

# Eyewash and Emergency Shower



**Workplace  
Program**



Emergency wash fixtures are not substitutes for safety eyewear, face shields, protective clothing, or other personal protective gear. Eyewash stations and emergency showers are meant to ease eye injuries when control methods do not prevent employees' exposure to a chemical, physical, or biological agent in the workplace.

Occupational Safety and Health Administration (OSHA)'s standard 29 CFR 1910.151(c) requires that in a work area where a person's eyes or body might be exposed to harmful corrosive materials, employers must provide quick-drenching facilities for immediate emergency use. This includes at HIV and hepatitis B (HBV) research laboratories and production facilities, or any workplace where an employee's eyes could be splashed with solutions containing 0.1 percent or greater formaldehyde.

While OSHA specifies where and when to use the equipment, the American National Standards Institute (ANSI)/International Safety Equipment Association explains how to use it. In its letters of interpretation and inspection manuals, OSHA refers to ANSI/ISEA's Z358.1 standard as a way for employers to comply with health and safety requirements.

## Types of Emergency Wash Equipment

### Eyewash Stations

Eyewash stations are most appropriate in settings where eye tissue impairment is more likely than full-body contact with, or exposure to, hazards. Both main types of emergency eyewash units, depending on make and model, can conform to OSHA and ANSI standards. You may install either type in almost any work environment, but both types must be able to maintain a flow of three gallons per minute for 15 minutes.

- *Plumbed stations* – permanently connected to, and designed to receive water from, a remote, potable (drinkable) water source, usually a building's plumbing supply. Plumbed stations may be mounted to a fixed object, such as a wall or countertop, or to a pipe stand referred to as a pedestal mount. Plumbed eyewashes may include a bowl that collects and directs fluid away from the eyewash user after use. To ensure that water flows freely and cleanly from a plumbed station, test the station once a week. Protect eyewash nozzles from airborne contaminants with an integrated cover.
- *Portable stations* – features a self-contained tank of water or other fluid. Portable stations may be more practical in many cases, such as safety and rescue vehicles, or where

no reliable plumbing or water source is available. They can also be permanently fixed in place. Types of portable eyewash stations include:

- *Gravity-fed* – contain their own water or flush fluid, and must be refilled after every use. Water is pumped from a storage tank through drench nozzles and onto the eyes and face. You can install the units on walls, or temporarily on tabletops or other level surfaces. Follow the manufacturer's instructions for checking fluid levels and cleanliness in the tank.
- *Pressurized tank connected to drench nozzles or hose* – extra-portable and useful for immediate operation in most environments. They may not produce a strong or long enough shower to meet ANSI standards, so don't use them as your primary eyewash station.
- *Personal eyewash units* – intended to supplement rather than replace ANSI-ISEA standard-compliant eyewashes; especially helpful as a first response before a person reaches the primary washing device, when a person is on the way to a medical facility, or in outdoor worksites with no primary equipment.
- *Faucet-integrated or faucet-mounted eyewashes* – found in many laboratories, clinics, and schools as attachments to a sink's faucet. This type of eyewash must comply with the ANSI/ISEA standard of turning on within one second of activation.
- *Eye and face wash unit* – plumbed or self-contained device designed to flush the operator's eyes and face simultaneously by delivering a minimum of 3.0 gallons per minute (gpm) stream of fluid. Some fixtures divide a central stream of flushing fluid into several smaller streams to provide a gentler rinse; others use an aerated system to disperse the flushing fluid across the face to rinse off contaminants.
- *Hand-held drench hoses* – like showers, these supplemental devices are connected to a water supply and are used to irrigate the operator's eyes, face, and body. To prevent contaminated water from entering a hose from a different source, employers should install a drench hose with a backflow preventer that meets local codes and ordinances.

### Emergency Showers

These are designed to deliver enough flushing fluid to cover the whole body. In providing modesty curtains around

showers, the affected person is encouraged to rapidly remove contaminated clothing – a critical step after exposure to harmful materials.

Showers may be *plumbed* – permanently connected to a source of flushing liquid and mounted to a wall, floor, or ceiling – or they may be *self-contained*, so that flushing fluid must be refilled or replaced after each use.

Delivery of the flushing fluid can come from overhead, sides, or both, as long as the water pattern meets the ANSI/ISEA minimum height and dimensional requirements. Emergency showers must:

- be able to deliver a water pattern with a diameter of at least 20 inches to 60 inches;
- have a minimum spray volume of 20 gpm for a minimum of 15 minutes;
- be able to turn on in one second or less, and must not require that the operator repeatedly use the controls to keep the shower on;
- be able to be used hands-free;
- have a shower head that is 82 to 96 inches from the floor; and
- have an actuating valve or lever not more than 69 inches from the floor.

## Maintaining Flushing Fluid Standards

- *Flushing fluid* – can be any potable (drinking) water; preserved water; preserved, buffered saline solution; or other medically acceptable solution. Some eyewash stations may substitute a pH-balanced saline solution for tap water, which can damage the eyes.

It is critical to maintain the flushing fluid's pH balance and not allow bacterial growth. Use a bacteriostatic additive to maintain this balance in self-contained eyewash units. In personal wash units, provide a sterile flushing fluid in a closed container that is only opened at the time of use.

- *Flushing duration* – at least 15 minutes, immediately and thoroughly, using a large supply of clean fluid under low pressure. Longer times may be warranted for exposure to penetrating, corrosive materials.
- *Fluid pressure* – must be at a velocity low enough not to injure the user: a minimum of 0.4 gallons (1.5 liters) per minute for eyewashes; three gallons (11.4 liters) per minute for eye or face washes; and 20 gallons (75.7 liters) per minute for showers. Closely regulate fluid pressure in an eyewash station, because tender eye tissue is easily damaged.

- *Fluid temperature* – should be kept tepid (60-100° F) so it does not damage eye or other tissue. Tepid fluid also increases the chances that a victim can tolerate the required 15-minute wash. In some cases, warm water may compound a chemical reaction; consult a professional about the optimum water temperature for a specific application.

When working with plumbed units, you may need to disconnect the hot water pipe from the eyewash station. Employers can add automated devices to plumbed emergency fixtures that keep the fluid from reaching extreme temperatures.

## Selecting and Installing Emergency Wash Equipment

- Choose the right location. Immediate access to emergency wash station is crucial for increasing the affected person's chances of full recovery. The ANSI/ISEA standard directs that emergency equipment be installed within 10 seconds' walking time from the hazard's location. Avoid any location upstairs, around corners, through closed doors, beyond a partition, or otherwise physically separated from the work environment. The ANSI/ISEA standard notes that an average, able-bodied person covers about 55 feet in 10 seconds. Where highly corrosive chemicals are used, install equipment right next to the hazard. Follow these guidelines for choosing where to place emergency washing equipment:
  - Keep the path to equipment unobstructed. The 2014 ANSI/ISEA standard clarifies that a single step up into an enclosure where the wash is accessed is not considered an obstruction.
  - Install equipment near an emergency exit so emergency-response personnel can more easily reach an exposed employee.
  - Do not install near electrical equipment.
  - To prevent further contamination, install the equipment in a hazard-free area.
  - Install wash stations near a drainage system to prevent excess water accumulation.
  - Protect plumbed units from freezing by placing the unit on a wall adjoining a heated space, using electrical heat tracing, or other methods. Protect flushing fluid from freezing in self-contained eyewash units in cold environments by covering the units with heated blankets.
- Install equipment according to the manufacturer's instructions.

- Install sinks or face washes 33 to 53 inches from the floor. Measure this distance from the floor to the water flow.
- Select eyewash equipment that can deliver fluid to both eyes at the same time.
- Install emergency showers so they can be operated hands-free.
- Install signage so a person can easily identify the washing equipment.
- Make sure the area surrounding the equipment is well lighted.
- Install emergency showers so that the actuator handle is easily visible and reachable – about five feet from the ground. (In drench hose units or eyewashes, the actuator is usually built into the unit and can be installed facing outward for immediacy of use.)
- Mount the equipment at least 6 inches from the wall or obstructions.
- Install nozzle caps to keep foreign matter from accumulating in the nozzle area. Ensure that nozzle caps automatically separate from nozzles when users activate the equipment.
- Install equipment so it will activate in 1 second or less and so that the valve remains open without the operator having to use his or her hands to continue activating the equipment.
- Install equipment so that neither the pressure nor temperature of delivered fluid will harm affected body parts, and so that units deliver a sufficient spray pattern . Install temperature control valves. Consider that the initial temperature of the flushing water will be the temperature of the piping system. Recirculation systems will keep water temperature in the required range.
- To adhere to the ANSI/ISEA standard, select eyewash and shower equipment, including valves, which resist corrosion. Make sure your equipment and supply system piping parts and materials are compatible. If your equipment is not corrosion-resistant, paint or coat the equipment so it withstands exposure to airborne contaminants.
- As recommended in the ANSI/ISEA standard, inspect equipment every year and keep a record of all inspections and maintenance.

## Treating Eye Injuries

When an eye injury does occur, have an ophthalmologist (eye physician and surgeon) or other medical doctor examine the eye as soon as possible. Although the injury may not look or feel serious, it could seriously damage the eyes. If an employee

experiences blurred vision, partial loss of vision, double vision, or sharp pain in the eye after an incident, take the victim to an emergency room immediately and consult an ophthalmologist.

## Properly Disposing of Fluids

Properly dispose of wastewater by ensuring that it:

- is not allowed to pool or freeze where someone might slip, and
- is not allowed into a wastewater treatment system if the water may contain hazardous materials. In such cases, you may need to connect drain piping from the unit's acid waste disposal system or to a neutralizing tank. Note: don't use neutralizing agents on the eyes or skin.

## Chemical Considerations

Some chemicals react violently when mixed with other substances, and they may endanger the handler or other people in the area. Conduct a job hazard analysis to decide which emergency equipment is needed at your facility, keep a list of all hazardous substances at each work site, and make safety data sheets readily available for each hazardous chemical on site, as required by OSHA's hazard communication standard 29 CFR 1910.1200. With the help of a trained medical professional, establish first-aid procedures for chemical injuries, and regularly review and update the procedures.

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