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Environmental Health & Safety

Emergency Washing Equipment (EWE) Requirements

This guide presents the minimum performance requirements for emergency washing equipment. It covers the following types of equipment: emergency showers, eyewash equipment, and combination shower and eyewash or eye/face wash. Most of the requirements were taken directly from the Washington Administrative Code (WAC) 296-800-150 with additional requirements from the CDC/NIH publication Biosafety in Microbiological and Biomedical Laboratories (BMBL), 6th edition. Several requirements are UW-specific and represent industry best practices. Supporting information includes American National Standards Institute (ANSI) Z358.1-2014 and a directive from the Washington State Department of Labor & Industries (L&I); these references are provided at the end of this chapter.

1. Applications

Emergency washing equipment (EWE) is required to provide an immediate and local method of decontamination following exposure to hazardous chemicals. Emergency showers can also be used to effectively extinguish clothing fires and flush contaminants off clothing.

EWE is required in areas where exposure to the following types of chemicals may occur:

- a. Corrosives, including acids and caustics, with a pH equal to or less than 2.5 or equal to or greater than 11.
- b. Strong irritants – those that fall into category 1 or 2A under the Globally Harmonized System (GHS) hazard class “Serious eye damage/eye irritation”.
- c. Toxic chemicals (as classified per the International Fire Code (IFC)) that can be absorbed through skin.
- d. Cryogenic liquids.
- e. Unsealed radioactive materials.

Eyewashes are required in biosafety level (BSL) and animal biosafety level (ABSL) -1, 2 and 3 laboratories.

Eyewashes must additionally be installed in the following instances: where airborne particulates are generated (e.g., via equipment in metal and wood shops), where there may be other exposure to microbial hazards outside of research labs (e.g. dental clinics and phlebotomy stations), and as indicated by risk assessment.

Emergency eyewashes are required where there is potential for splashes to the face or eyes with the types of chemicals noted above.

Emergency showers are required if there is a potential for substantial portions of the body to come into contact with the types of chemicals noted above. UW EH&S interprets this to mean areas where the container size is equal or greater than 1-gallon and chemical transfer (by gravity or pressure), mixing, or spraying takes place.

Use of personal protective equipment (PPE) such as safety glasses, goggles, face shields, aprons, and gloves, though an important safeguard does not substitute for EWE requirements.

Typical areas on the University campus where EWE is needed include the following:

- a. Laboratories where chemicals, unsealed radioactive materials, or biological agents are used.
- b. Areas where chemical transfer, mixing, and use takes place, including laboratory support spaces, shops, the power plant, mechanical rooms, and some kitchens and dishwashing areas.
- c. Areas with closed chemical systems, particularly those under pressure, that can catastrophically fail and cause chemicals to leak, including the power plant, shops, and mechanical rooms.
- d. Chemical waste accumulation areas.
- e. Clinics where there is high potential for eye or mucosal exposure to blood or other potentially infectious material.
- f. Areas where there is a potential for the eyes to be exposed to physical hazards such as chips or dust from sanding or grinding processes, including shops and mechanical spaces.

2. Equipment

A plumbed eyewash, shower, or combination unit, meeting the specifications of the current edition of ANSI Z358.1 shall be provided. Activation of an emergency washing device shall be simple (one action) and not take longer than one second to activate. Drench hoses may be useful in some applications but do not substitute for showers or eyewashes. Portable, non-plumbed eyewash units may be approved only in locations where adequate plumbing is not available or in other limited circumstances as approved by EH&S.

Combination shower and eyewash units must be designed and tested to operate both components simultaneously in accordance with ANSI requirements. Emergency washing devices on a loop system shall be designed so more than one device can be operated at a time with flow rates meeting ANSI requirements.

EWE must be connected to potable water (PW) per the local Plumbing Code. Verify through the choice of the unit that the PW supply cannot be contaminated through back pressure. The water source is potable if it is served by the building domestic water or by a separate line connected directly to the city supply into the building. This contrasts with lab water or industrial water that serves the laboratory sinks or utility equipment.

Showers and eyewash units must be supplied with tempered water per the local Plumbing Code. Mixing valves must be specifically designed for EWE and set to deliver water at 90°F, and tempered water piping should be kept as short as reasonably possible. EWE located outdoors must be insulated and heat traced to prevent freezing.

Eyewashes shall be connected to a drain (e.g., sink mounted or wall mount with drain) to facilitate use during an emergency and complying with the weekly testing requirement. Swing-down or swing-over eyewashes that drain into a sink are preferred. Hose units are not allowed due to increased risk of backflow into the potable water system and difficulty of installing them at sinks while meeting ANSI Z358.1 requirements. If the eyewash is mounted at a sink, detail the eyewash placement and connection to verify that it will drain into the sink.

Emergency showers or combination units are generally not required to be connected to a floor drain; however, when a floor drain is included, it must comply with local plumbing code

requirements for slope, pipe size, and materials of construction. Depending on the intended use and hazards of the space, floor drains may need to be discharged to a neutralization tank or holding tank, or it may be appropriate to discharge to the sanitary sewer. An automatic trap primer must be installed to prevent the drain trap from drying out. In some facilities, placing showers within a stall with a sloped floor or shower pan, connected to a floor drain and equipped with a privacy curtain, may help minimize water damage from misuse or inadvertent activation, especially in corridors or public areas.

If shut-off valves are accessible to personnel other than maintenance and testing personnel, such valves shall be locked open in accordance with site procedures.

Flow alarms shall be installed on emergency showers located in hazardous occupancies locations (as defined by the Building Code) or remote locations, as advised by EH&S. A local visual and audible alarm shall be installed and monitored 24 hours a day, seven days a week by security or personnel responsible for initiating emergency response procedures.

EWE shall be identified with a highly-visible and permanent/durable sign. The area around the device shall be clear, unobstructed (does not block or interfere with activation of the device), and well-lit.

The area underneath the shower shall be kept unobstructed, with a minimum of 16 inches from the middle of the spray pattern to the nearest obstruction.

3. Location

Emergency washing equipment must be located on the same level as the hazard so that personnel can reach it from potential exposure points within 10 seconds. For design review purposes, UW EH&S uses a guideline of no more than 50 feet of walking distance. The path to the equipment must be free of obstructions; passing through a single door is acceptable as long as the door requires no key to open, swings in the direction of travel, and is equipped with a panic bar or similar emergency egress hardware. Locating showers in hallways can provide shared access for multiple laboratories as long as access requirements are met. When unauthorized or unintended activation could result in flooding or water damage, emergency showers should be placed within secured laboratory rooms.

Where electrical equipment is present, a minimum horizontal clearance of at least three feet from the emergency shower fixture must be maintained in every direction, or appropriate shielding must be provided. Avoid installing telephones, thermostats, power receptacles, and other electrical equipment within six feet of the shower. If receptacles are necessary within six feet, they must be equipped with ground fault circuit interruption (GFCI) and designed for splash protection.

For closed-loop hydronic systems and cooling towers, EWE is required at the location of the chemical pot feeders or chemical feed tanks. Provide a utility sink at the eyewash location.

In animal facilities, if open floor drains are provided, traps must be filled with water and/or appropriate disinfectant or sealed to prevent the migration of vermin and gases. For BSL-3 applications, locate EWE within the BSL-3 laboratory.

4. Testing and Commissioning

The EWE units must be tested to confirm that they meet the performance requirements per the current edition of ANSI Z358.1. This is usually done as part of commissioning by the commissioning agent.

Provide a signed service label on all units when testing is completed.

Provide a report to the owner and to EH&S (ehsdept@uw.edu) as a condition of substantial completion that documents all units have been tested and perform per the current edition of ANSI Z358.1.

5. References

- a. WAC 296-800-15030: Make sure emergency washing facilities are functional and readily accessible
- b. Biosafety in Microbiological and Biomedical Laboratories (BMBL) 6th Edition: An eyewash station is readily available in the laboratory
- c. ISEA ANSI Z358.1-2014: International Safety Equipment Association / American National Standard for Emergency Eyewash and Shower Equipment
- d. DOSH Directive 13.00: Emergency Washing Facilities, July 15, 2011. Washington State Department of Labor and Industries (L&I) Division of Occupational Safety and Health.
- e. Seattle Plumbing Code/Washington State Plumbing Code (current edition) Section 416.0 Emergency Eyewash and Shower Equipment