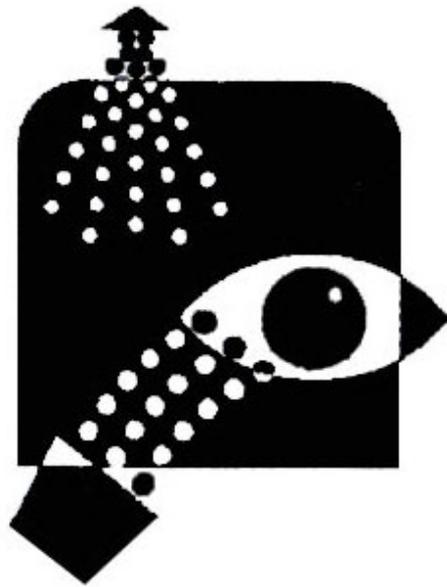


Emergency Shower & Eyewash



Training Guide

No matter how many precautions employees take, accidents sometimes happen. In these situations quick action is essential, and if the incident involves a hazardous material, using a safety shower or eyewash can be extremely important.

ANSI Guide:

Combination unit – A unit that has any combination of the following equipment: emergency shower, eyewash, eye/face wash or drench hose.

Drench hose – A supplemental device consisting of a flexible hose connected to a flushing fluid supply and used to irrigate and flush face and body areas. Areas that require eyewashes can only utilize drench hoses if a plumbed or self-contained eyewash is also available in that area or if the drench hose is designed to meet the definition of a plumbed or self-contained eyewash.

Emergency shower – A device specifically designed and intended to deliver flushing fluid in sufficient volume to cause that fluid to cascade over the entire body.

Flushing fluid – Fluid that is either water or else a sterile buffer solution designed specifically for eyewash and shower units.

Personal eyewash – A supplemental device to plumbed or self-contained eyewashes, which can deliver immediate flushing fluid to the eyes or body. Areas that require eyewashes can only use personal eyewashes if plumbed or self-contained eyewashes are also available in that area.

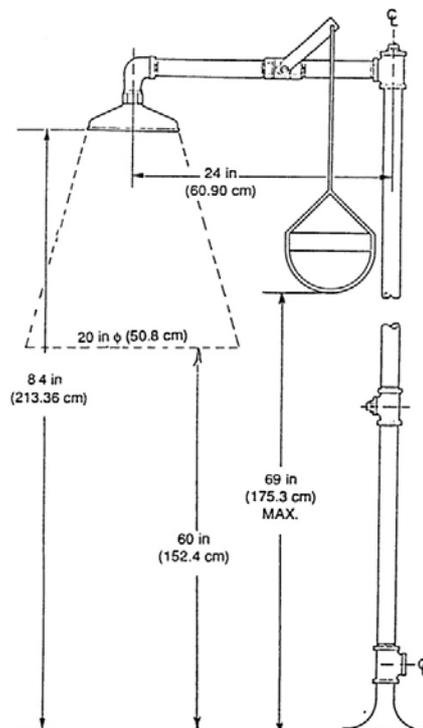
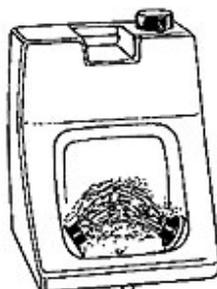
Plumbed eyewash – An eyewash unit permanently connected to an uninterrupted water supply that is capable of delivering a minimum of 0.4 gallons per minute (gpm) for 15 minutes.

Remodel – Any large scale alterations to an area that will change the location of walls, doors, counter space or cabinets; or a project that replaces most existing furnishings/fixtures (cabinets, chemical fume hoods, light fixtures, wiring, plumbing, etc.) with new furnishings/fixtures in one area. Note: the implementation of numerous “small projects” for the same area in order to avoid being labeled as a remodel project may be subject to the requirements of this document as a remodel, based on the judgment of the Associate Director for Campus Code Compliance and Fire Safety.

Self-contained eyewash – A stand-alone eyewash device containing flushing fluid that is capable of delivering a minimum of 0.4 gpm for 15 minutes.

Pre- Installation

- > Check to make sure all equipment components have been provided by manufacturer before installation.
- > Ensure all tools have been provided for installer to properly set up equipment.
- > It is recommended to flush water supply lines before installation.
- > Check flowing water pressure at inlet supply. Minimum water flow is 30 PSI (Pounds per Square Inch) Ideal water flow is 40-50 PSI
- > Suggested water temperature is 60°F - 100°F
- > Location: Emergency fixtures must be within 55 feet of a potential hazard (No more than 10 seconds to reach)





SHOWERS

Plumbed Shower: An emergency shower permanently connected to a source of potable water

Self-Contained Shower: A shower that contains its own flushing fluid, and must be refilled or replaced after use

1) Heads

- A. Positioned 82"- 96" from floor.
- B. Spray pattern will have a minimum diameter of 20" at 60" above the floor.
- C. Flow Rate=20 gallons per minute (GPM) at 30 pounds per square inch (PSI).
- D. The center of the spray pattern shall be located at least 16 inches from any obstruction.
- E. Shower pull rod handle should be no more than 69 inches above the floor.

2) Valves

- A. Activate in 1 second or less.
- B. Stay-open valve (no use of hands).
- C. Valve remains on until the user shuts it off.

3) Installation

- A. Shower shall be located in an area that requires no more than 10 seconds to reach.
- B. Shower location shall be in a well-lit area and identified with a sign.
- C. Shower shall be located on the same level as the hazard.

4) Maintenance and Training

- A. Plumbed showers will be activated weekly to verify correct operation.
- B. All employees who might be exposed to a chemical splash shall be trained in the use of the equipment.
- C. All showers shall be inspected annually to make sure they meet with ANSI Z358.1 requirements.

EYE WASHES

Plumbed Eye Wash: An eye wash unit permanently connected to a source of potable water

Gravity-Fed Eye Wash: An eye wash device that contains its own flushing fluid and must be refilled or replaced after use

1) Heads

- A. Positioned 33"-53" from floor to water flow.
- B. Positioned 6" from wall or nearest obstruction.
- C. 0.4 gallons per minute (GPM) for 15 minutes for plumbed units shall provide flushing fluid at 30 PSI.
- D. 0.4 gallons per minute (GPM) for 15 minutes for gravity-fed units.

2) Valves

- A. Activate in 1 second or less.
- B. Stay-open valve (leaving hands free).

3) Installation

- A. Eyewash equipment shall be located in an area that requires no more than 10 seconds to reach.
- B. The location of the eye wash unit shall be in a well-lit area and identified with a sign.
- C. Eyewash equipment shall be on the same level as the hazard.

4) Maintenance and Training

- A. Plumbed eye wash units shall be activated weekly to verify proper operation.
- B. Gravity-fed units shall be maintained according to the manufacturer's instructions.
- C. All employees who might be exposed to a chemical splash shall be trained in the use of the equipment.
- D. All eyewash equipment shall be inspected annually to make sure they meet ANSI Z358.1 requirements.

EYE/FACE WASH

A device used to irrigate and flush both the face and the eyes

1) Heads

- A. Positioned 33"-53" from floor to water flow.
- B. 6" from wall or nearest obstruction.
- C. Large heads to cover both eyes and face or regular size eye wash heads plus a face spray ring.
- D. 3 gallons per minute (GPM) for 15 minutes.

2) Valves

- A. Same as eye wash.

3) Installation

- A. Same as eye wash.

4) Maintenance and Training

- A. Same as eye wash.

DRENCH HOSES

Hand-Held Drench Hose: A flexible hose connected to a water supply and used to irrigate and flush eyes, face and body areas

1) Heads

A. 3 gallons per minute (GPM).

2) Valves

A. Activate in 1 second or less.

3) Installation

A. Assemble per the manufacturer's instructions.

B. The location of the drench hose shall be in a well-lit area and identified with a sign.

4) Maintenance and Training

A. Activate weekly to verify proper operation.

B. All employees who might be exposed to a chemical splash shall be trained in the use of the equipment.

C. All drench hose equipment shall be inspected annually to make sure they meet ANSI Z358.1 requirements.

Note: Hand-held drench hoses support shower and eyewash units but shall not replace them.

PERSONAL EYE WASH

A supplementary eye wash that supports plumbed units, gravity-fed units, or both by delivering immediate flushing fluid.

NOTE: Personal eye wash units can provide immediate flushing when they are located near the workstations. Personal eye wash equipment does not meet the requirements of plumbed or gravity-fed eye wash equipment. Personal eye wash units can support plumbed or gravity-fed eye wash units, but cannot be a substitute.

Squeeze bottles are considered a secondary eyewash and a supplement to ANSI compliant eyewash stations and are not ANSI compliant and should not be used in place of an ANSI compliant unit.

Advantages to using eyesaline flushing solution instead of water in gravity fed or personal eyewash stations:

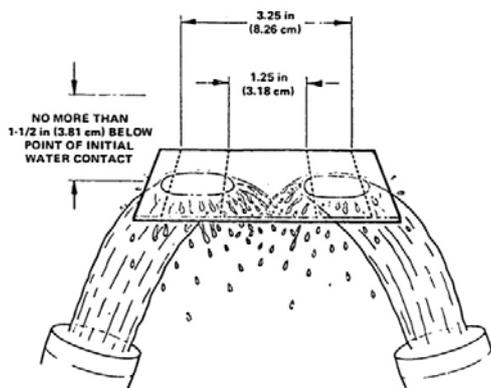
Eyesaline is a buffered, isotonic saline solution. Buffered to the same pH balance of the human eye. It also contains a preservative to help reduce the bacterial growth. Tap water can contain chlorine and other chemicals. This can cause further irritation to the eyes. It also has the potential for bacteria growth. When tap water is used, weekly solution replacement is strongly recommended as bacteria can grow rapidly in standing water. Eyesaline needs to be replaced every six months.

Monthly inspections are a legal requirement. These inspections should include the following:

- Ensure access is unobstructed.
- Verify protective eyewash covers are properly positioned, clean, and intact.
- Check that bowl and spouts are clean and free of trash.
- Place a dishpan or bucket under the drainpipe to collect the water.
- Check that flow is effective and continuous by pressing the hand paddle.
 - Verify that protective eyewash covers come off when activated.
 - Check that water flows from both eyepieces.
 - Evaluate for adequate flow. The streams of water should cross.
 - Verify that flow continues until the paddle is moved to its resting position.
- Check that water drains from the bowl.
- Document the inspection date and initial.
- Some emergency eyewashes are designed to fold up against the wall and have no paddle to engage the water flow. These are activated immediately when you pull them down. To test this type, place a large plastic garbage can under the eyewash to collect the water and pull down on the eyewash. Do not worry about activating the shower; it has a separate pull handle.



***All emergency equipment must be identified with a highly visible sign positioned near or on the fixture in a well lighted area.**



Eyewash Test Gauge

Place eyewash gauge on top of fluid stream and lower approximately 1-1/2 inches into fluid stream. The eyewash pattern should cover the areas between the interior and exterior lines.

Gravity Fed Eyewash Test

Using a 1 gallon container and a timing device, collect 1 gallon of flushing fluid at the start of the flow. Record time required to fill container. Using a flowmeter or other device, determine flow rate is at least .4 GPM (Gallons Per Minute)@minimum 15 minutes.

Shower Test

Using a shower tester tent and bucket to collect drain water and drain in nearby sink. The most effectively conducted by two people – one on a step stool/ladder holds the shower tent in place, the second operate the valves, determine flow rate is at least 20 GPM (Gallons Per Minute)@minimum 15 minutes.

Minimum Water Flow Requirements

- At least .4 GPM (1.5 liters) for eyewashes
- 3 GPM (11.4 liters) for eye/face washes
- 20 GPM (75.7 liters) for drench showers

Eyewash/Shower should activate in one second or less using a one step activation process and stay open until manually shut off



Eyewash Use

- In the event of an emergency, activate eyewash by pushing handle back. Hold both eyelids open with thumb and forefingers. Roll eyeballs back and forth so fluid flows on all surfaces of eye and under eyelid
- Flush eyes for 15 minutes
- After equipment use, seek a medical advisor immediately for further treatment

Shower Use

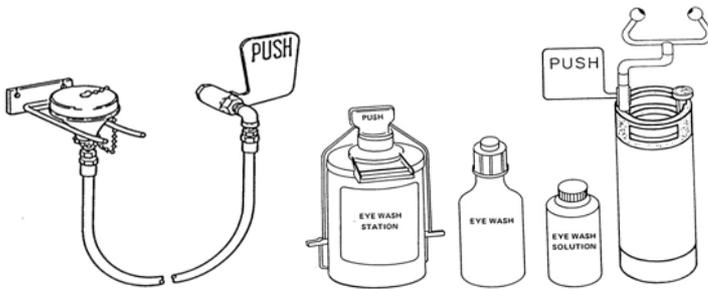
- In the event of an emergency, activate drench shower by pulling on circle pull rod. Begin to remove any clothing exposed to chemical or other hazardous substance (If eyes have been exposed to hazardous materials, follow procedure for eyewash use)
- Flush eyes, face and body for 15 minutes
- After equipment use, seek a medical advisor immediately for further treatment

Shower vs Eyewash

Drench showers are not to be used in lieu of eyewash stations. Drench showers are high-pressure and are intended to flush the skin, not the eyes. There are combination eyewash/drench showers that can be used to handle both, but a shower should not be the primary eyewash station.

Maintenance

- Activate eyewash and shower equipment weekly to ensure proper operation of equipment and to flush water supply line, check for leaks, obstruction of flow or any damaged parts. Replace parts as needed or contact manufacturer if equipment is not functioning properly
- Document weekly activation procedure on inspection tag
- Keep installation instructions manual filed within eyewash and/or shower proximity for reference if problems occur or if replacement parts are required



Hand-held drench hoses provide support for emergency eyewash and shower equipment, but should not be used as the only source of emergency relief.

Personal eyewash equipment does not meet the criteria of plumbed or self-contained eyewash equipment i.e. does not meet 15 minute flushing criteria.

Eyewash alarms can be added to your equipment, especially for equipment located in remote locations, to warn personal that an eyewash or shower is being used.

Drench shower privacy curtains can be added to your equipment to ensure privacy while equipment is in use.

Do you need dust covers on the eye washes?

Dust covers on eyewash heads are required to prevent build-up of particulates, which could enter the eye. Eyewash dust covers are designed to extricate themselves as soon as water flows from the outlet.



ANSI Z358.1-2014

The revision updates to Z358.1-2014 include the emergency shower requirement that once activated they can be used hands free. Another clarification emphasizes that fluid flow location and pattern delivery for emergency eye washes and eye/face washes is a critical aspect during installation of the equipment. The height of the fluid pattern should be no greater than 53 inches from the height of the floor for eye washes and eye/face washes. Self-contained eye washes are required to be inspected weekly to verify flushing fluid level and maintained according to manufacturer's instructions.

Emergency shower fixtures must be within 55 feet of a potential hazard and must take no more than 10 seconds to reach.

The path to the fixture must not be obstructed by debris or other hazards that may impede the path of the injured employee.

The equipment must be on the same level the user is working on. If there are doors between the hazard and the fixture, they must swing in the direction of travel.

If the worker's ability to walk or move might be impacted by the chemical exposure, the fixture should be placed closer to the worker.

If highly corrosive chemicals are used, the drench shower or eyewash should be placed immediately adjacent to the hazard.

If a potential chemical spill in an area is likely to affect multiple workers, a sufficient number of fixtures should be in place to prevent one worker from having to wait 15 minutes while another is drenched.

Visibility is also a factor. The area around the fixture should be well lighted.

ANSI Z358.1-2014 requires the use of tepid flushing fluid for all types of emergency equipment applications. Tepid water is defined in the standard as a flushing fluid that is at a temperature conducive to encouraging an injured party to complete the full 15-minute flush during an emergency. ANSI suggests an incoming water temperature between 60° F and 100° F (16°-38° C)

If the flushing fluid is determined to not be between 60° and 100°, thermostatic mixing valves (TMVs) can be installed to ensure a consistent temperature for the eyewash or shower. There are also turnkey units available where the hot water can be specifically dedicated to one particular unit. For large facilities with many eye wash and showers, there are more complex systems that can be installed to maintain the temperature between the 60° and 100°F for all of the units in the facility.

EUROPEAN STANDARD

EN 15154-1: 2006 Emergency safety showers. Plumbed-in body showers for laboratories

EN 15154-2: 2006 Emergency safety showers. Plumbed-in eye wash units

EN 15154-3: 2009 Emergency safety showers. Non plumbed-in body showers

EN 15154-4: 2009 Emergency safety showers. Non plumbed-in eye wash units

EN 15154-1: 2006

- The lower edge of the shower head must be located 220 +/- 10 cm above floor level
- The valve must be fully open after a rotation of the manual control of a maximum of 90° or a pull of the manual control of a maximum of 20 cm
- The control element must not be located higher than 175 cm above floor level
- Body showers must be supplied with drinking water or water of similar quality
- Body showers should feature a flow volume of at least 60 liters per minute
- Water output must be guaranteed for a period of at least 15 minutes
- Body showers must be self-draining between the shut-off fitting and the shower head.
- At a height of 150 cm above floor level or 70 cm below the shower head, 50 +/- 10 percent of the water volume must fall within a circle with a radius of 20 cm. The area within which at least 95 percent of the water falls must be restricted to a circle with a radius of 40 cm
- Recommended water temperature between 15°C -37°C

EN 15154-2: 2006

- The upper edge of the spray head must be installed 100 +/- 20 cm above floor level
- A clear area of at least 15 cm must be guaranteed around the eye shower
- The valve should be fully open after a rotation of the manual control of a maximum of 90° or a pull of the manual control of a maximum of 20 mm
- Eye showers must be supplied with drinking water or water of similar quality
- Eye showers should feature a flow volume of at least 6 liters per minute
- Water output must be guaranteed for a period of at least 15 minutes
- The jet of water supplied by the spray heads can have a height of 10 cm to 30 cm
- Recommended water temperature between 15°C -37°C

References:

Occupational Safety and Health Administration <https://www.osha.gov>

American National Standards Institute <https://www.ansi.org>

The Safety Equipment Institute <http://www.seinet.org>

International Safety Equipment Association <https://safetyequipment.org>

European Committee for Standardization <https://www.cen.eu>