Emergency Eyewash and Shower Equipment
Standard Operating Procedure

Environmental Health & Safety
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Safety Showers and Eyewash Stations

Regulatory Authority or Standard

The Texas A&M Health Science Center (HSC) is committed to meeting compliance with all applicable federal, state and local rules, regulations, policies and procedures. The HSC’s Environmental Health and Safety (EHS) office has the responsibility of supporting these compliance obligations through regulating and developing safety and environmental policies and procedures for all HSC components.

This document for Emergency Eyewash and Shower Equipment was developed in compliance with the American National Standards Institute (ANSI) standard Z358.1 (Emergency Eyewash and Shower Equipment) and inspection criteria and maintenance operations unique to the Texas A&M Health Science Center work environment.

Change History

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<th>Revision Number</th>
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Section 1. Introduction

The purpose of this Standard Operating Procedure is to outline the requirements for the installation, inspection, use and maintenance of Emergency Eyewash and Emergency Shower Equipment.

Section 2. Scope

The HSC will provide Emergency showers and/or eyewash stations wherever mandated by rule, regulation or consensus standards, or whenever a hazard assessment determines areas where corrosive materials or infectious agents are present, or where there is a reasonable probability of injury to the eyes or skin occurring as a result of exposure to hazardous chemicals or materials.

Section 3. Operations / Departments Affected

This program applies to all plumbed and non-plumbed emergency eyewash and emergency shower equipment located in all HSC facilities.

Section 4. Definitions

Emergency Shower: A device designed to deliver flushing fluid in sufficient volume in order to enable the user to have water cascading over the entire body while the hands are free.

Emergency Eyewash: A device used to provide fluid to irrigate and flush both eyes simultaneously at a velocity low enough to be non-injurious to the user.

Eye/Face Wash: A device used to provide fluid to irrigate and flush both the face and the eyes simultaneously.

Combination Unit: An interconnected assembly of drenching and flushing equipment that is supplied by a single flushing fluid source.

Drench Hose: A supplemental device consisting of a flexible hose connected to a flushing fluid supply that is used to provide fluid to irrigate face and body areas.

Personal Eyewash: A supplementary device that supports plumbed or self-contained eyewash units, by delivering immediate flushing fluid to the eyes or body.

Plumbed Eyewash: An eyewash unit that is permanently connected to a source of potable water in order to irrigate both eyes.
Potable water: Water that is suitable for drinking

Flushing fluid: Potable water, preserved water, preserved buffered saline solution or other medically acceptable solutions manufactured and labeled in accordance with applicable federal regulations.

Flow Pressure: The pressure of the flushing fluid exerted in the wall of the pipe near the outlet while the faucet/outlet is fully open and flowing.

Flow Regulator: A mechanical device intended to control the flow of flushing fluid through the pipe.

Stay-open valve: A valve that, once activated, must be closed manually by the user.

Tepid: Moderately warm; lukewarm

Hazardous Material: Any substance or compound that has the capability of producing adverse effects on human health and safety.

Section 5. Responsibilities

5.1 Laboratory Supervisor
- Ensure that the necessary emergency eyewash and shower equipment are located on the same level as the hazards.
- Ensure unobstructed access to the safety shower/eyewash equipment so that it requires no more than 10 seconds to reach (no more than 55 feet walking distance).
- Ensure that all employees and students who may need the emergency eyewash and shower equipment are trained on their location and use.
- Ensure that emergency eyewash stations within the laboratory are activated weekly and a weekly activation log is maintained.
- Request maintenance for immediate repair, modification or installation of eyewash/shower equipment.
- Inform Environmental Health & Safety (EHS) before removing any emergency eyewash/shower equipment from the laboratory.

5.2 Environmental Health & Safety
- Ensure that supervisors, employees, and students are notified of their responsibilities as outlined in this Standard Operating Procedure.
- Ensure that all employees and students have received instruction regarding operation and maintenance of emergency eyewash and shower equipment as needed.
- Coordinate with facilities management for inspection, modification, repair, maintenance, and installation of emergency shower and eyewash units, as necessary.
- Ensure that each department is aware of their responsibilities under this program.
- Maintain an updated inventory of emergency eyewash and safety shower units.
- Assist with building plan review and selection from a list of recommended units during new construction or major renovation.
- Provide assistance, necessary equipment and inspection tags required to test emergency eyewash/shower equipment as required by departments.
- Conduct annual inspection to ensure that the emergency eyewash and shower equipment is functioning properly.
- Monitor that the provided emergency eyewash station weekly activation log is maintained by each laboratory.
- Conducting hazard assessments (using the guidance provided in Appendix A)
- Evaluating and approving personal eyewash bottles.
- Identifying emergency eyewashes and showers that are no longer needed and submitting a request to Facilities Management for their removal.
- Providing technical assistance to Facilities Management and other personnel in the selection, installation, maintenance, and testing of emergency eyewashes and showers.
- Conducting an annual review of all elements of the emergency eyewash and shower program.

5.3 Facilities Maintenance

- Perform immediate modifications, repair, maintenance, and installation of emergency eyewash and shower equipment as required.
- Inform EHS after installation, repair, and modification of eyewash and/or shower equipment so that EHS can inspect/re-inspect the units.
- Executes all work orders for the installation or repair of emergency eyewash and shower equipment on a high priority basis.
- Conducts annual flow rate testing and compliance assessment.
- Maintains written records of flow rate testing and compliance assessment.
- Notifying facility EHS staff of changes in work areas or work processes and practices that require a Hazard Assessment to evaluate the need for new installations, or for the removal of existing emergency eyewashes or showers.
- Testing all emergency equipment after installation to ensure that it meets the manufacturer’s installation requirements.
- Units that fail testing must be repaired immediately. If deficiencies cannot be immediately corrected, the area supervisor must be notified and the unit must be tagged “DO NOT USE”. The area supervisor must notify all affected employees and EHS when emergency equipment is out of service. A portable unit may be temporarily required to meet the need for an emergency eyewash and shower.
Section 6. Selection Criteria

6.1 Hazard Assessment

6.1.1 A hazard assessment (see Appendix A) will be performed in areas of the facility when
(1) Interpretation of code, guideline or standard is needed.
(2) When reviewing project specifications for all new construction and renovation projects to determine the need for eyewash and shower units, including proper selection and installation.
(3) Every time the workplace conditions change.

6.1.2 When deemed necessary by the hazard assessment, ANSI-approved emergency eyewashes and/or showers must be installed in newly constructed areas. All unapproved eyewashes and showers must be replaced with ANSI-approved units during renovation projects.

6.1.3 Only the American National Standards Institute (ANSI)-approved emergency eyewashes, showers, and drenching equipment may be purchased and installed in accordance with the manufacturer’s specification to maintain the ANSI approval.

6.1.4 Selection of the emergency eyewashes and equipment must be approved by the facility EH&S staff.

6.2 Safety Showers

6.2.1 ANSI requires that a means shall be provided to ensure controlled flow of flushing fluid at a velocity low enough to be non-injurious to the user.

6.2.2 The safety shower equipment shall be designed so that it can be activated in 1 second or less, and it remains operational without user assistance (stay-open valve) until intentionally closed.

6.2.3 The shower equipment shall be capable of delivering flushing fluid at a minimum volume of 75.7 liters per minute (20 gpm) for at least 15 minutes.
6.2.4 The spray pattern of the shower shall have a minimum diameter of at least 50.8 cm (20 in.) at 152.4 cm (60 inches) above the surface on which the user stands.

6.2.5 The center of the spray pattern shall be located at least 40.6 cm (16 in.) from any obstruction.

6.3 Emergency Eyewashes

6.3.1 ANSI requires that a means shall be provided to ensure controlled flow of flushing fluid at a velocity low enough to be non-injurious to the user.

6.3.2 The emergency eyewash unit shall be designed so that it can be activated in 1 second or less, and once activated; it remains operational without requiring the use of operator’s hand until intentionally closed.
6.3.3 The 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 minimum 15 minutes.

6.4 Drench Hose

6.4.1 Drench hoses are considered to be secondary to emergency eyewash and shower equipment. Monocular and dual-head drench hoses do not meet ANSI standards for emergency eyewash or safety shower as because they are not hands free. Therefore, having a drench hose does not replace the need for an emergency eyewash/safety shower.

6.4.2 Drench hoses may be used to "spot" rinse an area when a full shower is not required, to assist a victim when the victim is unable to stand or is unconscious, or to wash under a piece of clothing before the clothing is removed.

6.5 Water Temperature

The ANSI Z358.1-2009 recommends that the flushing fluid shall be "tepid". However, ANSI provides a guideline that the flushing fluid temperature in the range of 27°C-35°C (80°F-95°F) is considered suitable.
6.6 Privacy consideration

Normal showers should not be used in-lieu of an emergency shower for drenching and removing chemicals. Shower enclosure, if used, shall provide at least 86.4 cm (34 in.) in diameter of unobstructed area inside.

Section 7. Installation

7.1 Emergency Shower

7.1.1 It is the installer’s responsibility to ensure that all safety shower units are assembled and installed in compliance with ANSI Z358.1-2009 and the manufacturer’s instructions.

7.1.2 All laboratories, newly constructed or renovated, or any room used for similar purposes wherein corrosives, flammable liquids, toxins, bio-hazardous wastes, or radiological materials are handled as well as other work-areas where hazardous materials are used; such as mechanical rooms, pH neutralization systems, battery charging areas, spraying operations, and high dust areas shall have a safety shower for emergency use.

7.1.3 The shower location shall be identified with highly visible signs. The sign shall be visible within the area served by the shower and shall consists of symbols that require users to have any language skill to understand.

7.1.4 The shower shall be designed and installed so that the flushing fluid column is between 208.3 cm (82 in.) and 243.8 cm (96 in.) in height from the surface on which the user stands.

7.1.5 Safety shower shall be in accessible location requiring no more than 10 seconds to reach. It shall be positioned no more than 55 feet from the furthest corner of the room.
7.1.6 The shower unit shall be located on the same level as the hazard. The location area shall be well-lit and the path shall be unobstructed.

7.1.7 Safety shower shall deliver tepid flushing fluid. The equipment shall be protected from freezing or freeze-protected equipment shall be installed, as necessary.

7.1.8 If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

7.2 Emergency Eyewash

7.2.1 It is the installer’s responsibility to ensure that all emergency eyewash units are assembled and installed in compliance with ANSI Z358.1-2009 and the manufacturer’s instructions.

7.2.2 All laboratories, newly constructed or renovated, or any room used for similar purposes wherein corrosives, flammable liquids, toxins, bio-hazardous wastes, or radiological materials are handled as well as other work-areas where hazardous materials are used; such as mechanical rooms, pH neutralization systems, battery charging areas, spraying operations, and high dust areas must have a hands-free eyewash unit.

7.2.3 Emergency eyewash units shall be in accessible locations requiring no more than 10 seconds to reach. It shall be positioned no more than 55 feet from the furthest corner of the room.

7.2.4 The eyewash unit shall be positioned with the flushing fluid nozzle between 83.8 cm (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.

7.2.5 The location area shall be well-lit and the path shall be free of obstructions.

7.2.6 Emergency eyewash unit shall be located in an area identified with highly visible signs. The sign shall be visible within the area served by the eyewash unit and shall consists of symbols that require users to have any language skill to understand.
7.2.7 The eyewash unit shall be located on the same level as the hazard. The ANSI Z358.1 requires that the eyewash unit should be located immediately adjacent to the hazard in case of handling strong acid or alkali.

7.2.8 The eyewash unit shall deliver tepid flushing fluid. The equipment shall be protected from freezing or freeze-protected equipment shall be installed, as necessary.

7.2.9 If shut off valves are installed in the supply line for maintenance purpose, provisions shall be made to prevent unauthorized shut off.

Section 8. Inspection Procedures

8.1 Emergency Eyewash Equipment

Weekly flushing of emergency eyewash units in compliance with the ANSI Z358.1-2009 shall be conducted by the laboratories. Weekly check cards will be provided to the laboratories (one card per eyewash). Verification of weekly flushing and distribution of a new annual check card will be conducted by EHS laboratory inspection staff during regularly scheduled laboratory inspections. If units are not being checked weekly by laboratory staff, EHS inspectors will record this as a Deficiency on the Laboratory Inspection Report.

8.1.1 Method

Respective laboratory personnel shall follow the same method as outlined in this “Standard Operating Procedure” for weekly activation of emergency eyewash units situated in their laboratory.

Before activating the eyewash unit, check if the unit is connected to any types of drainage system. Apply appropriate water collection method as necessary. A plastic cup, a strong zip-lock bag, or a small bucket may be used depending on the design of the eyewash unit. The Safety office can provide any necessary testing equipment.

8.1.1.1 Turn the valve on to full open position (activation of the unit). The eyewash nozzles shall have a dust protecting cover, which shall be automatically removed upon activation of the unit.

8.1.1.2 Verify that the eyewash unit opens within one second of opening the valve and it remains open without operator’s further assistance (stay-open valve) until intentionally closed.
8.1.1.3 The emergency eyewash unit shall provide flushing fluid to both eyes simultaneously. The flushing streams shall rise to approximately equal heights on both sides.

8.1.1.4 Record the test as passes or failed, sign and date the inspection tag. Dry the eyewash sink and floor using a sponge.

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8.1.2 Performance Evaluation:

Emergency eyewash equipment will pass EHS’s annual inspection, if all of the following criteria are met.

8.1.2.1 The unit shall be hands-free (stay-open valve); once activated; it can be used without the use of operator’s hands until intentionally closed.

8.1.2.2 The valve shall be simple to operate and shall go from “off” to “on” position in 1 second or less.

8.1.2.3 It shall not take more than 1 second to open the unit once the valve is full open.
8.1.2.4 Operator shall not require a separate motion to remove the dust protection cover of the eyewash unit.

8.1.2.5 The unit shall be capable of delivering a minimum of 1.5 liter/minute (0.4gpm) of flushing fluid for at least 15 minutes.

8.1.2.6 The unit shall deliver flushing fluid to both eyes simultaneously at a velocity low enough to be non-injurious to the user.

8.1.2.7 The flushing fluid temperature shall be tepid. Temperature in the range of 27-35°C (about 80-95°F) is considered suitable.

Section 9. Maintenance, Repair and Training

9.1 Emergency eyewash unit shall be activated weekly for a period long enough to verify operation and ensure that flushing fluid is available. Weekly activation prevents sediment build-up within the eyewash unit and minimizes microbial contamination in the stagnant water.

9.2 It is department’s responsibility to ensure that emergency eyewash and safety shower equipment that does not pass inspection is repaired immediately by contacting Facilities or EHS.

9.3 Whenever an emergency eyewash or safety shower is non-functional, immediately contact the Facilities to fix it. Do not handle hazardous materials in that work-area until the unit is returned to proper service.

9.4 Any party removing emergency eyewash or safety shower equipment from service, must notify EHS and the affected department beforehand.

9.5 Individuals who may be exposed to hazardous materials shall be instructed in the location and proper use of emergency eyewash and safety shower equipment.

9.6 The ANSI Z358.1 requires that all emergency eyewash and safety shower equipment shall be inspected annually.
Section 10. References


Appendix A
Hazard Assessment Form
# Emergency Eyewash and Safety Shower Hazard Assessment Form

## IDENTIFICATION

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## A. INVESTIGATION

1. CHEMICALS IN AREA:

2. CONDITIONS OF USE:

## B. RISK ASSESSMENT CODE (RAC)

1. **SEVERITY CLASSIFICATION:**

   - Class I - Catastrophic - Marginal (may cause death or permanently disabling injury).
   - Class II - Critical (may cause severe injury or severe occupational illness).
   - Class III - Marginal (may cause minor occupational injury or illness).
   - Class IV - Negligible (probably would not affect personnel safety or health).

2. **PROBABILITY ESTIMATE:**

   - Estimate A - Likely to occur immediately.
   - Estimate B - Probably will occur in time.
   - Estimate C - May occur in time.
   - Estimate D – Unlikely to occur.

3. **RAC DETERMINATION:**

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   If the results of the evaluation determine that the RAC is 1 or 2, an eyewash or shower is required. If the results of the evaluation determine that the RAC is 4, 5 or 6, an eyewash or shower is not required. A RAC of 3 indicates that the eyewash or shower is optional.

## C. FINDING

- REQUIRED
- OPTIONAL
- NOT REQUIRED

### Applicable Assessment Criteria/Consensus Standards/VA Directives/TAMU Standard Operating Procedures

- OSHA 1910.1044(i)(3): *If there is any possibility that an employee's eyes may be splashed with solutions containing 0.1 percent or greater formaldehyde, the employer shall provide acceptable eyewash facilities within the immediate work area for emergency use.*
- OSHA 29 CFR 1910.151(c): *Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.*
- Center for Disease and Control and Prevention, *Biosafety in Microbiological and Biomedical Laboratories (BMBL)* 5th Edition, 2007
- VA General Safety Guidebook
- VHA DIRECTIVE 2009-026, May 2009

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Surveyor Signature