Section 1.2  EMERGENCY EYEWASH AND SAFETY SHOWER EQUIPMENT

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A. Regulations, Consensus Standards, and References

1. Regulations

California Code of Regulations (CCR), Title 8, General Industry Safety Orders
- Section 3273, Working Area
- Section 5162, Emergency Eyewash and Shower Equipment
- Section 5217(i), Formaldehyde, Hygiene Protection

CCR, Title 24, Part 5, 2013 California Plumbing Code (CPC)
- Section 416.0, Emergency Eyewash and Shower Equipment

Palo Alto Municipal Code, Title 16, Chapter 16.09, Sewer Use Ordinance
- Section 16.09.175, General Prohibitions and Practices

2. Consensus Standards and References


ASTM International, ASTM F1637-13, Standard Practice for Safe Walking Surfaces

National Electrical Code (NEC)

3. References


B. Scope

This section presents the minimum requirements for eyewash and shower equipment for the emergency treatment of the eyes or body of a person exposed to hazardous substances. It covers the following types of equipment: emergency showers, eyewash and eye/facewash equipment, and combination shower and eyewash or eye/face wash.
C. Application

1. Provisions for Emergency Eyewashes

Emergency plumbed eyewash or eye/facewash equipment shall be provided for all work areas where, during routine operations or foreseeable emergencies, the eyes of an employee may come into contact with a substance which can cause corrosion, severe irritation, or permanent tissue damage or is toxic by absorption (see box below). A plumbed eyewash shall be provided at all work areas where formaldehyde solutions in concentrations greater than or equal to 0.1% are handled.

- T8 CCR, Section 5162(a)
- T8 CCR, Section 5217(i)(3)

EH&S considers the following to be substances which can cause corrosion, severe irritation, or permanent tissue damage, or which are toxic by absorption:

a. Substances classified by the manufacturer or distributor according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Category 1 (serious eye damage) or Category 2A (irritant) eye hazards.

b. Substances identified by the manufacturer or distributor as causing corrosion, severe irritation, or permanent tissue damage to the eyes.

c. Substances designated by “S” in the skin notation column of Table AC-1 of T8 CCR Section 5155.

d. Substances identified by the manufacturer or distributor as toxic by skin absorption.

This consideration is based on T8 CCR, Section 5162, the OSHA Guide to The Globally Harmonized System of Classification and Labelling of Chemicals (GHS), and T8 CCR, Section 5155.

2. Provisions for Emergency Showers

A plumbed emergency shower shall be provided for all work areas where, during normal operations or foreseeable emergencies, areas of the body may come into contact with a substance which is corrosive or severely irritating to the skin or which is toxic by skin absorption (see box below). A plumbed emergency shower shall be provided at all work areas where formaldehyde solutions in concentrations greater than or equal to 1% are handled.

- T8 CCR, Section 5162(b)
- T8 CCR, Section 5217(i)(2)

EH&S considers the following to be substances which are corrosive or severely irritating to the skin or which are toxic by skin absorption:

a. Substances classified by the manufacturer or distributor according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Category 1 (skin corrosion) or Category 2 (skin irritation) skin hazards.

b. Substances identified by the manufacturer or distributor as corrosive or severely
irritating to the skin.

c. Substances designated by “S” in the skin notation column of Table AC-1 of T8 CCR Section 5155.
d. Substances identified by the manufacturer or distributor as toxic by skin absorption.

This consideration is based on T8 CCR, Section 5162, the OSHA Guide to The Globally Harmonized System of Classification and Labelling of Chemicals (GHS), and T8 CCR, Section 5155.

3. Stanford EH&S presumes that laboratory fume hoods contain hazardous substances that require emergency eyewash and shower facilities.

4. Laboratories and laboratory support facilities using and handling hazardous substances will generally require eyewash and safety showers. Biological laboratories using bleach and other chemical disinfectants will generally require eyewash and safety showers. Consult with EH&S for any exceptions or if an evaluation is needed.

5. For new construction and major renovations, careful consideration should be given to not only current, but also future use of the laboratory as research needs change. Without an emergency eyewash and safety shower, future use of hazardous materials in the space will be restricted or require potentially costly retrofitting.

D. Location

1. Emergency eyewash and shower equipment shall be on the same level as the hazard and accessible for immediate use in locations that require no more than 10 seconds for the injured person to reach. The path of travel must be free of obstructions. If both eyewash and shower are needed, they shall be located so that both can be used at the same time by one person.

   - T8 CCR, Section 5162(c)
   - 2013 CPC, Section 416.4

The average person covers a distance of approximately 55 ft. in 10 seconds when walking at a normal pace. The physical and emotional state of a potential victim (visually impaired, with some level of discomfort/pain, and possibly in a state of panic) should be considered along with the likelihood of personnel in the immediate area to assist. Other potential hazards that may be adjacent to the path of travel that might cause further injury should be considered.

   - ANSI Z358.1-2014, Appendix B5

2. One intervening door can be present so long as it opens in the same direction of travel as the person attempting to reach the emergency eyewash and shower equipment and the door is equipped with a closing mechanism that cannot be locked to impede access to the equipment (i.e., the door is a panic door). Where the hazard is corrosive, consult with EH&S.
E. Performance Requirements

Emergency eyewash and shower equipment shall meet the requirements of ANSI Z358.1-2014. Control valves for all such equipment shall meet the requirements of ANSI Z358.1-2014.

- T8 CCR, Section 5162
- ANSI Z358.1-2014

F. Signage and Visibility

1. The path of travel shall be clearly identified with signage. Emergency eyewash and shower locations must be identified with a highly visible sign positioned so the sign is visible within the area served by eyewash and shower equipment. The areas around the eyewash or shower must be well lit.

- 2013 CPC, Section 416.4
- ANSI Z358.1-2014, Section 4.5.3
- ANSI Z358.1-2014, Section 5.4.3

2. A large contrasting spot (32” diameter) should be painted on, embedded in, or affixed to the floor directly beneath the shower to indicate its location and the area that must be kept free from any obstruction.

- Guidelines for Laboratory Design: Health, Safety, and Environmental Considerations
- Good Practice per Stanford University EH&S

G. Prohibitions Around Equipment

1. No obstructions shall be located within 16 inches from the center of the spray pattern of the emergency shower facility. Note: The eyewash is not considered an obstruction.

- T8 CCR, Section 5162(c)
- ANSI Z358.1-2014, Section 4.1.4
- 2013 CPC, Section 416.1

2. No electrical apparatus or receptacles (electrical outlets) shall be located within a zone measured 3 feet horizontally and 8 feet vertically of eyewash stations or showers. If a 120-volt outlet or receptacle is present within 6 feet of an eyewash or shower, it shall be equipped with a Ground Fault Circuit Interrupter (GFCI).

- NEC
- Good Practice per Stanford University EH&S
This prevents potential electrical hazards posed when the water generated by the activated emergency eyewash/safety shower is in proximity to live electrical equipment.

H. Water Supply

1. Emergency eyewash and shower equipment shall not be limited in the water supply flow rates. Flow rate and discharge pattern shall be provided in accordance with ANSI Z358.1-2014.
   - 2013 CPC, Section 416.2

2. Emergency eyewash and shower equipment shall deliver tepid water (60-100°F). Optimal range is 60-77°F, based on first aid recommendations for thermal burns.
   - 2013 CPC, Section 416.2
   - ANSI Z358.1-2014
   - 2010 American Heart Association and American Red Cross Guidelines for First Aid

I. Design for Maintenance and Use

1. Shut-off valves

   The water supply to showers and/or shower/eyewash combination units should be controlled by a ball-type shutoff valve which is visible and accessible to shower testing personnel in the event of leaking or failed shower head valves. If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.

   - Good Practice per Stanford EH&S
   - ANSI Z358.1-2014, Section 6.4.5.

   This design will make maintenance easier.

2. Floor Drains

   Where feasible, floor drains should be installed below or near safety showers, with the floor sloped sufficiently to direct water from the shower into the sanitary sewer drain.

   - Good Practice per Stanford EH&S
   - Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version

   Floor drains will minimize the potential for excessive flooding, which may damage laboratory facilities and equipment, interrupt laboratory operations, cause a reluctance to use the safety shower or to use it for a sufficient amount of time, and create a slipping hazard. Floor drains will
also facilitate required monthly testing.

Any floor drain which may be in service during safety shower use shall be installed with a temporary plug which remains closed except when the shower is in use or protected from spills by a covered sump or berm system.

- Palo Alto Ordinance, 16.09.032(b)(1)(B)

The installation of a floor drain, temporary plug, covered sump, or berm shall not project into the walking surface so as to create a tripping hazard. Walkways shall be stable, planar, flush, and even to the extent possible. As a minimum level of care, changes in levels between 1/4 and 1/2 inch (6 and 12 mm) shall be beveled with a slope no greater than 1:2 (rise:run). Changes in levels greater than 1/2 inch shall be transitioned by means of a ramp or stairway that complies with applicable building codes, regulations, standards, or ordinances, or all of these. The installation of a berm must not impede the flow of water from the emergency shower into the floor drain.

- T8 CCR 3273(a)
- ASTM F1637-13

3. Where feasible, eyewash basins should be plumbed to sanitary sewer drains.

- Good Practice per Stanford EH&S
- Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version

Drains will minimize the potential for excessive flooding, which may damage laboratory facilities and equipment, interrupt laboratory operations, cause a reluctance to use the eyewash or to use it for a sufficient amount of time, and create a slipping hazard. Drains will also facilitate required monthly testing.

4. Modesty curtains should be considered for emergency showers. When installed, a minimum unobstructed area of 34 inches shall be provided.

- Good Practice per Stanford EH&S
- ANSI Z358.1-2014, Section 4.3.

The removal of contaminated clothing while using a safety shower is essential. Modesty curtains remove a potential impediment to use and encourage the removal of contaminated clothing.

J. Installation

Emergency eyewash and shower equipment shall be installed in accordance with the manufacturer’s installation instructions.
• 2013 CPC, Section 416.3

K. Verification and Testing

1. Verification Upon Installation

Proper operation of the equipment must be verified by the contractor installing the emergency eyewash or shower equipment prior to project closeout and facility occupation. Verification procedures must be in accordance with ANSI Z358.1-2014. Tags to allow monthly testing records to be kept must be affixed to the showers and eyewash fountains.

• ANSI Z358.1-2014
• Good Practice per Stanford University

*By testing the equipment, Stanford can be assured that it is working properly before the users begin their research.*

2. Monthly Testing

Plumbed eyewash and shower equipment shall be activated at least monthly to flush the line and to verify proper operation. Self-contained units shall be maintained in accordance with the manufacturer’s instructions.

• T8 CCR, Section 5162(e)

L. Self-Contained Units

Self-contained emergency eyewash and shower equipment in lieu of plumbed equipment must be approved by EH&S. Such equipment shall meet all applicable requirements.

• T8 CCR, Section 5162
• ANSI Z358.1-2014

M. Supplemental Equipment

Supplemental equipment, including personal eyewash units or drench hoses which meet the requirements of ANSI Z358.1-2014, Section 8 may support plumbed or self-contained units but shall not be used in lieu of them. Water hoses, sink faucets, or showers are not acceptable eyewash facilities.

• T8 CCR, Section 5162(a)
**N. Americans with Disabilities Act Compliance**

For compliance with the Americans with Disabilities Act, contact the Stanford University Diversity & Access Office.