PennState Physical Plant ENVIRONMENTAL HEALTH & SAFETY

ENVIRONMENTAL HEALTH AND SAFETY

Emergency Eyewashes and Safety Showers at Penn State University

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Contents

1. Purpose

This document is necessary to ensure suitable facilities for quick drenching or flushing of the eyes and body of individuals with exposure to hazardous materials. The document outlines requirements for access, performance, and installation of emergency eyewashes (eyewashes) and safety showers (showers).

2. Scope and Applicability

This document applies to all work that occurs at Penn State locations except the Hershey Medical Center and the College of Medicine. The document covers emergency equipment that may be used by Penn State employees, students, and visitors for purposes of quick irrigation in the event one's eyes or body are exposed to hazardous materials. This document outlines requirements for existing eyewashes and showers as well as requirements and design standards for new installations. It also includes requirements applicable to pesticide exposure and other special circumstances.

3. Terms and Definitions

- **ANSI-compliant** – meets all performance, installation, and design requirements of ANSI Z-358.1-2014 (a standard incorporated by reference where specified)
- **Chemical laboratory** – a location where chemicals are mixed or manipulated on a laboratory scale, multiple chemical procedures are used, and procedures are not part of a production process
- **Corrosive material** – a chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact; classified health hazard GHS05 as indicated by corrosive pictogram on SDS or label
- **Combination Unit** – a plumbed device used to irrigate and flush the eyes and face as well as the entire body
- **Drench hose** – A supplemental irrigating device consisting of a flexible hose connected to a flushing fluid supply and used to provide fluid to irrigate and flush face and body areas; may or may not meet document requirements; may or may not meet ANSI Z-358.1-2014 requirements Note: If a drench hose meets all eyewash requirements of this document, then it can be used as an eyewash to comply with this document.
- **Eyewash** – A plumbed device used to provide fluid to irrigate and flush both eyes simultaneously
- **Existing installation, (existing equipment)** - equipment installed before the effective date indicated in this document
- **Eye/face wash** - A plumbed device used to provide fluid to irrigate and flush the eyes and face; the word "eyewash" used throughout this document often refers to both eyewashes and eye/face washes unless describing specific performance requirements of an eye/face wash (e.g., flow rate)
- **Eye flushing device** – a device capable of flushing the eyes; not necessarily ANSI-compliant; not necessarily plumbed (i.e., squeeze bottle devices)
- **Emergency shower, (safety shower), (shower)** – A plumbed device specifically designed and intended to deliver flushing fluid in sufficient volume to cause that fluid to cascade over the entire body.
- **Facilities** – unless otherwise specified by context, the word "facilities" refers to suitable drenching equipment that meet the access requirements of this document (e.g., plumbed eyewash, eye/facewash, or safety shower)

- **New installation, (new equipment)** – equipment installed after the effective date indicated in this document
- **Plumbed** – connected to building water supply
- **Suitable Flushing Facilities** – Safety showers, eyewashes, and/or eye/face washes that comply with this document
- **Worker Protection Standard** - a regulation issued by the U.S. Environmental Protection Agency that governs pesticides used in the production of agricultural plants on farms, forests, nurseries, and greenhouses. Agricultural plants include those grown or maintained for commercial or research purposes.

4. Resources, References, and Source Information

29 CFR 1910.151 – Medical services and first aid

29 CFR 1910.1048 – Formaldehyde

ANSI/ISEA Z358.1-2014 – American National Standard for Emergency Eyewash and Shower Equipment

BMBL, 6th Edition

5. Roles and Responsibilities

Supervisors and Principal Investigators:

- Assess the need for and access to suitable flushing facilities
- Ensure eyewashes and safety showers in their work area remain unobstructed
- Train students and employees in their work area on the locations of nearest shower and eyewash as well as procedures proper use.
- Ensure eyewashes in their work area receive documented weekly inspections and that any issues identified are reported to the appropriate facility manager or maintenance unit.

Employees:

- Use eyewashes or safety showers when necessary as directed by a substance's Safety Data Sheet
- Conduct weekly eyewash inspections as assigned by Supervisor in accordance with Eyewash inspection procedure
- Keep access to eyewashes and safety showers clear and unobstructed
- Report any observed eyewash and safety shower deficiencies to your Supervisor

Unit Department Heads and Budgetary Personnel:

- Provide necessary support and resources for installation, maintenance and repair of eyewash and safety showers in their areas of responsibility when required

Safety Officers and/or Facility Coordinators:

- Ensure eyewashes in common areas receive documented weekly inspections

- Ensure deficiencies related to building problems are abated to keep flushing facilities in good working order

EHS:

- Oversee eye wash and safety shower management including determination of the need for installation of suitable flushing facilities in existing facilities and new design or renovation projects.
- Provide options for back up eyewash and safety shower capabilities when existing units are out of service (EHS has portable wash unit available for temporary use)
- Conduct annual testing of eyewashes and safety showers at Commonwealth campuses
- Periodically assess compliance with this document

Penn State Office of Physical Plant:

- Conduct annual testing process of eyewashes and safety showers at University Park
- Complete work order related preventative maintenance and repair of flushing facilities
- Apply new construction and installation requirements (Appendix A) to new installations of eyewashes and safety showers and ensure installation contractor includes requirements in scope of work
- Ensure execution of initial commissioning process of flushing facilities

Commonwealth Campuses Maintenance Operations

- Assist EHS during annual testing process of eyewashes and safety showers at Campus
- Complete work order related preventative maintenance and repair of flushing facilities
- Apply new construction and installation requirements (Appendix A) to new installations of eyewashes and safety showers and ensure installation contractor, if required, includes requirements in scope of work
- Ensure execution of initial commissioning process of flushing facilities along with EHS Campus Coordinator support

6.0 General Requirements (Existing and New Installations)

Access to eyewashes and safety showers must be unobstructed. Examples of obstructions include, but are not limited to, travel up and down stairs, items stored in pathway, items stored on floor in front of the facilities, and passing through locked or swipe-access doors. For existing installations, travel through an unlocked door is acceptable, if facilities are immediately available within the work area. For new installations, travel through an unlocked door is not acceptable unless the door swings outward in the direction of travel towards the eyewash and/or safety shower and the door cannot be locked to impede access to the equipment.

Safety showers and eyewashes shall not be located within six feet of electrical hazards (receptacles, disconnects, panel boards, etc.) unless the electrical hazard is appropriately protected from water. Safety showers and eyewashes shall not be located near any materials that may constitute a hazard if exposed to water (water-reactive chemicals, waste satellite accumulation areas, etc.).

Gravity-fed, self-contained, and squeeze-bottle type shower or eyewash units are not permitted unless expressly approved by EHS or use aligns with temporary compliance alternatives outlined by this document. For exposure during remote operations (e.g., fieldwork, farming) or similar operations where fixed eyewashes and showers are not feasible, squeeze-bottle eyewashes are permitted and safety showers are not required. However, there are specific requirements for working with pesticides in Section 10 of this document.

Lack of a floor drain, or lack of plumbed drainage, does not affect eyewash and safety shower requirements. Lack of appropriate water supply does not affect eyewash and safety shower requirements (e.g., an alternative research space may be required for compliance).

Where the possibility of freezing conditions exists, the shower and/or eyewash shall be protected from freezing or freeze-protected equipment shall be installed.

Anyone with potential exposure to hazards that requires access to an eyewash and shower must know where the nearest facilities are located and how to operate them. This training is the responsibility of the Principal Investigator (PI) or Supervisor.

Eyewashes and showers must be maintained and tested per the Maintenance section of this document.

7. Existing Eyewashes and Safety Showers

This section applies to eyewashes and safety showers installed before October 27th, 2022.

7.1 Access and Location Requirements

Where the eyes or body of any person may be exposed to corrosive materials, regardless of personal protective equipment used, suitable facilities for quick drenching or flushing of the eyes **and** body shall be provided within the work area for immediate emergency use.

To be considered “in the work area for immediate emergency use,” the facilities must be able to be accessed without excessive time or distance traveled. As an example, the furthest acceptable placement of an eyewash or shower would be in a corridor immediately adjacent to the space containing the exposure. Travel beyond the end of an immediate corridor or up/downstairs to access an eyewash or safety shower would be considered excessive and not acceptable.

Where the eyes of any person may be exposed to biological materials in a laboratory classified as Biosafety Level 1 or greater, regardless of protective equipment used, a plumbed eyewash shall be provided within that laboratory.

7.2 Performance Requirements

Only plumbed facilities that meet the general requirements of this document and the following performance requirements will be considered “suitable facilities”.

Emergency showers shall deliver safe flushing fluid at a minimum of 20 gallons per minute (gpm). Eyewashes shall deliver safe flushing fluid to the eyes not less than 0.4 gpm. Eye/face washes shall deliver fluid to the eyes and face not less than 3.0 gpm. Eyewashes and eye/face

washes shall provide flushing fluid to both eyes simultaneously. Eyewash and eye/face wash fluid stream shall rise above the nozzles a sufficient distance to allow for flushing (greater than two inches). Where protective nozzle caps are in place on eyewashes and eye/face washes, their removal shall not require a separate motion by the operator when activating the unit. The control valve for all eyewashes, eye/face washes, and safety showers shall remain open without the use of the operator's hands until intentionally closed.

For existing installations, a drench hose can serve as an eyewash if it meets the eyewash performance requirements outlined in this section; however, a drench hose's control valve does not have to remain open by a single action of the operator. A drench hose must provide water to flush both eyes simultaneous to be considered a suitable eyewash. The drench hose must comply with the eyewash maintenance requirements of this document (e.g., weekly documented flushes, annual testing).

8. New Construction and Installations

This section applies to new construction, renovation, and installation projects initiated after October 27, 2022.

8.1 Access and Location Requirements

Where the eyes or body of any person may be exposed to corrosive materials, regardless of protective equipment used, an ANSI-compliant eyewash **and** safety shower must be installed within 55 feet from any point of potential corrosive exposure. An eyewash and safety shower must be installed in all spaces designed for chemical mixing and manipulation and in spaces which now or in the future will meet OSHA's definition of a chemical laboratory (see definitions). An eyewash and shower must be installed in all BSL-2 laboratories. An eyewash and shower must be installed in all dedicated animal handling facilities. An eyewash must be installed in all BSL-1 laboratories. For all these installations, the flushing facilities shall be located within 55 feet from any point of potential corrosive or biological exposure. For all of these installations, an eye/face wash is preferred over an eyewash.

8.2 Performance Requirements

New installations of eyewashes, eye/face washes, and safety showers must meet ALL performance and installation requirements outlined in ANSI Z-358.1-2014. For further details, see Appendix A – Eyewash and Safety Shower Design Requirements.

For new installations, a drench hose can be used to meet eyewash requirements, as long as it meets all eyewash performance requirements outlined in Appendix A.

New installations must provide flushing fluid temperature within the range of 60 – 100 degrees Fahrenheit for 15 minutes.

8.3 Drainage Requirements

Any exceptions to these drainage requirements must be approved by EHS.

8.3.1 Safety Showers

Safety shower drainage shall comply with the existing OPP design standard as of the effective date of this document. This means a floor drain shall be provided to serve each safety shower installed. The drain shall be located directly below shower head. The floor shall slope toward drain.

8.3.2 Eyewashes and Eye/face Washes

Each emergency eyewash and eye/face wash installed as part of new construction shall have drainage plumbed directly to a sanitary sewer line (shall not drain to floor or have open-ended pipe).

8.4 New Installation Guidelines

The following conservative guidelines can help ensure compliance when planning for new installation of eyewashes and safety showers during construction or renovation:

- A combination unit (eye/face wash and shower) should be installed in every laboratory that will now or potentially in the future mix or manipulate chemicals or use biological materials.
- The combination unit should be placed as close to points of exposure as possible with a travel distance not exceeding 55 feet.
- The combination unit must be certified by the manufacturer that design meets ANSI Z-358.1 (ANSI-approved).
- The combination unit must be installed per the manufacturer's instructions, and it must meet all installation and performance requirements in ANSI Z-358.1. Appendix A provides a summary of the requirements.
- The combination unit must provide water at a temperature range of 60 – 100 degrees Fahrenheit for 15 minutes.
- The combination unit must receive a documented initial commissioning evaluation per Appendix B by the installation firm, after installation, but before occupants are exposed to hazards.
- Ensure compliant floor drains are installed under safety showers. Ensure eyewash discharge is plumbed to a sanitary sewer line.

8.5 Initial Commissioning and Certification of New Installations

The contractor responsible for installation of an eyewash or safety shower after the effective date indicated in this document is responsible for certifying the equipment meets required installation and performance criteria. The intent of this commissioning process is to ensure proactive compliance with design standards and functionality of emergency equipment before research commences or people are exposed to hazardous materials. Eyewashes and showers must be assessed using the criteria outlined in Appendix B. The evaluation must be certified by the

person performing it with name, date, and signature. These completed forms must be filed in E-Building or otherwise filed with building construction documents as well as submitted to EHS. Exposure to corrosive or biological hazards is not permitted before initial certifications in new laboratories and work areas where an eyewash or safety shower is installed. This initial certification process does not affect, and is in addition to, the annual testing process.

9.0 Maintenance, Inspection, and Testing

9.1 Weekly Eyewash Inspection

Weekly eyewash inspections include flushing the unit until the water runs clear, and a visual evaluation of the condition and function of the eyewash. Eyewash stations must be inspected weekly to prevent rust accumulation, sediments, hard water deposits, etc. Safety showers are not required to be flushed weekly.

When flushing an eyewash, allow the water to flow a sufficient time to conduct required tasks outlined by this section (e.g., 30 seconds, until water runs clear). It is required that a log of weekly flushes be maintained (and readily available or posted) indicating the date flushed and person performing the task. Weekly eyewash flush records shall be retained for at least three months. This form (https://ehs.psu.edu/laboratory-safety/forms) should be used to document weekly flushing.

During weekly flushes, visually inspect the eyewash for the following:

- The station is free from damage, corrosion, or contaminants that could hinder operation
- The handle to activate the water is present and functioning
- The water supply has not been turned off
- The eyewash station water flows sufficiently to reach the eyes
- Nothing is obstructing access
- Water appears to flush clear

Any problems with water flow or operation must be reported to the Facility Coordinator, Office of the Physical Plant (OPP), or Campus Maintenance for evaluation (i.e., place a work order).

Supervisors (PI of a laboratory with an eyewash or Supervisor of a work-area with an eyewash) are responsible for ensuring weekly flushes of eyewashes in their work area. When multiple Supervisors share access to one eyewash, the Supervisors are collectively responsible to ensure weekly flushing. For eyewashes that are not designated for use by any PI, laboratory, or work group, and are in a common, shared location (e.g. corridor), weekly flushes are the responsibility of the building's Facility Coordinator (or equivalent position).

These inspection and flushing requirements apply to drench hoses that are used as an eyewash. If a drench hose is not designated as an eyewash, it is not required to be flushed weekly.

9.2 Annual Eyewash and Shower Testing

Annual inspection and testing of eyewashes and safety showers is conducted by OPP at University Park and EHS Regional Coordinators (or local designees) at Commonwealth Campuses. Condition, access, and performance will be evaluated. The date of annual testing must be indicated on a tag affixed to the eyewash or safety shower. This annual testing is required once per calendar year within a period not to exceed 18 months.

To conduct annual maintenance, those responsible must use a similar work process outlined in Appendix C. The pass/fail criteria in Appendix C must be used to test eyewashes and safety showers annually. If certain criteria are not met, as indicated in Appendix C, the eyewash or shower must be tagged out of service until the issue is repaired or corrected. A red "Do Not Operate" tag or similar indication shall be used to communicate to potential users that the eyewash or shower failed inspection **and** is not adequate for use.

If an eyewash or shower fails annual evaluation and is tagged out of service, OPP or EHS Regional Coordinators (group performing test) shall inform the Facility Coordinator, Safety Officer, or similar position. The inspecting party, affected PIs, facility supervisor, the space owner, and/or the Facility Coordinators shall work together to abate the problem and return the eyewash or shower to service. When an eyewash or shower is out of service, those relying on access to the unit to comply with this document must cease use of corrosive and/or biological materials until the problem is fixed, or they must develop alternative means of compliance in accordance with the related section of this document or the guidance below.

If an eyewash or shower is temporarily out of service for repair, the following options are potential means of compliance. If a work group must use one of the following alternative means of compliance, the use must be approved by EHS in writing for temporary use only (e.g., four weeks):

- Plumbed eyewash alternatives:
    - A readily accessible self-contained pressurized vessel (personal wash unit) containing flushing fluid ≥ 15 gallons that can flush both eyes simultaneously
    - Two squeeze bottles of flushing fluid (each ≥ 32 fluid ounces) readily accessible for use. Squeeze-bottles must be discarded if partially used, out of date, or if the seal has been broken.
    - A plumbed drench hose that can flush both eyes simultaneously
- Plumbed safety shower alternatives:
    - A readily accessible self-contained pressurized vessel (personal wash unit) containing flushing fluid ≥ 15 gallons that has a drench hose that can flush areas of the body
    - A plumbed drench hose that can adequately provide fluid to any area of the body
    - Access to a washroom shower or emergency safety shower on the same floor of the building to which access cannot be prevented (with those trained on location, access, and use)

10. Special Circumstances and Requirements

10.1 Pesticides

A plumbed eyewash is required in buildings where pesticide concentrates are mixed and in locations with utilities where pesticides are commonly used (e.g., greenhouses, pesticide laboratories, maintenance/farm shops).

A plumbed household shower, an emergency safety shower, or 3 gallons of bottled water is required to be present at any pesticide facility covered by the Worker Protection Standard.

Note: Some pesticide facilities have emergency flushing equipment located outside and only connect them to a water supply during pesticide application season.

An eye flushing device (e.g., squeeze bottle or clean water tank) is required at all pesticide loading sites and at areas within ¼ mile of areas where pesticides are being applied. However, if a pesticide label requires eye protection, the eye flush device must be within 10 seconds (or 55 feet) from point of exposure. A sealed pint-size bottle of water or saline solution would meet this requirement. Squeeze-bottles must be discarded if partially used, out of date, or if the seal has been broken.

10.2 Exposure in Buildings Not Owned by Penn State

Where the eyes or body of a Penn State employee may be exposed to corrosive materials in buildings not owned by Penn State, facilities for quick drenching or flushing of the eyes **and** body shall be provided within the work area for immediate emergency use. The work unit that has exposed employees in buildings not owned by Penn State is responsible to ensuring access to suitable flushing facilities.

10.3 Alternative Means of Compliance and Exceptions

Any exceptions to this document or alternative means of compliance are only allowed with express, written approval from EHS. Exceptions, justifications, and alternative means of compliance should be documented by EHS.

EHS recognizes there are spaces and occasions where weekly eyewash flushing is not a reasonable expectation. Examples of these instances include: labs that will not be occupied for an extended period of time (e.g., over summer), labs that do not have exposure to corrosive chemicals or biohazards (e.g., irritants and flammables only), and redundant eyewash stations that would not be a reasonable choice to use by any person (e.g., a lab has five eyewashes and one is superior to the rest because of performance and location). If an academic or work unit can justify there is no reason to anticipate an eyewash will be used, EHS can provide written approval to discontinue documented weekly flushes for a period of time. If the eyewash becomes required

once again, the academic or work unit is required to flush the eyewash for 15 minutes and resume weekly testing. EHS is responsible for documenting such approvals.

11. Revision History

Revision Date	Purpose or Description
10/27/2022	V1.0 – Original EHS publication after internal and stakeholder review
4/18/2023	V1.0 – Removed all mentions of the work “program”

Appendix A. Eyewash and Safety Shower Design and Installation Requirements

Any eyewash, eye/face wash, or shower installation project initiated after 10/27/2022 must meet installation and performance requirements outlined in the most current version of ANSI Z-358.1-2014. For ease of access, these requirements are summarized in this Appendix.

EHS does not stipulate how these requirements are met, but compliance must be achieved during the design and installation phase.

A.1. Safety Showers

A.1.1. Performance:

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

Emergency showers shall be capable of delivering flushing fluid at a minimum of 75.7 liters per minute (20 gpm) for a minimum of 15 minutes. If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

Emergency showers shall provide a flushing fluid column that is at least 208.3 cm (82 in.) and not more than 243.8 cm (96 in.) in height from the surface on which the user stands.

The spray pattern shall have a minimum diameter of 50.8 cm (20 in.) at 152.4 cm (60 in.) above the surface on which the user stands, and the center of the spray pattern shall be located at least 40.6 cm (16 in.) from any obstruction. The flushing fluid shall be substantially dispersed throughout the pattern.

Emergency showers shall be designed, manufactured and installed in such a manner that, once activated, they can be used without requiring the use of the operator’s hands.

Emergency showers shall be constructed of materials that will not corrode in the presence of the flushing fluid. Stored flushing fluid shall be protected against airborne contaminants.

The control valve shall remain open without the use of the operator’s hands until intentionally closed. The valve shall be simple to operate and shall go from "off" to "on" in one second or less. The valve shall be resistant to corrosion. Manual or automatic actuators shall be easy to locate and readily accessible to the user. Valve actuators shall be located not more than 173.3 cm (69 in.) above the level on which the user stands.

If used, enclosures shall provide for a minimum unobstructed area of 86.4 cm (34 in.) in diameter.

A.1.2. Installation - Emergency showers shall:

Be assembled and installed in accordance with the manufacturer's instructions, including flushing fluid delivery requirements.

Be in accessible locations that require no more than 10 seconds to reach (55 feet). The emergency shower shall be located on the same level as the hazard and the path of travel shall be free of obstructions that may inhibit its immediate use.

Be located in an area identified with a highly visible sign positioned so the sign shall be visible within the area served by the emergency shower. The area around the emergency shower shall be well-lit.

Be positioned so that the shower pattern is dispersed such that the top of the flushing fluid column is at least 208.3 cm (82 in.) and not more than 243.8 cm (96 in.) from the surface on which the user stands. The center of the spray shall be at least 40.6 cm (16 in.) from any obstruction.

Be connected to a supply of flushing fluid per the manufacturer's installation instructions to produce the required spray pattern for a minimum period of 15 minutes. Where the possibility of freezing conditions exists, the emergency shower shall be protected from freezing or freeze-protected equipment shall be installed. If shut off valves are installed in the shower line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

Deliver tepid flushing fluid (60-100 °F) for at least 15 minutes. In circumstances where chemical reaction is accelerated by flushing fluid temperature, consult EHS. Where hot and cold water is supplied, the temperature must be controlled by a mixing valve.

When the plumbed emergency shower is installed, its performance shall be verified annually.

A floor drain shall be provided to serve each safety shower. The drain shall be located directly below shower head. The floor shall slope toward drain.

A.2. Eyewashes

A. 2. 1. Performance

A means shall be provided to ensure that a controlled flow of flushing fluid is provided to both eyes simultaneously at a velocity low enough to be non-injurious to the user.

The eyewash shall be designed and positioned in such a way as to pose no hazard to the user.

Nozzles and flushing fluid units shall be protected from airborne contaminants. Whatever means is used to afford such protection, its removal shall not require a separate motion by the operator when activating the unit.

Eyewashes shall be designed, manufactured and installed in such a manner that, once activated, they can be used without requiring the use of the operator’s hands.

Eyewashes shall be constructed of materials that will not corrode in the presence of the flushing fluid.

Eyewashes shall be capable of delivering flushing fluid to the eyes not less than 1.5 liters per minute (0.4 gpm) for 15 minutes. If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

Eyewashes shall be designed to provide enough room to allow the eyelids to be held open with the hands while the eyes are in the flushing fluid stream.

Eyewashes shall provide flushing fluid to both eyes simultaneously. A test gauge for making determination of a suitable eyewash pattern shall be a minimum 10.16 cm (4 in.) in length with two sets of parallel lines equidistant from the center. The interior set of lines shall be 3.18 cm (1.25 in.) apart and the exterior lines shall be 8.26 cm (3.25 in.) apart. Place the gauge in the stream of the eyewash. The flushing fluid shall cover the areas between the interior and exterior lines of the gauge at some point less than 20.3 cm (8 in.) above the eyewash nozzle(s).

The control valve shall remain open without the use of the operator’s hands until intentionally closed. The valve shall be simple to operate and shall go from "off" to "on" in one second or less. The valve shall be resistant to corrosion. Manual or automatic actuators shall be easy to locate and readily accessible to the user.

A. 2. 2. Installation - Eyewashes shall:

Be assembled and installed in accordance with the manufacturer's instructions, including flushing fluid delivery requirements.

Be in accessible locations that require no more than 10 seconds to reach (55 feet). The eyewash shall be located on the same level as the hazard and the path of travel shall be free of obstructions that may inhibit its immediate use.

Be located in an area identified with a highly visible sign positioned so the sign shall be visible within the area served by the eyewash. The area around the eyewash shall be well-lit.

Be arranged such that the flushing fluid flow pattern as described in section A.2.1 (where nozzle streams meet) is not less than 83.8 cm (33 in.) and no greater than 134.6 cm (53 in.) from the surface on which the user stands and 15.3 cm (6 in.) minimum from the wall or the nearest obstruction.

Be connected to a supply of flushing fluid per the manufacturer's installation instructions to produce the required spray pattern for a minimum period of 15 minutes. Where the possibility of freezing conditions exists, the eyewash shall be protected from freezing or freeze-protected equipment shall be installed. If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

Deliver tepid flushing fluid (60-100 °F) for at least 15 minutes . In circumstances where chemical reaction is accelerated by flushing fluid temperature, consult EHS. Where hot and cold water is supplied, the temperature must be controlled by a mixing valve.

When the plumbed eyewash is installed, its performance shall be verified annually.

Each emergency eyewash shall have drainage plumbed directly to a sanitary sewer line.

A.3. Eye/face Wash Equipment

A.3.1. Performance

A means shall be provided to ensure that a controlled flow of flushing fluid is provided to both eyes and face simultaneously at a velocity low enough to be non-injurious to the user.

Eye/face washes shall be designed and positioned in such a way as to pose no hazard to the user.

Nozzles and flushing fluid units shall be protected from airborne contaminants. Whatever means is used to afford such protection, its removal shall not require a separate motion by the operator when activating the unit.

Eye/face washes shall be designed, manufactured and installed in such a manner that, once activated, they can be used without requiring the use of the operator’s hands.

Eye/face washes shall be constructed of materials that will not corrode in the presence of the flushing fluid.

Eye/face washes shall be capable of delivering flushing fluid to the eyes and face not less than 11.4 liters per minute (3.0 gpm) for 15 minutes. If shut off valves are installed in the line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

Eye/face washes shall be designed to provide enough room to allow the eyelids to be held open with the hands while the eyes and face are in the flushing fluid stream.

Eye/face washes shall provide flushing fluid to both eyes simultaneously. A test gauge for making determination of a suitable eyewash pattern shall be a minimum 10.16 cm (4 in.) in length with two sets of parallel lines equidistant from the center. The interior set of lines shall be 3.18 cm (1.25 in.) apart and the exterior lines shall be 8.26 cm (3.25 in.) apart. Place the gauge in the stream of the eyewash. The flushing fluid shall cover the areas between the interior and exterior lines of the gauge at some point less than 20.3 cm (8 in.) above the eye/face wash nozzle(s).

The control valve shall remain open without the use of the operator’s hands until intentionally closed. The valve shall be simple to operate and shall go from "off" to "on" in one second or less. The valve shall be resistant to corrosion. Manual or automatic actuators shall be easy to locate and readily accessible to the user.

A.3.2. Installation - Eye/face washes shall:

Be assembled and installed in accordance with the manufacturer's instructions, including flushing fluid delivery requirements.

Be in accessible locations that require no more than 10 seconds to reach (55 feet). The eye/face wash shall be located on the same level as the hazard and the path of travel shall be free of obstructions that may inhibit the immediate use of the equipment.

Be located in an area identified with a highly visible sign positioned so the sign shall be visible within the area served by the eye/face wash. The area around the eye/face wash shall be well-lit.

Be arranged such that the flushing fluid flow pattern as described in section A.3.1 (where nozzle streams meet) is not less than 83.8 cm (33 in.) and no greater than 134.6 cm (53 in.) from the level on which the user stands and 15.3 cm (6 in.) minimum from the wall or nearest obstruction.

Be connected to a supply of flushing fluid per the manufacturer's installation instructions to produce the required spray pattern for a minimum period of 15 minutes. Where the possibility of freezing conditions exists, the eye/face wash shall be protected from freezing or freeze-protected equipment shall be installed. If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

Deliver tepid flushing fluid (60-100 °F) for at least 15 minutes. In circumstances where chemical reaction is accelerated by flushing fluid temperature, consult EHS. Where hot and cold water is supplied, the temperature must be controlled by a mixing valve.

When the plumbed eye/face wash is installed, its performance shall be verified annually.

Each emergency eye/face wash shall have drainage plumbed directly to a sanitary sewer line.

Appendix B. **Emergency Flushing Equipment Initial Commissioning and Certification**

This checklist must be completed by the installer for each eyewash, safety shower, and eye/face wash installed.

Building:	Location description:
Room number:	Unit: Eyewash or Eye/Face Wash or Safety Shower

Commissioning and Certification Checklist			
Criteria	**Pass**	**Fail**	**Notes:**
Safety Shower			
Flow rate exceeds 20 GPM.			GPM value:
Shower head is 82 – 96" from surface user stands.			
Spray pattern is at least 20" wide measured 60" from surface user stands.			
Center of spray pattern is at least 16" from any wall or obstruction.			
Valve stays open after a single action.			
Water flows within one second of opening valve.			
Provisions provided to prevent unauthorized shutoff of water supply (in lockable cabinet, valve can accept lockout device, valve not easily accessible e.g. above ceiling tile)			
Valve actuator (e.g. handle) not more than 69" from surface user stands.			
Shower is certified by manufacturer to comply with ANSI Z358.1.			
Shower is not obstructed in any way (nothing blocking path leading to it, nothing within a 3' radius)			
Shower has highly visible signage indicating its location (visible from work area).			
Freeze prevention measures are in place if potential for freezing.			
Shower will deliver tepid water (60 – 100°F) for 15 minutes			
Not within 6' of electrical unless electrical is protected by GFCI			
Floor drain provided directly under shower head.			
Eyewashes and Eye/Face Washes			
Flow velocity does not appear to have potential to harm eyes of user.			
Flow rate exceeds 0.4 GPM (eyewash); Flow rate exceeds 3.0 GPM (eye/face wash).			GPM value:
Nozzles are protected from airborne contaminants (have covers).			
Nozzle covers pop-off by force of water flowing.			
Valve stays open after a single action.			
Water flows within one second of opening valve.			
Provisions provided to prevent unauthorized shutoff of water supply (in lockable cabinet, valve can accept lockout device, valve not easily accessible e.g. above ceiling tile).			
Water rises enough above nozzles to adequately flush and fit hands to hold eyes open (> 2").			
Water provided to both eyes simultaneously.			
Water from both nozzles meet at a midpoint less than 8" above nozzles.			
Unit is certified by manufacturer to comply with ANSI Z358.1.			
Unit is not obstructed in any way (nothing blocking path leading to it, nothing within a 3' radius)			
Unit has highly visible signage indicating its location (visible from work area).			
Freeze prevention measures are in place if potential for freezing.			
Unit will deliver tepid water (60 – 100°F) for 15 minutes			
Top of flushing fluid when in operation is 33 – 53" from the ground.			
Center of spray pattern is at least 6" from any wall or obstruction.			
Not within 6' of electrical unless electrical is protected by GFCI			
Discharge plumbed directly to sanitary sewer line.			
Person Certifying (print & signature):		Date:	

File completed forms in E-Building or otherwise with building construction documents.

Submit completed forms to EHS via any of the following means:

- Email: psuehs@psu.edu
- Email: ehslabsafety@psu.edu
- Mail: 301 Steam Services Building, Steam Drive, University Park, PA 16802

Appendix C. **Annual Testing Procedures and Criteria**

Testing and Inspection Procedure	
Safety Showers	**Eyewashes and Eye/Face Washes**
1. Position the testing barrel/bucket (marked with gallon-graduations) underneath the shower and then place the shower curtain around the head and in the bucket	1. Verify nozzles are free from corrosion, build-up, or contaminants that may impede function
2. Pull the shower handle and let the water flow for 6 seconds (start timer when valve opened, not when water flows)	2. Arrange for proper drainage or water collecting if necessary
3. Verify valve stays open with a single action	3. Open the activation valve. Verify the valve stays open after a single action (but not for drench hose)
4. Verify the water exceeds the 2 gallons-mark (equivalent to 20 GPM) – Note the GPM value to the nearest half-gallon.	4. Allow water to run for one minute. Observe flow pattern. Ensure water is provided at least 2" above the nozzles (enough rise to adequately flush eyes), water is evenly distributed in the flow pattern, and water is provided to both eyes simultaneously.
5. Verify water is not excessively dirty in bucket (If needed, collect up to 20 gallons)	5. Ensure water does not appear dirty or is flushed clean over the duration of the test.
6. Indicate the test date on the shower test tag (replace tag as needed)	6. Turn off eye wash and clean job site as needed
7. Empty the shower test barrel and clean job site as needed	7. Update the eye wash tag test date (replace tag if needed)
8. Create follow up work order if repair is needed	8. Create follow up work order if repair is needed
9. Notify customer of job status if applicable	9. Notify customer of job status if applicable
10. Complete work order with notes and details in the log	10. Complete work order with notes and details in the log

Pass and Fail Criteria for Annual Testing		
Safety Shower Criteria	Pass	Fail
➢ Flow rate exceeds 20 GPM – GPM Value: _____ - TAG-OUT UNIT IF < 5 GPM		
➢ Valve stays open with single action		
➢ Water flushes clean during test or after flushing 20 gallons worth		
➢ An up to date annual testing tag is affixed to the unit		

Pass and Fail Criteria for Annual Testing			
Eyewash and Eye/Face Wash Criteria	Pass	Fail	N/A
➢ Nozzles are free from corrosion, build-up, or contaminants that would impede function			
➢ Caps come off by force of fluid, if present (do not need removed by hand)			
➢ Valve stays open with single action (N/A for drench hoses)			
➢ Water runs clean after flushing – TAG-OUT UNIT IF DOES NOT FLUSH CLEAN DURING TEST			
➢ Fluid stream is adequate (rises > 2" above nozzles to allow for flushing, evenly distributed from nozzles, separate steams provide fluid to both eyes simultaneously and meet) – TAG-OUT UNIT IF FLOW IS NOT ADEQUATE TO FLUSH EYES			
➢ An up to date annual testing tag is affixed to the unit			

*Annual Testing Notes:

- If tagged out, the tag should be a red "Do Not Operate" tag. The technician shall include a description of the failure that resulted in the tag-out. The description shall instruct the lab to "contact EHS" for an interim solution.
- Any failure must result in a work order or similar work request to correct the issue.
- The only reason the test should not be performed is if the unit cannot be physically accessed or testing would present a hazard to the tester. In which case, the person performing the test must take action to resolve the issue and reschedule testing.
- Any findings outside the scope of this criteria (e.g. minor obstructions, missing nozzle caps, non-GFCI outlets) can be reported to appropriate personnel but should not prevent the test from occurring nor result in failure