

Emergency Eyewash and Emergency Shower

Safety and Installation Requirements

February - 2023

OVERVIEW

Emergency eyewashes and emergency showers are designed to protect workers against chemical-related injuries. Due to the importance of proper installation, inspection, use and maintenance of these types of equipment, ACU has created these guidelines in compliance with the American National Standards Institute (ANSI), Z358.1 - (2014) to assure the correct operation in the event of an incident.

References

ANSI Z358.1 - 2014

29 CFR 1910.1450

29 CFR 1910.151



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DEFINITIONS

Combination Unit - Equipment that shares a common plumbing fixture. The combination may be of any of these fixtures: emergency shower, emergency eyewash, eye/face wash, or a drench hose. The most common combination is a shower and eyewash station.

Drench Hose - A flexible hose that may be used to supplement or be used when a full shower is not required, to assist a person if they are unable to stand or is unconscious, or to wash under a piece of clothing prior to the clothing being removed.

Emergency Eyewash - A device designed to deliver flushing fluid to irrigate and flush both of the user's eyes simultaneously at a velocity that will not cause injury to the user.

Emergency Shower - A device designed to deliver flushing fluid over the entire head and body of the user upon activation.

Eye/Face Wash - A device that is used to irrigate and flush both the eyes and the face simultaneously.

Flushing Fluid - May be any of the following: potable water, preserved water, preserved buffered saline solution or any other medically acceptable solutions that are manufactured and labeled in accordance with all applicable federal laws and regulations.

Flow Pressure - The pressure of the flushing fluid while the device is fully open and flowing.

Flow Regulator - A mechanical device designed to control the flow of flushing fluid through the piping system.

Hazardous Material - Any substance, chemical, compound, or material that could adversely affect the safety and health of a human.

Personal Eyewash - A supplemental device that is designed to deliver flushing fluid immediately. This is a supplemental device and does not replace the requirement to have a 15 minute-supply eyewash station. An expiration date of the fluid must be permanently printed on the unit.

Plumbed Eyewash - Any eyewash that has been permanently plumbed (connected) to a source of potable water.

Potable Water - Water which meets the quality standards prescribed in the U.S. Public Health Service Drinking Water Standards or water which is approved for drinking purposes by the State or local authority having jurisdiction.

Stay-Open Valve - A valve that stays open by design once it has been activated. It must be closed manually after it has been activated.

Tepid - Lukewarm; ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F).



RESPONSIBILITIES

Laboratory Supervisor

- Ensure that any required emergency eyewash and shower equipment are located on the same level as the hazard(s)
- Ensure an unobstructed access to the emergency eyewash/safety shower is maintained (takes no more than 10 seconds to reach; no more than 55 feet walking distance from hazard)
- Ensure that emergency eyewash stations (within the laboratory under their supervision) are activated weekly and the [weekly eyewash inspection log](#) is being maintained
- Ensure emergency shower equipment is being activated and tested at the beginning of each semester
- Ensure all employees and students who are at risk of exposure to any known hazard is trained in the use and location of the emergency eyewash and safety shower equipment

Management

- Ensure that applicable supervisors, employees, and students are notified of their responsibilities as outlined in these requirements
- Ensure that applicable employees and students have received any required training in the operation and maintenance of emergency eyewash and shower equipment
- Report and coordinate with maintenance personnel and the [Department of Institutional Compliance & Risk Management](#) for any need of inspection, repair, modification, maintenance, or installation of an emergency eyewash or shower

Maintenance Personnel

- Perform repair, maintenance, and installation of emergency eyewash and shower equipment as required or necessary
- Inform [Department of Institutional Compliance & Risk Management](#) of any installation, repair, or modification of eyewash or shower equipment

Environmental Health & Safety

- Reviews this program periodically (at least annually) and amend as needed
- Maintain and update the inventory of eyewash and shower units
- Provide assistance in testing eyewash/shower equipment
- Perform annual inspections of eyewash and shower equipment
- Monitor the provided [emergency eyewash/shower inspection log](#) to ensure it is being updated regularly by each department/laboratory
- Provide assistance to departments when a new eyewash/shower is needing to be purchased

EQUIPMENT SELECTION & PERFORMANCE REQUIREMENTS

All emergency eyewash stations and emergency showers must comply with ANSI, Z358.1-2014

Emergency Shower

The following are the requirements for emergency shower performance and operation:

- Emergency shower equipment shall be designed so that it can be activated in one second or less.
- Emergency shower equipment shall remain activated without any further user assistance until it is manually shut off (stay-open valve).
- Emergency shower equipment must deliver a pattern of flushing fluid of at least 50.8 cm (20 inches) at 152.4 cm (60 inches).
- The minimum volume of flushing fluid spray should be 75.7liters per minute (20 gallons per minute) for a minimum time of 15 minutes.
- Flushing fluid, when activated, must be at a velocity that will not cause injury to the user.

Note: When selecting an emergency shower, planning for the type of drainage that will be needed or used must be put into consideration.

Emergency Eyewash

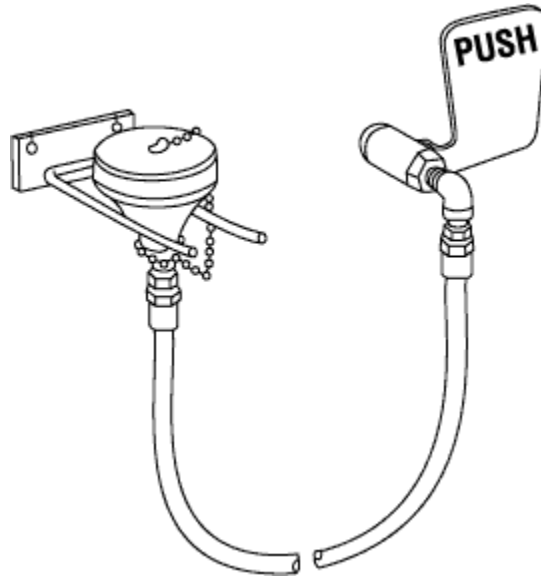
The following are the requirements for emergency eyewash performance and operation

- A means must be provided to ensure controlled flow of flushing fluid at a velocity that is non-injurious to the user.
- Emergency eyewash units must be designed so that it can be activated in one (1) second or less, and it shall remain in operation without requiring the use of an operator's hand until it has been manually closed.
- Eyewash equipment shall be capable of delivering fluid to both eyes simultaneously at a volume of not less than 1.5 liters per minute (0.4 gpm) for a minimum 15 minutes.
- The flushing fluid temperature must be tepid. (ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F))

Drench Hose

Drench hoses are considered and to be utilized as secondary equipment to emergency eyewash and safety shower stations. Drench hoses do not meet ANSI standards for emergency eyewash stations or safety showers because they do not operate hands free.

Drench hoses may be used for “spot” rinsing whenever a full shower is not required, to assist a victim where the victim is unable to stand or is unconscious, or to wash under articles of clothing before the clothing is removed.



(Example of drench hose)

Water Temperature

The recommended temperature of flushing fluid must be “tepid”. ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F). Anything below 16°C may result in hypothermic shock, while anything above 38°C can increase chemical reactions to the eyes and skin.

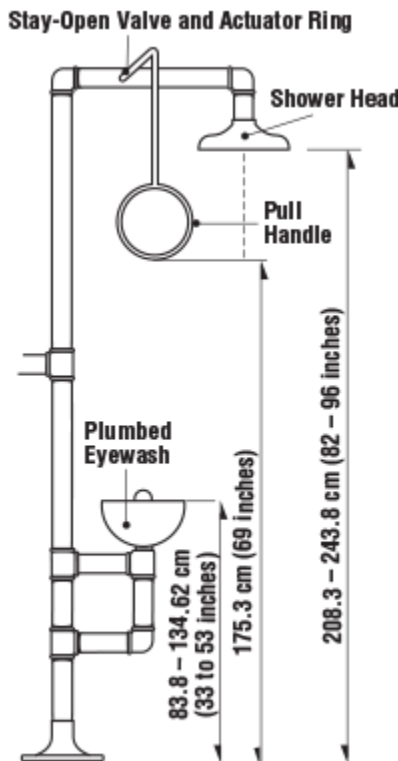
Privacy Considerations

Normal showers must not be used or installed in-lieu of an emergency shower for drenching and removing chemicals. If a shower enclosure is to be used, it shall provide at least 86.4 cm (34 in.) in diameter of unobstructed area inside.

INSTALLATION

Emergency Shower

It is the installer's responsibility to ensure that all emergency shower units that are assembled and installed are in compliance with ANSI Z325.1-2014 and in accordance with the manufacturer's installation instructions.



Installation Requirements: Emergency Shower

- All laboratories, or any room used for similar purposes, where corrosives, flammable liquids, toxins, bio-hazardous wastes, or radiological materials are handled shall have an emergency shower for emergency use.
- Rooms with pH neutralization systems, battery charging areas, spraying operations, and high dust areas must have an emergency shower for emergency use.

- An emergency shower location must be identified with signs that are highly visible. All signs must be visible within the area that is being served by the shower and must include the use of symbols that allow all users to understand.

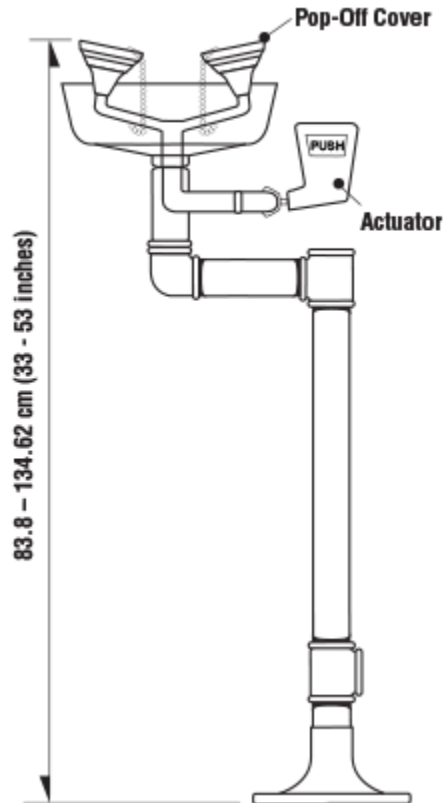


(Example of emergency shower sign)

- An emergency shower must be designed and installed so that the flushing fluid column is between 208.3 cm (82 in.) and 243.8 cm (96in.) in height from the surface on which the user stands.
- An emergency shower must be installed in an accessible location requiring no more than 10 seconds of travel time to reach.
- An emergency shower must be positioned no more than 55 feet from the furthest corner of the room in which it is installed.
- An emergency shower must be located on the same level as the hazard, the shower area and travel path must be well-lit, and the path must be unobstructed.
- Emergency showers must deliver tepid flushing fluid. All equipment must be protected from freezing or freeze-protected equipment must be installed, whenever necessary.
- If shut off valves are required to be installed in the supply line for maintenance related purposes, provision must be made to prevent unauthorized shut off.

Emergency Eyewash

It is the installer's responsibility to ensure that all emergency eyewash units that are assembled and installed are in compliance with ANSI Z325.1-2014 and in accordance with the manufacturer's installation instructions.



Installation Requirements: Emergency Eyewash

- All laboratories, or any room used for similar purposes, where corrosives, flammable liquids, toxins, bio-hazardous wastes, or radiological materials are handled must have an emergency eyewash for emergency use.
- Rooms with pH neutralization systems, battery charging areas, spraying operations, and high dust areas must have an emergency eyewash for emergency use.
- An emergency eyewash location must be identified with signs that are highly visible. All signs must be visible within the area that is being served by the shower and must include the use of symbols that allow all users to understand.



(Example of emergency eyewash sign)

- Emergency eyewash units must be positioned with the flushing fluid nozzle between 83.8cm (33 in.) and 114.3 cm (45 in.) in height from the surface on which the user stands, and a minimum of 15.3 cm (6 in.) from the wall or nearest obstruction.
- Emergency eyewash units must be installed in an accessible location requiring no more than 10 seconds of travel time to reach.
- Emergency eyewash units must be positioned no more than 55 feet from the furthest corner of the room in which it is installed.
- The location area must be well-lit and the path must be free of obstructions.
- Emergency eyewash units must be located on the same level as the hazard, the eyewash and travel path must be well-lit, and the path must be unobstructed.
- Emergency eyewash units must be located immediately adjacent to the hazard when the hazard(s) consists of handling strong acids ($\text{pH} \leq 1$) or bases ($\text{pH} \geq 12$).
- Emergency eyewash units must deliver tepid flushing fluid. All equipment must be protected from freezing or freeze-protected equipment must be installed, whenever necessary.
- If shut off valves are required to be installed in the supply line for maintenance related purposes, provision must be made to prevent unauthorized shut off.

INSPECTION PROCEDURES

Emergency Shower Equipment

All applicable departments with emergency shower equipment must follow the same method as outlined below for activation and inspection at the beginning of each semester.

Semester Inspection Process

Prior to Activation

- Check to see if the unit is connected to any type(s) of drainage system. If no drainage system is connected, apply appropriate water collection methods as necessary. (Examples: plastic cup, bucket, pale, etc. depending on the design of the eyewash unit.)
- Make sure that the supply line valve is in the full open position.

After Activation

- Verify that the shower unit opens within one second of opening the valve and it remains open without any further assistance from the operator (stay-open valve) until the valve is intentionally closed.
- The flushing fluid temperature must be tepid. (ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F))
- Dry the shower head to prevent dripping
- Inspect floor area around the shower station for any fluid. Dry floor area if necessary.

Annual Inspection

All emergency shower equipment must pass an annual inspection by the Department of Institutional Compliance & Risk Management. The Environmental Health & Safety Manager will inspect the following criteria:

- The unit must be hands-free (stay-open valve)
- The unit must be able to be used without the use of the operator's hands until the valve has been intentionally closed.
- The valve must be simple to operate and is able to be fully activated (open valve) within one (1) second or less.
- The unit must be capable of delivering a flushing fluid spray should be 75.7liters per minute (20 gallons per minute) for a minimum time of 15 minutes.
- The velocity of the flushing fluid must not be able to cause injury to the user.



- The flushing fluid temperature must be tepid. (ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F))

Emergency Eyewash Equipment

All applicable departments with emergency eyewash equipment must follow the same method as outlined below for weekly activation and inspection.

Weekly Inspection Process

Prior to Activation

- Check to see if the unit is connected to any type(s) of drainage system. If no drainage system is connected, apply appropriate water collection methods as necessary. (Examples: plastic cup, bucket, pale, etc. depending on the design of the eyewash unit.)
- Make sure that the supply line valve is in the full open position.
- Check to see if the eyewash nozzles have dust protecting cover(s), which automatically are removed upon activation of the unit.

After Activation

- Verify that the eyewash unit opens within one second of opening the valve and it remains open without any further assistance from the operator (stay-open valve) until the valve is intentionally closed.
- The emergency eyewash unit must provide flushing fluid to both eyes simultaneously.
- The flushing fluid streams must rise to approximately equal height on both sides (from each nozzle).
- The flushing fluid temperature must be tepid. (ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F))
- Dry the eyewash bowl (sink).
- Inspect floor area around eyewash station for any fluid. Dry floor area if necessary.
- Record the testing on the [Weekly Eyewash Inspection Log](#) as either “Compliant” or “Defective” and complete all applicable information.

Annual Inspection

All emergency eyewash equipment must pass an annual inspection by the Department of Institutional Compliance & Risk Management. The Environmental Health & Safety Manager will inspect the following criteria:

- The unit must be hands-free (stay-open valve)



- The unit must be able to be used without the use of the operator's hands until the valve has been intentionally closed.
- The valve must be simple to operate and is able to be fully activated (open valve) within one (1) second or less.
- An operator must not require a separate motion to remove the dust protection cover of the eyewash unit. (The dust protection cover must be removed automatically upon activation.)
- The unit must be capable of delivering a minimum of 1.5 liter/minute (0.4 gpm) of flushing fluid for at least 15 minutes.
- The unit must deliver flushing fluid to both eyes simultaneously.
- The velocity of the flushing fluid must not be able to cause injury to the user.
- The flushing fluid temperature must be tepid. (ANSI defines this temperature range to be between 16°C - 38°C (60°F - 100°F))

Portable Emergency Eyewash Equipment

Portable emergency eyewash units do not require weekly flushing. However, each portable unit must be visually inspected of the following:

- The equipment is clean
- The path to the equipment is unobstructed
- The flushing fluid is non-expired
- The flushing fluid is full (not empty or low)

MAINTENANCE, REPAIR AND TRAINING

It is the applicable department's responsibility to ensure that emergency eyewash units and emergency shower equipment are maintained as stated within these requirements.

- Emergency eyewash units must be activated weekly for at least 30 seconds to verify proper operation, to prevent sediment build-up, minimize microbial contamination, and to ensure that flushing fluid is available.
- Whenever an emergency eyewash or emergency shower becomes non-operational or defective, a work-order must be submitted to facilities using the "Report a Problem" system found here: [Report a Problem: Facilities Problem](#)
- Operation with the recognized hazard for which the emergency eyewash or emergency shower was installed must not be performed until the equipment has been properly repaired or replaced and has returned to proper service.
- Any party that plans to remove an existing emergency eyewash or emergency shower equipment must notify the [Department of Institutional Compliance & Risk Management](#) prior to having the equipment removed.
- All individuals who may be exposed to hazardous materials or any recognized hazard that requires the installment of an emergency eye wash or emergency shower must be instructed in the location and proper use of the equipment.
- All emergency eyewash and emergency shower equipment must be inspected annually.