

**CAUTION**



Face shield must be worn when operating this equipment.



IMPACT



HEAT



DUST



OPTICAL RADIATION



CHEMICAL

**DANGER**

FACE SHIELD MUST BE WORN  
WHILE OPERATING  
THIS MACHINE

# Eye and Face Protection

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# Related Videos

- <https://www.youtube.com/watch?v=jNJPTE2yyZ4> Eye and Face Protection: Personal Protective Equipment (7:35 min)
- <https://www.youtube.com/watch?v=ClvgdalqiBU> Eye Protection (6:40 min)

# Why Would We Need Eye and Face Protection?

- According to OSHA thousands of people are blinded each year from work-related eye injuries that could have been prevented with the proper selection and use of eye and face protection.
- Eye injuries alone cost more than \$300 million per year in lost production time, medical expenses, and worker compensation.
- Eye and face protection must be provided whenever necessary to protect against chemical, environmental, radiological or mechanical irritants and hazards.

# How Can We Prevent an Eye Injury?

- Know the eye safety dangers at work-complete an eye hazard assessment.
- Eliminate hazards before starting work. Use machine guarding, work screens, or other engineering controls.
- Use proper eye protection

# Types of Eye Hazards



Flying objects



Harmful light radiation – ultraviolet,  
infrared or lasers



Chemicals



Particles and dust

# Types of Eye Protection



Safety glasses with side shields



Googles



Eyecup



Face shields



Filter lenses

# Common Causes of Eye Injuries

## Impact Injuries

- The majority of impact injuries result from flying or falling objects, or sparks striking the eye.
- Most of these objects are smaller than a pin head and can cause serious injury such as punctures, abrasions, and contusions.
- Safety spectacles are intended to shield the wearer's eyes from impact hazards.



Safety glasses  
with side shields



Goggles



Face shields

# Common Causes of Eye Injuries

## Chemicals

- A large percentage of eye injuries are caused by direct contact with chemicals.
- These injuries often result from an inappropriate choice of PPE that allows a chemical substance to enter from around or under protective eye equipment.
- Serious and irreversible damage can occur when chemical substances contact the eyes in the form of splash, mists, vapors, or fumes.
- Safety goggles protect the eyes, eye sockets, and the facial area immediately surrounding the eyes from a variety of chemical hazards.
- All face shields are considered secondary protection and must be used in addition to safety goggles to provide adequate protection.



Goggles



Face shields

# Common Causes of Eye Injuries

## Heat Injuries

Heat injuries may occur to the eye and face when workers are exposed to high temperatures, splashes of molten metal, or hot sparks. Protect your eyes from heat when workplace operations involve pouring, casting, hot dipping, furnace operations, and other similar activities. Burns to eye and face tissue are the main concern when working with heat hazards.

- Safety spectacles with side shields are used as primary protection to shield the eyes from heat hazards.
- Safety goggles are used as primary protection to shield the eyes from heat hazards. Goggles form a protective seal around the eyes, preventing objects or liquids from entering under or around the goggles.
- Face shields are considered secondary protectors to be used in addition to primary protection such as safety spectacles or goggles.



**Safety glasses  
with side shields**



**Goggles**



**Face shields**

# Common Causes of Eye Injuries

## Dust

- Dust is present in the workplace during operations such as woodworking and buffing.
- Working in a dusty environment can cause eye injuries and presents additional hazards to contact lens wearers.
- Goggles form a protective seal around the eyes, preventing nuisance dust from entering under or around the goggles. Ventilation should be adequate, but well protected from dust entry.



Goggles

# Common Causes of Eye Injuries

## Optical Radiation-Laser Work

- Laser work and similar operations create intense concentrations of heat, ultraviolet, infrared, and reflected light radiation.
- A laser beam, of sufficient power, can produce intensities greater than those experienced when looking directly at the sun. Unprotected laser exposure may result in eye injuries including retinal burns, cataracts, and permanent blindness.
- The selection of laser protection should depend upon the lasers in use and the operating conditions. Workers with exposure to laser beams must be furnished suitable laser protection.
- Wearing protection with the correct filter shade number is required to protect workers' eyes from optical radiation. Protect for the specific wavelength of the laser. Be of optical density adequate for the energy involved



Filter lenses

# Common Causes of Eye Injuries

## Optical Radiation-Welding

- Welding helmets are secondary protectors intended to shield the eyes and face from optical radiation, heat, and impact.
- Use welding helmets *in addition* to primary protection such as safety spectacles or goggles to provide adequate protection



Welding helmets

# Common Causes of Eye Injuries

## Optical Radiation: Glare

Control Glare with:

- Special-Purpose Spectacles that include filter or special-purpose lenses to provide protection against eye strain.
- Changes in your work area or lighting
- Tinted eyeglass lenses or visor-type shades (Yale School of Medicine, 2014).



# Eye and Face Protection

**1.** The type of eye protection required depends on the hazard.

For most situations, safety glasses with side shields are adequate. Where there is a danger of splashing chemicals, goggles are required. More hazardous operations include conducting reactions that have potential for explosion and using or mixing strong caustics or acids. In these situations, a face shield or a combination of face shield and safety goggles or glasses should be used.

**2.** Face shields should only be worn over primary eye protection (spectacles or goggles).

**3.** As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eye wear (OSHA, 2002).

**4.** It is recommended that contact lenses not be permitted in the laboratory. The reasons for this prohibition are:

**a.** If a corrosive liquid splash in the eye, the natural reflex to clamp the eyelids shut makes it very difficult, so to remove the contact lens before damage is done.

**b.** The plastic used in contact lenses is permeable to some of the vapors found in the laboratory. These vapors can be trapped behind the lenses and can cause extensive irritation.

# Eye and Face Protection

- c.** The lenses can prevent tears from removing the irritant. If chemical vapors contact the eyes while wearing contact lenses, these steps should be followed:
  - Immediately remove the lenses.
  - Continuously flush the eyes, for at least 15 to 30 minutes.
  - Seek medical attention.
- 5.** Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
- 6.** Welding helmets or face shields should be used only over primary eye protection (spectacles or goggles).
- 7.** Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.
- 8.** Protection from light radiation is directly related to filter lens density. Select the darkest shade that allows task performance (OSHA, 2002).
- 9.** Visitors shall follow the same eye protection policy as employees. If they do not provide their own eye protection, it is the laboratory's responsibility to provide adequate protection (OSU, 2014).

# Eye and Face Protection Selection Chart

<b>Hazard to Eyes and Face</b>	<b>Common Related Task</b>	<b>Possible Impact</b>	<b>Personal Protective Equipment</b>
<b>Flying particles, fragments composite chips, dust, sand and dirt</b>	Chipping, grinding, machining, masonry work, wood-working, sawing, drilling, chiseling, powered fastening, riveting and sanding.	Can cause punctures, abrasions and contusions.	Safety glasses with side shields Goggles Face shields
<b>Liquid chemicals, acids, caustics, corrosives, splash, fumes, vapors, and irritating mists.</b>	Acid and chemical handling, degreasing, plating, and working with blood.	May cause extremely serious and irreversible effect.	Goggles with indirect vents Face shields
<b>Heat(e.g. molten metal, hot sparks)</b>	Pouring, casting, hot dipping, furnace operations and welding.	Burns	Safety glass with side shields Goggles Face shields may use with safety glass and goggles
<b>Dust</b>	Woodworking and buffing.	Eye injuries and especially presents hazards to contact lens wearers.	Eyecup or goggles
<b>Ultraviolet light (Radiant energy, glare, and intense light)</b>	Welding, torch-cutting, brazing, soldering, and laser work.	Retinal burns, cataracts and permanent blindness.	Face shields

# First Aid for Eye Injury

## Chemical Splash

If an eye injury occurs, quick action can prevent a permanent disability. For this reason:

- Emergency eyewashes should be placed in all hazardous areas (OSHA, 2014).
- Don't squeeze eyes shut. Hold them open with thumb and index finger.
- First-aid instructions should be posted close to potential danger spots (OSHA, 2014).
- Employees must know where the closest eyewash station is and how to get there with restricted vision.
- Flood eyes with cool, clean water for 15-20 minutes.
- Get medical attention immediately. Have the chemical container and its label available for evaluation.
- Don't use another chemical to neutralize the spilled chemical (Noone, 2003).

## Flying Particles

- Don't try to remove anything embedded in the eye. You could cause more damage.
- Don't pull or squeeze the eye. Cover it and get medical attention immediately.

## Radiation/Burns

- If the eyes are exposed to intense heat, flames, lasers or arc welding radiation, apply ice packs to relieve pain.
- Get medical attention immediately.

## Blows To The Eyes

- Apply ice packs to control swelling and relieve pain.
- Get medical attention as soon as possible.

## Eyestrain

- Glare, poor lighting and long periods spent at a video display terminal can cause eye fatigue, soreness and headaches.
- Improve the lighting in the area.
- Give eyes adequate rest (Noone, 2003).



# Proper Care of the PPE

Scheduled and daily maintenance of protective eyewear is mandatory. To reduce the risk of eye injuries proper maintenance should include the following:

- Adjust eyewear for a snug fit and reasonable comfort
- Secure loose parts
- Replace scratched, cracked, pitted
- Clean eyewear after each shift or as needed
- Clean shared eyewear by washing with warm, soapy water, and rinsing thoroughly
- Use a disinfectant and hang eyewear to dry in a clean place
- Store eyewear in a case to prevent scratching
- Use an anti-fogging product to reduce or eliminate fogging
- Label each person's eyewear with their name
- Require each worker to be responsible for inspecting his/her eyewear, and/or faded lenses(TDI, 2014)

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**Thank you!**

**Be Safe**

**Wichita State University  
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