UNIVERSITY OF NEBRASKA MEDICAL CENTER℠
ENVIRONMENTAL HEALTH AND SAFETY

SAFETY GUIDELINE
Eye and Face Protection

Policy

The University of Nebraska Medical Center (UNMC) aims to reduce the risk of eye injuries for personnel. To achieve this, appropriate eye protection must be worn whenever there is a potential risk of injury or exposure to the eyes.

Eye and face protection, including safety glasses, goggles, face shields, and similar devices, must meet the requirements specified in the most recent American National Standard for Occupational and Educational Personal Eye and Face Protection Devices (ANSI Z87.1).

Principal Investigators (PIs), department managers and supervisors are responsible for ensuring appropriate eye and face protection is available and that employees, students, and volunteers wear it when necessary.

Hazards to Consider

Blood and Other Body Fluids: Eye and face protection shall be worn whenever splashes, spray, spatter, or droplets of blood or other body fluids may be generated, and eye, nose, or mouth contamination can be reasonably anticipated. Activities that can create splashes and sprays include pipetting, mixing, centrifugation, blending, vortexing, loading syringes, pouring liquids, opening containers, streaking plates, and cleaning with disinfectants.

Chemicals, Toxic Materials, & Carcinogens: Eye and face protection must be worn in all areas when working with or around dangerous chemicals, including machinery or laboratory equipment that uses these chemicals.

Mechanical Hazards: Eye and face protection must be worn by all personnel operating machinery that presents hazards from flying particles, such as drills, power saws, lathes, etc.

Impact: Eye and face protection must be worn by all personnel working with equipment or processes that present impact hazards from flying objects, fragments, chips, particles, sand, dirt, etc.

Dust: Eye and face protection must be worn by all personnel who are performing dust-generating processes (e.g., woodworking, sanding, lawn care, etc.) or who are working in dusty environments.

Heat: Eye and face protection must be worn by all personnel working with equipment or processes that generate exposure to high temperatures, hot sparks, or splashes from molten metals.

Welding: Eye and face protection must be worn by all personnel involved with welding or working near a welding operation. Welding presents hazards from sparks, intense rays, and molten metal.

Light and/or Radiation: All personnel working with equipment or processes that present light and/or radiation hazards must wear eye and face protection. This includes ultraviolet (UV), laser, infrared, and visible radiation.

Types of Eye and Face Protection

Safety Glasses**:** These are glasses with impact-resistant lenses and frames made of metal or plastic. All safety glasses must have side shields that provide side impact protection. Safety glasses protect the eye from moderate impact and particles (e.g., minor chemical splashes, scaling, grinding, sawing, etc.). However, they do not provide adequate protection for heavy chemical use processes (e.g., pouring, mixing, stirring, etc.).

Safety Goggles: These are tight-fitting eye protection that completely covers the eye, eye sockets, and the facial area surrounding the eyes and provides protection from impact, dust, and chemical splashes. Goggles should be used to protect against chemical splashes, corrosive material, and bulk chemicals.

Face Shields: Headgear equipped with transparent sheets of plastic covering the entire face. Face shields protect against nuisance dust and potential splashes or sprays of hazardous liquids but will not adequately protect against impact hazards. Face shields must not be used alone and are not a substitute for appropriate protective eyewear. In addition to the face shield, safety glasses or goggles must be worn when impact protection is required.

Laser Protective Eyewear: Safety glasses and goggles that provide protection from laser radiation. Please review the UNMC Laser Eye Protection Safety Guideline for additional information.

Ultraviolet (UV) Radiation Eye & Face Protection: Face shields, safety glasses, and goggles that protect from UV radiation. When working with UV emitting equipment, wear the appropriate eye and face protection. Always wear a full-face shield. Use a polycarbonate face shield stamped

with the ANSI Z87.1-1989 UV certification to protect the eyes and face. For additional information, please review the Ultraviolet (UV) Radiation Hazards Safety Guideline.

Welding Face Shields: Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens. Welding shields protect eyes from burns caused by infrared, ultraviolet, or intense radiant light. They also protect the eyes and face from flying sparks, metal spatter, and other hazards produced during welding, brazing, soldering, and cutting operations.

Selection of Eye and Face Protection

The selection of eye and face protection should be determined according to the following:

- The identified hazards
- Performance of the protective equipment versus applicable ANSI standards
- Availability
- Employee preference among available choices

The following chart is a selection guide of eye and face personal protective equipment (PPE) based on common workplace hazards and activities.

Activity	Eye & Face Hazards	Eye & Face PPE

Chemical and hazardous material processes, degreasing plating	Chemical splash, spill, acid burns, fumes, breakage of glass	Chemical goggles or safety glasses with side shields. Use a face shield in addition to chemical goggles for severe exposure[1 & 2]
Blood, body fluid, infectious biological material processes	Splashes and sprays from pipetting, mixing, centrifugation, blending, vortexing, loading syringes, pouring liquids, opening containers, streaking plates, cleaning with disinfectants	Safety glasses with side shields. Use a face shield in addition to safety glasses for severe exposure[1 & 2]
`Laser processes	Direct or reflective laser beam	See UNMC Laser Eye Protection Safety Guideline
UV radiation processes	UV light from germicidal lamps, nucleic acid transillumination boxes, nucleic acid crosslinkers, curing lamps, and UV lasers	See Ultraviolet (UV) Radiation Hazards Safety Guideline
Hot work processes, furnace operations, pouring, casting, hot dipping, and welding	Sparks, optical radiation, and flash burns	Safety glasses with appropriate lenses or welding face shields. Use a welding face shield in addition to safety glasses for severe exposure[1 & 3]
Impact-generating processes, grinding, chipping, masonry work, woodworking, drilling, chiseling, powered fastening, riveting, sawing and sanding	Flying particles and dust	Impact goggles or safety glasses with side shields. Use a face shield in addition to impact goggles for severe exposure[1 & 2]
Dust-generating processes, woodworking, buffing, and general dusty conditions	Nuisance dust	Safety glasses with side shields or goggles[2]
Machining processes	Flying particles, mists, and vapors	Safety glasses with side shields or goggles[2]
Pesticide and fertilizer application processes	Chemical splash, spill, airborne chemicals, and vapors	Chemical goggles or safety glasses. Use a face shield in addition to safety glasses or goggles for severe exposure[1]

1: Besides safety glasses or goggles, face shields and welding face shields must be worn.
2: Safety glasses that provide side protection must be worn if objects are likely to fly into the worker's eyes and face or when working with biological, chemical, radioactive, or other hazardous materials.
3: Welding goggles, shields, or helmets should be equipped with a shade that provides the appropriate level of protection, as referenced in the OSHA Filter Lenses for Protection Against Radiant Energy Table.

In addition to the requirements outlined in ANSI Z87.1, protective equipment has several optional features. Each feature allows for more adaptable and usable protection for multiple scenarios. The additional markings and features are outlined below.

Symbol	Meaning	Symbol	Meaning
$Z87$	Basic protection	H	Smaller head sizes
$Z87_+$	Impact-rated protection	V	Variable tint
O_2	Relaxed optics	S	Special purpose lenses
W shade number	Level of welding protection	X	Anti-fog
U scale number	Level of UV protection	D_3	Splash and droplet protection
R scale number	Level of infrared protection	D_4	Dust protection
L scale Number	Visible light filter	D_5	Fine dust protection
$Z87_{-2}$	Prescription protection		

Please review the Laboratory PPE Selection Guide for additional information.

Comfort and Fit

Protective eyewear and face shields should fit well. Safety glasses and goggles should fit with the bridge properly supported on your nose, the center of the lens in front of your eye, and the frame as close to your face as possible.

Safety glasses, goggles, and face shields must not interfere with the seal of a tight-fitting respirator.

Maintenance and Storage

Employees must follow the manufacturer's guidelines for maintaining and storing eye and face PPE. The following are additional guidelines that must be followed:

- Eye and face PPE should be inspected for damage (e.g., cracks, pitting, severe scratches, distortion, etc.) before each use. If deficiencies are noted, they should be documented and reported to the supervisor, and the equipment should be cleaned, repaired, or replaced before use.
- Eye and face PPE that has been subject to impact should not be used and must be replaced.
- When more than one employee uses the same eye and face PPE, it must be cleaned and disinfected according to the manufacturer's instructions before being used by another employee.
- Eye and face PPE must be cleaned and disinfected if contaminated by hazardous materials.

- Clean eye and face PPE must be stored in a closed container protected from dust, moisture, or damage.

Training and Issuance

Principal Investigators (PIs), department managers and supervisors are responsible for determining and providing the appropriate eye and face PPE and training on PPE needed for processes conducted. Employees are responsible for inspecting their eye and face PPE before and after use, reporting any defects or damage to their supervisor, wearing PPE as instructed, and maintaining and storing PPE appropriately.

PPE training should be documented, and a copy of the training record should be available upon request. Please review the Personal Protective Equipment (PPE) Training & Issuance Record for additional information.

Prescription Eyewear and Contact Lenses

Normal prescription eyewear does not provide adequate protection from injury to the eyes and does not meet ANSI standards.

UNMC EHS does not recommend employees wear contact lenses in laboratories without eye protection. Wearing of contact lenses in laboratories increases risk by:

- They can cause visual issues if suddenly displaced
- Contact lenses are difficult to remove if/when chemicals get into the eyes
- They tend to prevent the removal of contaminants by natural eye fluids.
- Contact lenses may discolor when they come into contact with many laboratory chemicals
- They can absorb chemicals and chemical vapors and can unknowingly cause extensive damage to the eyes

Please contact the Optical Shop at Truhlsen Eye Institute for information on prescription safety glasses and eyewear.

Additional Resources

OSHA 29 CFR 1910.133
OSHA 29 CFR 1910 Subpart I Appendix B