



Design Requirements for Eyewash and Safety Shower Units

Application:

Eyewash Stations must be provided in the following areas.

- Laboratories
- Plumbed emergency eyewash equipment shall be installed in every lab or room, where an MSDS for the materials used specifies the use of an eyewash in case of eye contact, and there is a possibility of eye contact occurring.

Deluge Showers must be provided in the following areas.

- Laboratories
- Plumbed emergency shower equipment shall be installed in every lab or room, where an MSDS for the materials used specifies the use of a deluge shower in case of skin contact, and there is a possibility of skin contact occurring.

Detailed Installation, Operation and Design

Eyewash Stations

Specifications

- In accordance with the guidelines of ANSI Z358.1-2004, such eyewash equipment should ensure that a controlled flow of potable water is provided to both eyes simultaneously at a velocity low enough not to injure the user.
- The eyewash units should have dual nozzle sprays.
- Dust covers or protection devices should protect the nozzles that are supplied with the eyewash in place; they prevent dust and debris from falling inside the eyewash heads and potentially entering the eyes when the unit is turned on.
- The dust covers should be automatically removed by actuation of the valve.
- The plumbed eyewash unit should be capable of delivering 1.5 L of water per minute (0.4 gallons per minute) for at least 15 minutes continuously.
- The eyewash unit should deliver tepid (lukewarm) water. The temperature of water should at least be 15.5°C (60°F) to prevent causing hypothermia or early cessation of flushing. New installations of eyewashes should be installed with plumbing for tepid water. Existing stations can remain cold water only, but it is strongly recommended that a tepid eyewash and shower should be available in the hallway of every floor within 150 feet of the untempered eyewash. This arrangement allows for the existing installations to remain useful while enhancing safety by providing access to a tepid eyewash.



- The valve should be large enough to be easily located and operated by the user; it shall go 'off' to 'on' in less than one second. Control valves shall be resistant to corrosion from potable water.
- Manual or automatic actuators should be easy to locate and operate by touch.
- The eyewash units should be installed and designed in such a manner that they do not require users' hands to operate upon activation, and allow both eyelids to be opened using both hands.
- The unit should be located to provide enough room to allow the eyelids to be held open with the hands while the eyes are in the water stream.
- The emergency eyewash station shall be identified with a highly visible sign. There should be no sharp projections or electrical hazards anywhere in the operating area of the unit. It should be ensured that the path leading to the emergency eyewash is clear of obstruction and that the immediate area is neat and easily accessible.

Installation

- Equipment shall be installed in compliance with ANSI standard Z 358.1-2004, and the manufacturer's instructions. Upon installation, equipment shall be tested for leaks.
- Plumbed eyewash unit must be installed in accessible location that an injured person can reach in 10 seconds or less, which is roughly 55 unobstructed feet.
- When acids or strong caustics/corrosive are used, equipment should be located within 10 feet of the work area and have unrestricted access to a well-lit area.
- The unit should be located on the same level as the hazard and the path of travel must be free of obstructions that may inhibit the immediate use of the equipment. A door is considered to be an obstruction. If the hazard is not a corrosive, one intervening door can be present between the hazard and emergency equipment so long as the door opens in the same direction of travel as the person attempting to reach the emergency equipment; and/or the door does not lock to impede access to eyewash station.
- Eyewash locations should be identified with highly visible signs and the areas shall be well-lit, and free of obstructions and projections.
- There must be a proper drainage system present near the eyewash unit; this will minimize any potential of contamination to surface or groundwater.
- Eyewashes should be mounted so that water nozzles are not less than 0.84 m (33 inches) and no greater than 1.15 m (45 inches) from the surface/ floor on which the user stands.
- The eyewash must be, at least, 0.15 m (6 inches) away from the wall or any other obstruction.
- Equipment piping that is located in areas exposed to potential freezing temperatures should be insulated or protected with appropriate material(s).



- If feasible, the units should be located so one person can use both the eyewash and shower at the same time.
- Drench hoses may supplement, but cannot replace the eyewash unit. A drench hose requires the use of at least one hand, rendering it impossible to hold both eyelids open simultaneously.
- Personal or portable eyewash equipment should only be used where there is no access to plumbing, or where a personal eyewash unit is to be used as a first wash before proceeding to the eyewash station.
- Employees and students who might be exposed to splashes of hazardous materials have to be instructed by their supervisors in the proper use of personal protective equipment, emergency showers, and eyewash equipment.

Safety Showers

Specifications

- In accordance with the guidelines of ANSI Z358.1-2004, the safety shower should be able to supply a controlled flow of potable water, delivering 75.7 litres per minute (20 gallons per minute).
- The shower unit should deliver tepid (lukewarm) water upon activation. The temperature of water should at least be 15.5°C (60°F) to avoid causing hypothermia to the user. New installations should be installed with plumbing for tepid water. Existing showers can remain cold water only, but it is strongly recommended that a tepid shower should be available in the hallway of every floor within 150 feet of the untempered shower. This arrangement allows for the existing installations to remain useful while enhancing safety by providing access to a tepid shower.
- The control valve should operate in less than one second upon its activation and must remain 'on' without the use of worker's hand, until it is intentionally shut off. This allows the injured worker to remove the contaminated clothing.
- The valve shall be large enough to be easily located and operated by the user; the actuators must not be located more than 1.7 m (69 inches) above the surface where user stands.
- The spray pattern of shower should have a diameter of 0.51 m (20 inches) at 1.53 m (60 inches) above the surface on which the injured worker stands.
- The centre of the shower spray pattern should be located at least 0.46 m (16 inches) from any obstructions, protrusions, or sharp objects.
- The emergency shower must be installed with the showerhead not less than 2.08 m (82 inches) or more than 2.44 m (96 inches) from the surface on which the user stands. If a shower enclosure is used, it shall provide a minimum unobstructed area of 0.87 m (34 inches) in diameter.



- Equipment should be located away from electric outlets and appliances so there is no possibility of an electrical shock.

Installation

- The emergency shower should be installed in compliance with ANSI standard Z 358.1-2004, and the manufacturer's instructions. Upon installation, equipment must be tested for leaks and proper functioning.
- Emergency showers should be located in accessible locations that require no more than 10 seconds to reach and shall be located on the same level as the potential chemical or biological hazard.
- Shower locations should be identified with highly visible signs and the areas shall be bright, well lit, and free of obstructions and projections.
- The shower should supply water at a minimum rate of 75.7 Liters per minute (20 gallons per minute) for a period of at least fifteen minutes.
- If the equipment piping is located in areas which are exposed to potential freezing temperatures, then it should be insulated or protected with appropriate material(s).
- There must be a proper drainage system present near the shower; this will minimize any potential for contaminating the surface or groundwater.
- Combination units with showers with eye and eye/face wash may be installed where feasible. The combination units shall be connected to a system capable of supplying adequate flushing fluid to meet the requirements of each component when all components are operated simultaneously. Combination units will be positioned so they can be used simultaneously by the user under the shower.



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