



Goal

Provide information about the causes of eye injuries, types of eye protection, and first-aid procedures for a variety of eye injuries.

Objective

Identify eye-injury hazards, prevention measures, and first-aid treatment methods so that employees understand how to avoid and respond to eye injuries at work.

Standards

The Occupational Safety and Health Administration (OSHA)'s standard 29 CFR 1910.133 requires employers to provide employees appropriate eye and face protection whenever it is needed to protect against mechanical, chemical, environmental, or radiological irritants and hazards – including flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or light radiation.

Many types of eye protection are available, but the design, construction, testing, and use of protective eyewear must comply with American National Standards Institute (ANSI) standard Z87.1. This standard requires the manufacturer's monogram to appear on each lens and for 'Z87' to appear on all components. Further, OSHA requires all eye and face personal protective equipment to be distinctly marked with the manufacturer's identity.

Eye protection must provide impact resistance, which is the primary difference between safety glasses and regular glasses. The ANSI standard requires safety glasses to withstand the impact of a one-quarter-inch steel ball traveling 150 feet per second. Regular prescription glasses do not provide this protection.

For employees who wear prescription lenses while engaged in operations involving eye hazards, OSHA requires eye protection that incorporates the prescription in its design or that can be worn over the prescription lenses without disturbing the proper position of the prescription or protective lenses.

Types of Injuries

The suitability of eye protection types depends on potential eye hazards present in the workplace. Eye injuries fall into three broad categories: physical, chemical, and thermal.

Physical

According to the Bureau of Labor Statistics (BLS), many high-impact physical eye injuries happen as a result of flying or falling objects or sparks striking the eye. Other high-impact injuries are caused by tree limbs, ropes, chains, tools, or other objects swinging from a fixed or attached position that strike the eye.

Small, fast-moving particles falling or flying into an unprotected eye, such as debris from sanding, grinding, chipping, or similar operations, is the most common cause of physical eye injury. Even relatively fine, slower-moving particles, such as dust, can scratch the eye's surface.

While goggles offer greater overall protection, safety glasses fitted with clear side shields may be the best choice if the job requires extensive side vision. When a hazard from flying objects exists in the workplace, OSHA requires employers to ensure employees' use of eye protectors with side protection. Detachable side protectors – clip-on or slide-on shields that meet the requirements – are acceptable.

Protection from high-impact hazards requires safety glasses or goggles with polycarbonate lenses, which are the most impact-resistant lens type. Glass lenses shatter on high impact, but resist scratching from dust and grit better than other lenses. Some polycarbonate lenses are made with a scratch-resistant coating to protect against both high-impact and fine-particle hazards. The work environment determines the type of eye protection needed.

Chemical

Exposure to chemical splashes, vapors, and fumes is another common source of workplace eye injury. Serious eye damage can result from exposure to alkalis or caustic acids – sodium hydroxide (caustic soda, lye) begins destroying eye tissue within one-tenth of a second of contact.

The best eye protection when working with chemicals is safety goggles with direct ventilation. Safety goggles provide a secure shield around the eyes to protect against hazards coming from many directions. Extremely dangerous environments require goggles with indirect ventilation and an anti-fogging coating.

Thermal

Acetate shields or other flexible plastic visor-type shields that cover the face and neck are the best protection against heat. Employees should always wear safety glasses or goggles under

a face shield. A welding helmet may be required in extreme heat or concentrated light environments. To protect employees from injurious light radiation, OSHA requires employers to ensure that affected employees use equipment with filter lenses that have a shade number appropriate for the work performed. Visit www.osha.gov for a list of appropriate shade numbers for a variety of operations.

Injury Prevention

To help prevent eye injuries in the workplace, thoroughly analyze operations. Identify potential eye-injury hazards by inspecting work areas, access routes, and equipment; and by reviewing eye incident and injury records. Once you identify the hazards, you can help prevent eye injuries through training and equipment maintenance.

Training

Providing training on how to select and use eye protection helps reduce injuries. Employees must be able to recognize which eye protection is appropriate for which workplace environment, and must use eye protection when working around:

- dust, concrete, and metal particles;
- falling or shifting debris, building materials, or glass;
- smoke or poisonous gas;
- chemicals (acids, bases, fuels, solvents, lime, wet or dry cement powder);
- welding light and electrical arc;
- thermal hazards and fires; and
- bloodborne pathogens (hepatitis or HIV) from blood, body fluids, or human remains.

Any employees or visitors entering or passing through work areas requiring eye protection must also wear protective eyewear.

Equipment Maintenance

Employers must complete scheduled and daily maintenance of protective eyewear. To reduce risk of eye injuries, proper equipment maintenance should include:

- adjusting eyewear for a snug fit and reasonable comfort;
- securing loose parts;
- replacing scratched, cracked, pitted, or faded lenses;
- following the manufacturer's cleaning instructions;
- cleaning eyewear after each shift or as needed;

- cleaning shared eyewear by washing it with warm, soapy water and rinsing thoroughly;
- using a disinfectant and hanging eyewear to dry in a clean place;
- storing eyewear in a case to prevent scratching;
- using an anti-fogging product to reduce or eliminate fogging;
- labeling each person's eyewear with his or her name; and
- requiring each employee to inspect his or her own eyewear.

First Aid

Establish first-aid procedures for eye injuries. Employers must provide approved emergency eyewash equipment where there is risk of eye injury from exposure to hazardous chemicals. In the event of any eye injury, do not rub the eye, because this increases damage to delicate eye tissues. Follow these recommendations for treating eye injuries resulting from:

Chemical Burns

- Immediately flush the eye with water for 15-20 minutes.
- When flushing the affected eye, avoid contact with the unaffected eye.
- Flush the eye by holding the head under a faucet or by pouring water from a clean container.
- Open the eye as wide as possible while flushing.
- Check the chemical's safety data sheet for special instructions in case of exposure.
- Get immediate medical attention.
- Cover both eyes with sterile dressings, but do not bandage the eye or use an eye cup.

Specks

- Do not rub the eye.
- Use eye wash and flush thoroughly.
- See a doctor if the speck does not wash out, or if pain or redness continues.

Cuts, Punctures, or Objects in the Eye

- Do not flush the eye.
- Do not try to remove an object stuck in the eye.
- Cover both eyes. Stabilize an injured eye with a small paper

cup taped in place; stabilize an uninjured eye with a sterile dressing.

- See a doctor at once.

Blows

- Apply a cold compress, but don't apply pressure.
- Tape a plastic bag of crushed ice to the forehead so that the bag rests gently on the injured eye.
- See a doctor at once in cases of continued pain, reduced vision, blood in the eye, or eye discoloration. These can indicate internal damage.

Review Questions

1. What does ANSI Z87.1-1989 require of safety lens manufacturers?
 - a. Manufacturer's identity on each lens
 - b. Date of manufacture
 - c. 'Z87' to appear on all component parts
 - d. Both a and c
2. What first-aid treatment is given for chemical burns to the eye?
 - a. Flush the eye with water for 15 minutes
 - b. Get medical help
 - c. Refer to the chemical's safety data sheet for instructions in case of exposure
 - d. All of the above
3. What type of eye protection is best when working with chemicals?
 - a. Safety glasses without side shields
 - b. Regular glasses
 - c. Welding helmet
 - d. Safety goggles that fit snugly around the eyes
4. How does an employer determine potential eye hazards in a work area?
 - a. Analyze plant operations
 - b. Ask the boss
 - c. Contact OSHA
 - d. All of the above

Answers

1. d
2. d
3. d
4. a

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