



Head Protection Standard

In some University workplaces, the risk of falling or flying objects, impact against a fixed object, or contact to exposed energized electrical conductors creates a potential for head injury. Although the human skull offers a good degree of natural protection, such hazards must be considered potentially life-threatening. Whenever practicable, these hazards shall be eliminated or reduced with engineering and/or administrative controls. To protect against those hazards, which continue to exist, after all such control measures have been implemented, appropriate protective headwear (usually hard hats) must be used. This standard is based on the Canadian Standards Association (CSA) standard Z94.1-15, "*Industrial Protective Headwear – Performance, Selection, Care, and Use.*"

SCOPE:

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

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

RESPONSIBILITIES:

Principal investigators/supervisors and all others in authority shall:

- Identify situations where head protection is required;
- Determine (using this standard or in conjunction with the Office of Environmental Health and Safety) the type of protective headwear required for the specific head hazard;
- Provide employees with appropriate protective headwear;
- Ensure that workers are informed in the proper use, care and maintenance of protective headwear; and
- Ensure that workers wear appropriate protective headwear at all times in areas where head hazards exist.

Workers shall:

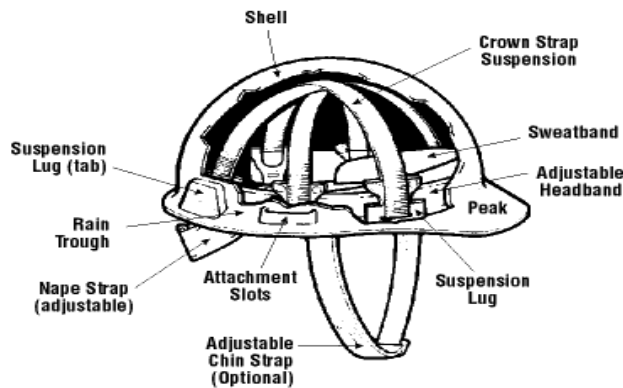
- Wear appropriate head protection at all times in head hazard areas; and
- Maintain protective headwear in good condition.

PROTECTIVE HEADWEAR:

Head injuries may be prevented by using the appropriate protective headwear for the job. The protective headwear is designed to absorb some of the energy of blow through destruction of its component parts and, even though damage may not be apparent. Appropriate headwear must protect against the specific hazard presented, provide a comfortable and secure fit, and comply with CSA Z94.1-92 (R 2003) "*Industrial Protection Headwear*" and CSA Z94.1-15, "*Industrial Protective Headwear – Performance, Selection, Care, and Use.*"

I. Inspection of Protective Headwear:

Headwear usually consists of two components, the shell and the suspension, which work together as a system to protect the user. Both components require periodic inspection and must be replaced as required (See the below Picture of Headwear).



Component I: Shell:

The shell should be inspected before each use for physical damage such as dents, nicks or gouges from impact, abrasion, or wear that might reduce the degree of protection originally provided. Headwear should be replaced immediately at the first sign of any of these conditions.

Headwear is also susceptible to damage from ultraviolet light, temperature extremes, and exposure to chemicals including solvents, sunscreens and insect repellents. Degradation of thermoplastic materials may be apparent when the shell becomes stiff, brittle, faded, dull in color, or exhibits a chalky appearance or has hairline cracks.

The following is a simple field test that can be performed by an employee or supervisor to determine possible degradation of shells:

- Compress the shell inward from the sides about 1" (2.5 cm) with both hands and then release the pressure without dropping the shell. The shell should quickly return to its original shape, exhibiting elasticity.
- Compare the elasticity of the sample with that of a new shell. If the sample does not exhibit elasticity similar to that of a new shell, or if it cracks due to brittleness, it should be replaced immediately.

Component II: Suspension:

The suspension should also be inspected before every use as it will deteriorate over time. Exposure to dirt, perspiration, natural hair oils and even chemical hair treatments can speed up the process.

Suspension straps can become stretched, twisted, cut, torn or frayed and the plastic adjustment slots and attachment clips may become cracked or torn. Any headwear that shows these signs of worn or damaged parts should be removed from service and replaced immediately.

Headwear (including Type 2 headwear) that uses a liner made of foam or other materials should be checked regularly for cracks or other signs of damage. If a liner shows any signs of damage, the entire helmet should be replaced because usually the shell will be damaged as well.

II. Replacement Guidelines for Protective Headwear:

Personal protective equipment such as headwear does not have an indefinite service life. It must be inspected regularly, maintained appropriately and replaced as required. Generally, the manufacturer's instructions for maintaining and replacing headwear should be followed.

Some headwear has manufacturer date codes molded on the underside brim of the hat, so the age of the hat can easily be determined. If no expiry date is provided by the manufacturer, the headwear should be replaced **at least every five years** regardless of its outward appearance.

All headwear is susceptible to damage from ultraviolet light, temperature extremes, and chemical degradation. If there is high potential exposure to these conditions in the workplace, headwear should be replaced routinely **after two years** of use.

Any headwear that either shows significant damage upon inspection or that has been subject to a forceful impact but exhibits no signs of damage, **should be replaced immediately**.

III. Selection of Protective Headwear

There are several Types and Classes of protective headwear. The right type of protective headwear should be selected based on the hazards present in the work place. **Appendix A** provides a guide for selecting the appropriate class of protective headwear. The Type and Class of protective headwear can be found either on a CSA label on the headwear or stamped by the manufacturer.

The protective capabilities of the headwear are summarized as follows:

1. General Impact and Penetration Hazards

The two types of protective headwear differ in the degree of protection they provide against impact and penetration hazards. It is important that an assessment of potential exposure to impact and penetration hazards be conducted prior to selecting the appropriate type of headwear to use.

Type 1 – Crown only protection

Type 1 protective headwear provides impact and penetration protection for the crown only.

Type 2 – Crown and lateral protection

Type 2 protective headwear provides impact and penetration protection for the crown and laterally.

2. Electrical Hazards

The three classes of headwear differ in the level of protection they provide against electrical shock and burn. It is important that an assessment of potential exposure to electrical hazards be conducted prior to selecting the appropriate class of headwear to use.

Class G - Limited voltage protection

Class G headwear is made of non-conducting material that provides protection against a maximum voltage of $2200 \pm 3\%$ for 1 minute. Class G headwear offers some protection against electrical shock.

Class E - High voltage protection

Class E headwear is made of high-grade non-conducting material that provides protection against an applied voltage increasing at a uniform rate of 1000 ± 50 V/s up to a maximum of $20,000 \pm 100$ V for 3 minutes (at maximum voltage). Although Class E headwear offers greater protection against high voltage electrical shock, it is not intended to be used as a primary barrier against live electrical apparatus.

Class C - No voltage protection

Class C headwear offers no protection against electrical shock and is to be used where there is no possibility of exposure to electric shock or burn.

IV. Guidance on the Use of Protective Headwear

1. Inspect the headwear and replace if there are signs of damage.
2. Clean and use headwear per manufacturer's instruction.
3. Retention system supplied or fitted to the headwear should be fastened and under tension at all times to ensure the security of the headwear.
4. Chin straps, used with Class E headwear, should not be drawn over the brim or peak because the strap, in case of contact with a live electrical conductor, may allow the current to flow from the conductor to user.
5. Do not alter the headwear or add accessories to the headwear.
6. Winter liners intended for use in Class G and Class E headwear should be flame-retardant.
7. Keep headwear clean and dry to maximize protection against electric shock. Headwear that is wet or contaminated with oil, grease, or other conducting chemicals, or that is fitted with inappropriate accessories, may suffer a dramatic reduction in its protective capabilities against electric shock.

Appendix A

GUIDE TO SELECTION OF PROTECTIVE HEADWEAR

The two types of protective headwear differ in the degree of protection they provide against impact and penetration hazards. To determine the appropriate type of headwear to use, an assessment of potential exposure to crown and lateral impact hazards must be conducted.

DEGREE OF IMPACT/PENETRATION HAZARD	TYPE OF PROTECTIVE HEADWEAR	
	Type 1	Type 2
Only crown impact/penetration hazards exist	Yes	Yes
Both crown and lateral impact/penetration hazards exist	Not suitable	Yes

The three classes of protective headwear differ in the degree of protection they offer against electrical hazards. To determine the appropriate class of headwear to use, an assessment of potential exposure to electrical hazards must be conducted.

DEGREE OF ELECTRICAL HAZARD	CLASS OF PROTECTIVE HEADWEAR		
	Class G General Usage	Class E Electrical Trades	Class C Conducting Headwear
No Electrical Hazards	Yes	Yes	Yes
Limited Electrical Hazards (up to 2200 V)	Yes	Yes	Not suitable
High Voltage Electrical Hazards (up to 20,000 V)	Not suitable	Yes	Not suitable

NOTE: If a hazard assessment has not been completed, Type 2, Class E headwear must be selected since it provides the highest level of electrical, crown, and lateral protection.