on filter used will provide protection for arc welding. For recommended filters, see AS1338.1 for Arc welding filters</p>

* HT or CT applicable to toughened glass lenses only. Low impact plastics are not marked.