

Personal Protection

Control measures for personal protection include anything worn or used by an individual worker to provide protection to themselves. Personal protection is considered to be the last line of defense and should be only used when other control measures are not possible or have not provided sufficient protection.

Personal protection is considered to be the least effective method of control because:¹

- It does not get rid of the hazard
- Workers often find it difficult and uncomfortable to wear or use
- It has to fit or be used properly to be effective
- It has to be the right type for the hazard
- Workers need training on how to use it appropriately

Hierarchy of Risk Controls for Sun Safety:

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| 1. Elimination or substitution |
| 2. Engineering controls |
| 3. Controls that increase awareness |
| 4. Administrative controls |
| 5. Personal protection |

Implementing Personal Protection for Sun Safety at Your Workplace

Personal protection measures need to be considered as the 'last line of defense' of a broader approach to protection that includes engineering controls (for example, shade), administrative controls (for example, rescheduling of work to cooler/non-peak solar UV periods), and worker training on issues such as first aid for sunburn and heat stress. When personal protection is necessary, it should be used as part of a comprehensive personal protection program that includes the following elements:²

- **Hazard evaluation:** the protective measure needs to match the risk. To do this, know the: (1) characteristics of the hazards, (2) length of time that the device is expected to perform at the particular level of protection, and (3) the level of physical activity that will be undertaken while wearing the personal protection.
- **Selection:** personal protection needs to be appropriate for the hazard, the level of protection required, and the work activities being undertaken. For many personal protection devices there are standards/guidelines for selection (for example, CSA Z94.3.1-09 and CSA Z94.1-15).
- **Fitting:** any protective device needs to be fitted properly so that it is able to provide the level of protection for which it was designed. A comfortable fit will improve use and acceptance by the worker.
- **Training and education:** worker training is necessary to ensure proper use and care of the equipment. The use of personal protection may change how work is performed. Training is needed to help workers understand the need for the use of the devices and the benefits they will receive from correct use.
- **Maintenance and repair:** equipment maintenance, repair, and replacement should be part of ongoing costs of operating a personal protection program.



Visit sunsafetyatwork.ca for more information.

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Personal protection for sun exposure should provide a high **ultraviolet protection factor (UPF)*** and provide coverage to as much of the workers body as possible. However, personal protection should also allow workers to stay as cool as possible during hot weather.

Clothing

Clothing is the most effective form of personal protection from sun exposure. Clothing maintains a comfortable temperature close to the body while providing protection from injury and exposure to the sun, dirt, chemicals, rain, and other elements.³

For sun safety, clothing should provide as much coverage as possible to provide a barrier to solar UV exposure, while ensuring that workers are able to stay cool in hot weather.

To prevent heat stress, light-colored and loose fitting clothing of natural fabrics are recommended. They allow for more air movement and sweat evaporation.⁴ Long sleeved shirts and long pants are also recommended⁴ and are considered to be the standard work uniform when heat stress assessments are being made.⁵

However, many outdoor workers are resistant to wearing long clothing, and particularly long sleeved shirts.⁶ Some of this resistance may be because the upper part of our body, and particularly the back, tends to sweat more than the lower part of our body.⁷ Long pants have been shown to not increase body temperature when worn by outdoor workers in a hot and humid environment.⁸

Choosing Sun Protective Clothing

For protection against solar UV radiation, the best sun protective clothing are long sleeved shirts with collars and long pants. Most fabrics will provide good protection from solar UV, with the following factors shown to improve the UPF:⁹

- **Weave:** the tighter the weave the better UV protection. This is the most important consideration for clothing design
- **Thickness:** thicker fabrics transmit less UV radiation, but can be hotter to wear
- **Stretching:** the greater the stretch in the fabric, the more UV is able to penetrate
- **Colour:** generally darker colours with higher dye concentrations absorb more UV, but can also be hotter to wear
- **Water:** most fabrics transmit more UV when they are wet
- **Washing:** for many fabrics, particularly cotton and polycotton, protection is increased after the first washing and remains high over the life of the garment
- **Additives:** some fabrics have additional UV absorbing compounds added to them to improve their UV protection

In addition to these fabric considerations for general work wear, purpose-designed UV protective clothing is also available. This provides a very high UPF and will often be made of a breathable fabric and have ventilation features to improve wear-ability. This clothing will be marked as UV protective and will have the UPF (usually 50+) indicated on the label.

Hats

Wearing a hat can provide good protection to the scalp, face, ears, eyes and neck. However, the level of protection is generally less than what would be expected (it is often equivalent to an UPF of 2 to 4).¹⁰ This is because hats provide shading, whereas solar UV exposure to the face is due to a range of factors including the orientation of the sun, the amount of scattered and reflected solar UV radiation, and the tasks being undertaken by the wearer.

Choosing Sun Protective Hats

Hats should be made of a fabric with a high UPF (greater than 50). Features of hat design that influence the level of protection include:¹⁰

- Broad brimmed hats and legionnaire style hats provide the most protection.
- Broad brimmed hats, with wide brims of 7.5cm or more provide good protection to nose, cheek, neck, ears and chin.
- Baseball style caps provide good protection to the nose, but little protection to the cheek and chin, and no protection to the ears or neck.
- Legionnaire style hats provide good protection to the nose, ears and neck, but less protection to the cheeks and chin.

Hard Hats

Hard hats should be selected, used, and maintained in accordance with CSA Z94.1-15.¹¹ However, they usually provide a similar level of solar UV protection as do baseball caps. To improve the level of solar UV protection provided, the following attachments are recommended:

- Broad brim, usually of a lightweight material with a UPF of 30+
- Neck flap to protect neck, ears and side of face

Cooling Wear

Cooling wear are cooling systems that are designed to provide additional protection for workers in a hot environment. This includes vests, neck shades, towels, headwear, and bandanas. The cooling wear either works on the principle of evaporative cooling - if they are wetted prior to use, or it works through built-in replaceable ice/cooling packs.¹²

Some of these are designed to be used with hard hats. These personal cooling systems have been shown to be quite effective in reducing heat stress.¹³⁻¹⁵ However, the extra weight of the devices and the potential for interference with work tasks needs to be considered.¹²

Sunglasses and Protective Eyewear

Our eyes are very sensitive to UV radiation – all outdoor workers should wear eye protection year-round. For workers who do not require ‘protective eyewear’ as described in CSA Z94.3-07,¹⁶ good quality sunglasses will provide excellent UV protection, particularly if they are close-fitting and wrap-around in design.¹⁷

The three rules of protective eyewear are: be sure it fits, maintain it properly and wear it!

It is difficult to determine how much UV protection sunglasses will provide based on their price, color, or the darkness of the lenses. Look for labels that describes the type and amount of protection provided. In Canada, manufacturers follow voluntary industry standards when labelling sunglasses. This groups sunglasses into the following categories:¹⁸

- **Cosmetic sunglasses** have lightly tinted lenses and block less UV and visible light, compared to other sunglasses. They are not recommended for driving or for outdoor workers.
- **General purpose sunglasses** block between 60 and 92% of visible light and UVA, and between 95 and 99% of UVB radiation. These are recommended for outdoor workers, particularly when the sun is strong enough to make you squint.
- **Special purpose sunglasses** block very high levels of visible, UVA, and UVB radiation and are suitable for prolonged sun exposure. These are recommended for outdoor workers, but not when driving.

Choosing Protective Eyewear

Protective eyewear for use in a workplace is described in CSA Z94.3-07.¹⁶ Depending on the work tasks being undertaken, different protective eyewear is appropriate. This includes various classes of spectacles, goggles, welding helmets, non-rigid helmets, and face shields. Protective eyewear that is compliant with the CSA standard will have a certification mark on the frame and on the packaging, have a manufacturers mark on the lens, and will have permanently attached side shields.

For bright sun exposure, class 1A spectacles are recommended – these are light weight spectacles with side shields. If work tasks involve the potential for exposure to flying objects or particles, sparks, chemicals, and so on, other classes of spectacles or goggles are more appropriate.

Lens for protective eyewear can be made of a number of materials (in order of impact resistance) including polycarbonate, trivex, plastic (CR39), or glass. Polycarbonate lenses have the added benefits of being lightweight and having in-built UV absorbing properties. Tinted, photochromic or polarized lens are recommended for outdoor use to assist with glare reduction.¹⁹

Proper Care and Maintenance of Eyewear

Proper care and maintenance of eyewear ensures that it provides as much protection as possible.¹⁹

- Use water or a lens cleaning fluid to ‘wet’ clean the lenses
- Replace pitted or scratched lenses, as they may impair vision or have reduced impact resistance
- Protect eyewear when it is not in use by keeping them in cases or containers

Sunscreen

Sunscreen should be broad spectrum, water resistant, and have a minimum **SPF** of 30 to provide effective protection from sun exposure if used correctly. However, sunscreen is the least preferred of the personal protection measures for use in the occupational environment because:

- Sunscreen can be difficult to apply and reapply in a way that provides sufficient protection
- Workers often don't like using sunscreen and therefore its effectiveness is compromised
- Some work tasks are incompatible with the use of sunscreen

Sun Protection Factor (SPF) is a rating assigned to sunscreen to indicate the level of protection provided from UV radiation. It specifically describes the effectiveness of a sunscreen in preventing sunburn. It is the ratio of UV dose a person would receive without sunscreen to the dose received wearing sunscreen. For example, an SPF 30 sunscreen would result in a UV dose 30 times less than if sunscreen had not been used.

Tips for Workers Using Sunscreen

- Apply sunscreen generously and use more than you think you need to – most people find it hard to apply sunscreen evenly and thickly enough to all exposed skin areas, so the actual level of protection is often less than expected.²⁰
- Reapply regularly – this helps to provide continued protection, which can be decreased due to work activities or from an inadequate initial application.
- Always check the expiry date on the bottle – sunscreen stored in hot locations (for example, inside vehicles) can deteriorate more quickly.²¹
- As sunscreens come in a variety of forms, such as creams, lotions, gels, sprays, and sticks. You may have to try a few to see which one you like using.²¹
- Sunscreen and insect repellent can be used safely at the same time. Apply sunscreen first, and then insect repellent. Combination products are generally less effective than applying separate products.²²

Sunscreens recognized by the Canadian Dermatology Association are listed on their website: dermatology.ca

***Note:** Ultraviolet Protection Factor (UPF) is a rating used to describe how much protection fabrics and materials provide from UV radiation. It provides an indication of the ability of the material to block UV radiation passing through it. A fabric or material with a UPF 40 allows only 1/40th (2.5%) of UV radiation to pass through, therefore blocking 97.5% of UV radiation from passing through. For fabrics and materials to be sun protective, they should have a minimum UPF of 15 (this allows 6.7% of UV to pass through). A UPF of 40 or more provides excellent UV protection.

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