Emergency Eyewash and Shower Standard

PURPOSE

This standard has been developed to provide the minimum requirements for installation, training, use and maintenance of emergency eyewash and emergency shower equipment. All work areas where a worker may be exposed to materials harmful to mucous membranes, skin or body must have immediate access to equipment appropriate for the potential level of exposure and workers must be trained in use of the equipment.

SCOPE

This Standard applies to all persons whose work requires emergency equipment including eyewashes, eye/face washes, emergency showers, combination eyewashes and showers, personal wash units and drench hoses at the University of Lethbridge in compliance with Part 4 of the Alberta Occupational Health and Safety Code.

RESPONSIBILITIES

Supervisors

- Must know, understand and comply with the applicable components of this standard to facilitate the protection of the health and safety of workers.
- Ensure that a hazard assessment is performed in their area to identify emergency eyewash and shower requirements and apply the hierarchy of controls i.e. engineering controls (e.g. fume hoods and biosafety cabinets), administrative controls or personal protective equipment (e.g. safety glasses, goggles, and face shields).
- Ensure that workers are aware of the location of, and are trained in the proper use of emergency eyewashes and showers and document such training.
- Ensure the unobstructed access to emergency eyewashes and showers is maintained, and that equipment is maintained.
- Ensure that eyewash stations and emergency showers are inspected and flushed in accordance with this standard.
- Submit a Facilities work request for emergency shower and eyewash stations not operating properly, and ensure all deficiencies are corrected.

Employees

- Must know, understand and comply with the applicable components of this standard as well as any additional requirements set by their supervisor.

Facilities

- Apply the University Design Standards for the selection, purchase, installation and commissioning of emergency eyewashes and showers.
- Conduct annual performance testing as per the ANSI Standard Z358.1 and retain records.
- Repair emergency eyewashes and showers and retain records.
- In conjunction with Campus Safety, investigate operational deficiencies and make recommendations regarding eyewash and emergency shower equipment.

Campus Safety

- Provides information on appropriate legislation, codes, standards and best practices for the selection and installation of emergency eyewashes and showers.
- Assists users in obtaining repairs or service when service requests are not completed within a reasonable period.
- Development and maintenance of this document.

STANDARD

Installation

- All installations of emergency showers and eyewashes must comply with the specifications of the current version of the ANSI Z358.1 Standard.
- The need for emergency equipment in a work area is determined by completing a Hazard Assessment (refer to the UofL Hazard Assessment and Control Procedure) and in consultation with Safety Services.
- Eyewash stations and showers should be located within 10 seconds walking distance. For strong acids and caustics, the eyewash should be no more than 10 unobstructed feet away from the work area.
- The path to the eyewash station or shower should be free of obstructions, and should be mounted in such a way such that it can be accessed by people of all physical sizes.
- The area of the eyewash and shower should be well lit, well signed and clear of obstructions.
- New installations of eyewashes or showers 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 within 150 feet of the untempered eyewash. This arrangement allows the existing installations to remain useful while enhancing safety by providing access to a tepid eyewash.

- The procedure for this arrangement is that the worker goes to the closest eyewash for an initial cleansing. If the temperature became unbearable, the worker moves to the nearest tepid eyewash to ensure the appropriate flushing period is completed. Note that the flushing period can be as long as an hour for concentrated caustics.

Training

Site-specific training is to be provided by the supervisor and documented on the employee's training record. Training must include:

- Location of emergency equipment.
- Instructions regarding activation of emergency equipment.
- Demonstration regarding activation of emergency equipment (eyewash station only, where practicable), that does not create additional hazards by such activation (e.g. demonstrate use of eyewash where water is contained and drained).
- Instruction that eyelid(s) are to be held open with the hands while the eyes and face are still in the flow of water.
- Perform eye irrigation by introducing water at the inner corner of the eye – adjacent to the nose – and letting it run across the eye to the outer edge.

(See instructions on how to use and eyewash and emergency shower on page 4.)

Using an Eyewash or Safety Shower

How to use an Eyewash

- Open water supply fully.
- Place eyes in water stream.
- Hold both eyelids open with your fingers.
- Have a co-worker call for appropriate medical attention.
- Rinse until the time specified on the SDS has been reached (if necessary, have a co-worker look up the appropriate time and then time you).
- 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.

How to use a Deluge Shower

- Open water supply fully.
- Stand in the water stream.
- Remove all contaminated clothing. Typically undergarments would not be contaminated.
- Have a co-worker call for appropriate medical attention.
- Rinse until the time specified on the SDS has been reached (if necessary, have a co-worker look up the appropriate time and then time you).
- 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.

Inspection of Eyewashes and Showers with Drains

1. Ensure that the path to the eyewash/shower is easily accessible, and is not obstructed. Keep in mind that the injured worker would be in distress, and may have to rush to the emergency unit with eyes closed.
2. ONLY test a shower if it has a PLUMBED DRAIN.
3. Verify that nozzle caps, on the eyewash units, are in place to prevent contamination and that the nozzles, nozzle caps, and bowl/sink are clean and sanitary.
4. Actuate valve to full open position. Water must flow within 1 second.
5. Verify that nozzle caps come off when the eyewash is activated.
6. For the eyewash or shower unit, verify that water continues to flow until manually turned off and that the flow stays on without requiring the use of the operator's hands.
7. For a tepid eyewash put your hand in the stream of the water to ensure that it is tepid; not too cold or too hot.
8. Look at the flow pattern of the eyewash. It should provide a gentle non-injurious flow. Water streams should flush both eyes simultaneously.
9. A shower should provide a wide enough water stream to cover the whole body.
10. Flushing of the system should be conducted for as long as is needed to empty the pipe of stagnant water. The time required could be as little as 10 seconds or as much as three minutes (the ANSI specified time). Wipe up any water left on the floor.
11. Report any problems to Facilities by submitting an online work request.

Definitions

Eyewash: A device that provides fluid to irrigate and flush the eyes.

Shower: A device designed to deliver flushing fluid to the entire body, in sufficient volumes.

Drench Hoses: A device that consists of a flexible hose connected to a flushing fluid supply and used to provide fluid to irrigate and flush face and body areas. A drench hose is considered a “supplemental device” under ANSI Z358, and is thus not a substitute for a shower.

Potable Water: Water that is suitable for drinking.

Combination Unit: Emergency equipment which includes shower and eyewash and is supplied by a single source of flushing fluid.

Tepid Water: Lukewarm; moderately warm.

Personal Eyewash: A squeeze bottle filled with flushing liquid. Personal eyewashes are *not to be used as the primary eyewash* in a permanent workplace. They are only to be used in situations where no plumbed eyewash is available, or as an immediately available first flush before proceeding to the plumbed eyewash.

Appendix A

MAINTENANCE, FLUSHING AND INSPECTION

It is essential to maintain the emergency equipment to ensure its proper function in case of an emergency. Thus, the equipment shall be maintained according to the manufacturer's instructions. In addition the following shall be done to maintain the units:

Weekly Maintenance

Supervisors must ensure the following:

- Emergency eyewashes must be activated for at least three (3) minutes or until the water runs clear, whichever is longer. The purpose is to remove stagnant water, verify proper operation and remove sediment from the emergency equipment.
- Inspect eyewash and eye/face wash stations while flushing to make sure that water rises to approximately equal heights, and that fluid flow is sufficient to flush both eyes simultaneously while at a velocity low enough to be non-injurious to the user.
- Water in self-contained eyewash and eye/face wash stations must be replaced with fresh potable water regularly. Follow the manufacturer's recommendations for functionality tests and solution replacement when a preserved solution is used in these units.
- Emergency Equipment Maintenance Logs will be used to document weekly eyewash and showers inspection and flushing. The weekly emergency eyewash maintenance record shall be maintained Supervisors and PIs in their respective areas of responsibility. See the Responsibilities section for further details.

Annual Maintenance

- All emergency showers and eyewashes shall be inspected annually by Facilities to assure conformance with ANSI Z358.1 standard (annual performance testing).
- Central records shall be kept by Facilities to verify compliance. A tag indicating testing shall be affixed to the equipment.

Recommended Procedure for Annual Eyewash/Shower Inspections:

Note: The annual inspection will be carried out by a U of L Facilities/Operation or a contractor.

1. Ensure that fluid flow is not less than 1.5 liters per minute (0.4 gallons per minute) for eyewashes and 75.7 liters per minute (20 gallons per minute) for showers. This may be done with a flow meter or by timing the flow into a suitable container.
2. Inspect all components for corrosion or other damage.
3. If units are functioning correctly, document the annual check.

Detailed Installation, Operation and Design

Eyewash Stations

Specifications

- In accordance with the guidelines of ANSI Z358.1, 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.

Safety Showers

Specifications

- In accordance with the guidelines of ANSI Z358.1, 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 water 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 0.41 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

Eyewash Station

- The preferred eyewash installations are either the pull down or paddle on type. They can be by the sink or standalone. The drench hose type eyewash is acceptable as a supplement, but in service it is not specified as the primary eyewash except in grandfathered situations. This is due to the greater potential for the eyewash to be hidden by clutter.
- Equipment shall be installed in compliance with ANSI standard Z 358.1 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 equivalent to roughly 55 unobstructed feet from the hazard.
- 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. For new installations
- 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 many 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.

Emergency Shower

- 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).
- For new installations there must be a proper drainage system present near the shower; this will minimize any potential for contaminating the surface or groundwater. The drain must have a dyke around it to prevent spills from accidentally leaking down the drain. The shower must be located such that the dyke will not present a tripping hazard in everyday use.
- For new installs the floor under the shower should be non slip.
- 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.

REFERENCES

1. ANSI Standard Z358.1 (current version)
2. Canadian Centre for Occupational Health and Safety https://www.ccohs.ca/oshanswers/safety_haz/emer_showers.html
3. University of Toronto, Emergency Eyewash and Shower Standard
4. University of Calgary, Emergency Eyewash and Shower Standard

RELATED DOCUMENTS

Emergency Eyewash Maintenance Record

Laboratory Chemical Safety and Procedures Manual

Chemical Safety Standard