



Guidance for Choosing Protective Eyewear

According to the National Institute of Occupational Safety and Health (NIOSH), each day about 2000 U.S. workers have a job-related eye injury that requires medical treatment. About one third of the injuries are treated in hospital emergency departments and more than 100 of these injuries result in one or more days of lost work. Some common eye hazards are:

- Dust, concrete, and metal particles
- Falling or shifting debris, building materials, and glass
- Smoke and noxious or poisonous gases
- Chemicals (acids, bases, fuels, solvents, lime, and wet or dry cement powder)
- Cutting or welding light and electrical arcing
- Thermal hazards and fires
- Bloodborne pathogens (hepatitis or HIV) from blood, body fluids, and human remains

Some common eye injuries include:

- Corneal abrasions and conjunctivitis (red eyes)
- Concrete or metal particles or slivers embedded in the eye
- Chemical splashes or burns
- Welder's flash
- Eyeball laceration
- Facial contusions and black eyes

Safety Eye Wear

Safety eye wear is defined as any face or eye covering designed to protect the wearer's eyes from contact with flying objects, hazardous liquids, gases or other materials that may be hazardous to the eye. This eye wear is designed to resist impact and shattering when struck by flying objects or hazardous materials. Safety eye wear may include glasses, goggles, and faceshields with or without a prescription lens component.

Some examples of professions where safety eye wear should be routinely considered include carpenters, electricians, machinists, mechanics, plumbers, sheetmetal workers, sanders, grinding machine operators, welders, chemical handlers, and laser device/machine operators.

When evaluating the type of eye protection, the supervisor and employee should consider the following:

- The ability of the safety eye wear to protect against specific workplace hazards.
- The safety eye wear should fit properly and be comfortable to wear.
- The safety eye wear must provide unrestricted vision and movement.
- The safety eye wear should be durable and cleanable.
- The safety eye wear should not interfere with or restrict the function of any other PPE the employee wears.





Objective

Protective equipment for eyes and face should be provided, used, and maintained in a sanitary and reliable condition. Appropriate safety eye wear must be provided when a risk assessment indicates it is necessary based on the job hazards.

Risk Assessment and Guidance

The employer, supervisor, or manager should:

1. Evaluate all jobs and tasks to be performed by employees and identify potential eye injury hazards.
2. Determine appropriate feasible controls, including engineering controls, work practices and safety eye wear.
3. **Provide safety eye wear to all employees whose job pose identified eye injury hazards where engineering and work practice controls are infeasible or insufficient to provide adequate protection.** Examples where safety eye wear is needed include potential exposure to eye and face hazards from flying particles, molten metal, liquid chemicals, acids, caustic gases, vapors, or injurious light radiation such as lasers.
4. Ensure appropriate safety eye wear is provided to employees who wear prescription lenses

General Requirements

1. The affected employee must use eye protection that provides side protection when there is a hazard from flying objects.
2. The employee who wears prescription lenses while engaged in operations that involve eye hazards must wear eye protection that incorporates the prescription in its design, or wears eye protection that can be worn over the prescription lenses.
3. Eye and face personal protective equipment must be distinctly marked to facilitate identification of the manufacturer and meets the American National Standards Institute (ANSI) code Z87.1.
4. The employee must use equipment with filter lenses that have a shade number appropriate for the work being performed from protection from injurious light (e.g., sunlight, lasers, welding).
5. Employees who work in a laboratory with potential eye hazards should always wear protective eye wear.



Eye and Face Protection Selection Chart

| | Safety Glasses | Safety Goggles | Face Shield* | Laser Eye Wear | Welding Eye Wear |
|--|----------------------|----------------|----------------------|--|--|
| IMPACT: Flying fragments, objects, large chips, particles, sand, dirt, etc. | X | X | X* (Severe exposure) | | |
| CHEMICAL: Splash, Spray | | X | X* (Severe exposure) | | |
| DUST: Nuisance dust from woodworking, buffing, general dusty conditions | X (with foam gasket) | X | | | |
| OPTICAL RADIATION: Welding, torch cutting, brazing | X | | | | Helmet/shield shade based on amperage, material, and welding process |
| OPTICAL RADIATION: Laser | | | | Based on wavelength and optical density (OD) | |

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*Secondary protection only, must be worn over glasses or goggles

Protective Eye Wear Prescriptions & Examinations

Everyday use of prescription corrective lenses will not provide adequate protection against most occupational eye and face hazards, so employers must make sure that employees with corrective lenses either wear eye protection that incorporates the prescription into the design or wear additional eye protection over their prescription lenses. It is important to ensure that the protective eye wear does not disturb the proper positioning of the prescription lenses so that the employee's vision will not be inhibited or limited.

The employer will provide prescription lenses and frames as outlined by the State of Wisconsin contract, but the employee must provide a current eye wear prescription. Employees must use their personal eye care provider for examinations and prescriptions. The employee is responsible for the cost of eye examinations.

In order to obtain prescription safety glasses through UW-Madison Occupational Medicine, the employee must bring a current prescription and a supervisor signed Prescription Safety Eyewear Application to the appointment.

Types of Safety Eye Wear

Some of the most common types of eye and face protection include the following:

Safety Glasses: These protective eyeglasses have safety frames constructed of metal or plastic and impact-resistant lenses. Side shields are available on some models.

Safety Goggles: These are tight-fitting eye protection that completely cover the eyes, eye sockets and the facial area immediately surrounding the eyes and provide protection from impact, dust and



splashes. Some goggles will fit over corrective lenses. Depending on the hazard, employees might require direct vented, indirect vented or non-ventilated goggles.

- **Direct Vented:** Prevents large particles from passing into the goggle, allows airflow, and prevents fogging
- **Indirect Vented:** Protects against liquid and chemical splash entry, allows airflow, and prevents fogging
- **Non-Ventilated:** Prevents splash entry and does not allow passage of air into the goggle (may fog and require frequent lens cleaning)

Welding shields: Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, welding shields protect eyes from burns caused by infrared or intense radiant light; they also protect both the eyes and face from flying sparks, metal spatter and slag chips produced during welding, brazing, soldering and 12 cutting operations. OSHA requires filter lenses to have a shade number appropriate to protect against the specific hazards of the work being performed to protect against harmful light radiation.

Laser safety goggles: These specialty goggles protect against intense concentrations of light produced by lasers. The type of laser safety goggles depends on the equipment and operating conditions in the workplace.

Face shields: These transparent sheets of plastic extend from the eyebrows to below the chin and across the entire width of the employee's head. Face shields protect against nuisance dusts and potential splashes or sprays of hazardous liquids but will not provide adequate protection against impact hazards. Face shields used in combination with goggles or safety glasses will provide additional protection against impact hazards. When worn alone, however, face shields do not protect you from impact hazards. They must be worn with ANSI-approved safety glasses or goggles to comply with OSHA standards.

Each type of protective eyewear is designed to protect against specific hazards. Employers can identify the specific workplace hazards that threaten employees' eyes and faces by completing a hazard assessment as outlined in the earlier section.

Sources for More Information

- OSHA Regulation 29 CFR 1910.132, General Requirements.
- OSHA Regulation 29 CFR 1910.133, Eye and Face Protection.
- American National Standard Institute (ANSI) Z87.1 Eye and Face Protection Devices