



## Protective Eye and Facewear Standard: Selection and Use

In many University workplaces, flying particles, dusts, vapours, chemicals or intense light sources can create a potential for eye or face injury. Whenever practicable, these hazards shall be eliminated or minimized through the use of substitution or engineering controls. To protect against those hazards that continue to exist after all such control measures have been implemented, appropriate protective eyewear or facewear must be used. This standard is based on the Canadian Standards Association (CSA) Standard Z94.3.1-09 and the American National Standards Institute (ANSI) Z87.1-2003.

### SCOPE:

Any worker who may be exposed to eye or face injury from an operation or process conducted within a University of Toronto workplace.

**Note:** In this standard, "worker" includes faculty, staff, students and visitors.

### RESPONSIBILITIES:

Principal investigators/supervisors and all others in authority shall:

- Identify situations where eye or face protectors are required
- Determine (using this standard or in conjunction with the Office of Environmental Health and Safety) the type of protective eyewear or facewear required for the specific eye or face hazard;
- Provide employees with appropriate protective eyewear and/or facewear
- Ensure that workers are informed in the proper use, care and maintenance of protective eye and facewear; and
- Ensure that workers wear appropriate protective eyewear and facewear at all times in eye hazard areas.

Workers shall:

- Wear appropriate eye and face protection at all times in eye and face hazard areas; and
- Maintain them in good condition.

### PROTECTIVE EYEWEAR:

Eye and face injuries may be prevented by using the appropriate protective eyewear and facewear for the job. Appropriate protective wear must protect against the specific hazard presented, provide a comfortable and secure fit, and comply with CSA Standard Z94.3.1-09, "Eye and Face Protectors."

**Appendix A** outlines the recommended protectors to be worn when exposed to specific eye and face hazards.

The following outlines the general categories of protective eyewear and facewear:

#### 1. **Spectacle Type Safety Glasses**

Safety glasses have lenses that are impact resistant and frames that are far stronger than those of regular eyeglasses. "Plano" (non-prescription) or prescription safety glasses (for those who need corrective lenses) with permanently attached side shields must be worn by those who require protection against flying particles. Safety glasses must comply with CSA Standard Z94.3.1-09.

Safety glasses come in a variety of lens materials, shades and tints. Lens materials include glass, polycarbonate, or plastic. It should be noted that current glass material lenses do not meet the impact criteria in CSA Standard. Safety glasses intended for protection where a reduction of visible radiation or a moderate reduction of optical radiation are required must be opaque or have side protection with a shade number equal to or greater than that of the filter lens.

Use of prescription eyewear is recommended practice for workers who require corrective lenses and are exposed to eye hazards on a regular basis. "Over-the-glasses" protectors (oversized protectors designed to be worn over non-safety spectacles) should only be used for workers and visitors who require protection occasionally.

## **2. Safety Goggles**

Safety goggles are devices contoured for full facial contact and are held in place by a headband or another suitable means and therefore offer greater eye protection than safety glasses.

Safety goggles are impact resistant and must meet the minimum requirements of CSA Standard Z94.3.1-09. Like safety glasses, they are available in a variety of tints and shades.

Safety goggles may have direct or indirect ventilation to protect against fogging. Goggles with direct ventilation allow heat and humidity to dissipate, but do not protect against splash hazards. Goggles with indirect ventilation are designed to protect against dust and splash hazards.

## **3. Welding Protection**

Welding helmets and hand shields are designed to protect the face and eyes from non-ionizing radiation (heat, light, UV) and impact (weld spatter) when welding or working with molten materials. ***Welding helmets shall be used only in conjunction with primary eye protectors such as safety glasses or goggles.***

## **4. Face Shields**

Face shields are built to provide general protection to the face and front of the neck against flying particles and sprays of hazardous liquids. Face shields may also have crown protectors and/or chin protectors. ***Face shields do not fully enclose the eyes, and are to be used only in conjunction with primary eye protectors such as safety glasses or goggles.***

## **5. Laser Protective Eyewear**

Protective eyewear equipped with appropriate filter lenses must be used to protect against harmful light, e.g. infrared, ultraviolet, visible light. Refer to UofT's Laser Safety Program for information about laser protection (<http://www.utoronto.ca/safety/LaserPg/LasCont.html>). When choosing laser safety eyewear, the workers should consider the following factors:

- The wavelength of the eyewear must correspond to the wavelength of the laser.
- O.D. (Optical density) must be sufficient to reduce the laser beam below the maximum permissible exposure levels.
- The "Factor of Time" (how long the filter will last if exposed to laser radiation).
- VLT (Visual Light Transmission).
- Pulse Rating
- Comfort and fit.

## CSA Compliant Eyewear

---

Plano (Non-Prescription Eye and Face Protector)

- Frame:  
Certification mark (CSA or other accredited agency) on frame and/or temple and on packaging or declaration by the manufacturer that the product complies with CSA.
- Lenses:  
Manufacturer's mark or monogram.
- Side Protection (sideshields):  
Sideshields are permanently attached, either integral or part of a continuous formed front that extends to provide the coverage required by CSA standard.

---

Prescription Safety Eye and Face Protector

- Frame:  
Certification mark (CSA or other accredited agency) on frame and/or temple and on packaging or declaration by the manufacturer's label "CSA Z94.3" on temple.
- Lenses:  
Manufacturer's mark or monogram.
- Side Protection (sideshields):  
Sideshields are permanently attached or are an integral part of the eyewear design.

---

Non-Safety (Dress) Eyewear

- Frame:  
No marking with reference to safety assurance.
- Lenses:  
Some marking on lenses, but usually just indicates brand name.
- Side Protection (sideshields):  
None

---

**Note:** "Plano (Non-Prescription) Eye & Face Protector" may also include powered general-use magnifying protective safety eyewear.

*Reference: CSA Z94.3.1-09*

## **CONTACT LENSES IN THE CHEMICAL WORK ENVIRONMENT:**

Current evidence indicates that the use of contact lenses in the workplace, on the whole, does not place the wearer at additional risk of eye injury. Situations in which the use of contact lenses have minimized or prevented injury far exceed those in which they might have increased or exacerbated injury. This has been attributed to some obvious advantages related to the use of contact lenses, including increased visual acuity and better fit of protective eyewear than with eyeglasses. Furthermore, concerns associated with an increased risk of eye injury due to chemical splash or the absorption and retention of gases and vapours by the contact lens materials have not been supported by scientific evidence or human experience. Although there are some chemicals which interact adversely with contact lens materials, there have been many more instances where the contact lenses have been shown to provide a barrier to chemicals.

Based on existing evidence, it is reasonable to allow the use of contact lenses in chemical work environments. **Contact lenses are not protective devices, and must be used only in conjunction with appropriate protective eyewear in eye hazard areas.**

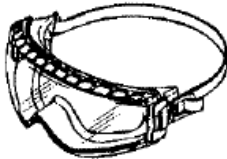
**CLASSIFICATION OF PROTECTIVE EAYEWEAR:**



**Class 1A** - Spectacle-type with side protection



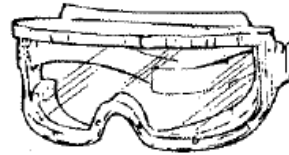
**Class 1B** - Spectacle-type with side and radiation protection



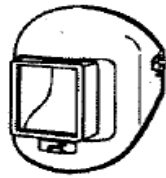
**Class 2A** – Direct ventilated goggles



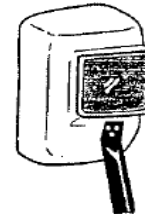
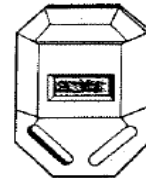
**Class 2B** - Non-ventilated goggles



**Class 2C** - Direct/non-ventilated goggles with radiation protection



**Class 3** - Welding Helmets



**Class 4** - Welding Hand Shields

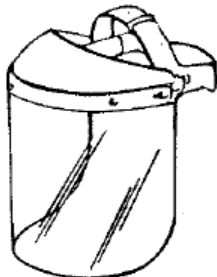


**Class 5A** - Non-rigid helmet (hood) with impact-resistance window

**Class 5B** - Non-rigid helmet (hood) for dust, splash, and abrasive materials protection

**Class 5C** - Non-rigid helmet (hood) with radiation protection

**Class 5D** - Non-rigid helmet (hood) for high-heat applications



**Class 6A** - Face shields for impact and splash protection

**Class 6B** - Face shields for radiation protection

**Class 6C** - Face shields for high-heat applications

Reference: CSA Z94.3.1-09

**CLASSIFICATION OF HAZARDS AND RECOMMENDED PROTECTORS**

Checkmarked areas indicate recommended protectors based on the nature of the hazard. Unchecked areas are considered to be unsuitable protection for the given hazard.

**Please note that apart from optical radiation, classes 3,4,5, and 6 must be used with one of class 1, or 2.**

Nature of Hazard	Hazardous activities involving but not limited to	Spectacles Class 1		Goggles Class 2			AND ONE OF THE FOLLOWING	Welding Helmet Class 3	Welding Hand Shield Class 4	Non-rigid Helmet (Hoods) Class 5				Face Shields Class 6		
		A	B	A	B	C				A	B	C	D	A	B	C
Flying objects	Chipping, scaling, stonework, drilling; grinding, buffing, polishing, etc; hammer mills; crushing; heavy sawing, planing; wire and strip handling; hammering, unpacking, nailing; punch press, lathe work, etc.	✓		✓	✓					✓	✓			✓		

**CLASSIFICATION OF HAZARDS AND RECOMMENDED PROTECTORS**

Checkmarked areas indicate recommended protectors based on the nature of the hazard. Unchecked areas are considered to be unsuitable protection for the given hazard.

**Please note that apart from optical radiation, classes 3,4,5, and 6 must be used with one of class 1, or 2.**

Nature of Hazard	Hazardous activities involving but not limited to	Spectacles Class 1		Goggles Class 2			AND	Welding Helmet Class 3	Welding Hand Shield Class 4	Non-rigid Helmet (Hoods) Class 5				Face Shields Class 6		
		A	B	A	B	C				A	B	C	D	A	B	C
Flying particles, dust, wind, etc	Woodworking, sanding; light metal working and machining; exposure to dust and wind; resistance welding (no radiation exposure); sand, cement, aggregate handling; painting; concrete work; plastering; materials batching and mixing	✓		✓	✓		<b>ONE OF THE FOLLOWING</b>			✓	✓			✓		
Heat, sparks and splash from molten materials	Babbiting, casting, pouring molten metal; brazing, soldering; spot welding, stud welding; hot-dipping operations		✓			✓							✓	✓		✓

**CLASSIFICATION OF HAZARDS AND RECOMMENDED PROTECTORS**

Checkmarked areas indicate recommended protectors based on the nature of the hazard. Unchecked areas are considered to be unsuitable protection for the given hazard.

**Please note that apart from optical radiation, classes 3,4,5, and 6 must be used with one of class 1, or 2.**

Nature of Hazard	Hazardous activities involving but not limited to	Spectacles Class 1		Goggles Class 2			AND	Welding Helmet Class 3	Welding Hand Shield Class 4	Non-rigid Helmet (Hoods) Class 5				Face Shields Class 6				
		A	B	A	B	C				A	B	C	D	A	B	C		
Acid splash; chemical burns	Acid and alkali handling, degreasing, pickling and plating operations, glass breakage; chemical spray; liquid bitumen handling				✓		ONE OF THE FOLLOWING				✓				✓			
Abrasive blasting materials	Sand blasting; shot blasting; shotcreting				✓							✓				✓		
Glare, stray light, heat (where slight reduction of visible radiation is required)	Reflection, bright sun, and lights; reflected welding flash; photographic copying	✓		✓	✓						✓	✓				✓		

**CLASSIFICATION OF HAZARDS AND RECOMMENDED PROTECTORS**

Checkmarked areas indicate recommended protectors based on the nature of the hazard. Unchecked areas are considered to be unsuitable protection for the given hazard.

**Please note that apart from optical radiation, classes 3,4,5, and 6 must be used with one of class 1, or 2.**

Nature of Hazard	Hazardous activities involving but not limited to	Spectacles Class 1		Goggles Class 2			AND ONE OF THE FOLLOWING	Welding Helmet Class 3	Welding Hand Shield Class 4	Non-rigid Helmet (Hoods) Class 5				Face Shields Class 6		
		A	B	A	B	C				A	B	C	D	A	B	C
Injurious optical radiation (where moderate reduction of optical radiation is required)	Torch cutting, welding, furnace work; spot welding, metal pouring, spot welding, and photographic copying		✓			✓						✓			✓	
Injurious optical radiation (where large reduction of optical radiation is required)	Electric arc welding; heavy gas cutting; plasma spraying and cutting; inert gas shielded arc welding; atomic hydrogen welding						✓	✓								

Reference: CSA Z94.3.1-09