Section 2.0 EMERGENCY EYEWASH AND SAFETY SHOWER EQUIPMENT

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A. Regulations, Consensus Standards, and References

Regulations:

Occupational Safety and Health Administration (OSHA), 29 CFR 1910.151(c), Medical Services and First Aid

Consensus Standards and References:

American National Standards Institute (ANSI), Z358.1, Current Version, Emergency Eyewash and Shower Equipment

National Electrical Code (NEC)

Guidelines for Laboratory Design: Health, Safety, and Environmental Considerations, Fourth Edition, Louis J DiBerardinis, Janet S. Baum, Melvin W. First, Gari T Gatwood, and Anand K. Seth, John Wiley & Sons, Inc., Hoboken, New Jersey, 2013.

Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Current Version, The National Academies Press, Washington, D.C., 2011.

B. Scope

1. 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.

2. All eyewash and shower equipment for the emergency treatment of the eyes or body of a person exposed to hazardous substances shall meet the installation, testing and performance requirements of the current ANSI Z358.1 standard.

3. Deviations from the Design Guideline must be reviewed and approved by EHS.

4. This document does not relinquish the owner or contractor from adhering to any and all applicable codes and standards for this project, requirements presented by the ASU Environmental Health and Safety (EHS), and including the requirements set forth in the ASU Design Guidelines.

C. Application

1. Provisions for Emergency Eyewashes

   a. 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 an injurious corrosive material which can cause severe irritation, permanent tissue damage or is toxic by absorption.

   b. A strong corrosive is a liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the site of contact or in the cases

of leakage from its packaging, a liquid that has a severe corrosion rate on steel. For the purposes of locating emergency eye-wash and safety shower units, liquids with pH ranging from 12 shall be considered corrosive.

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

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.

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

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

Substances with pH equal to or less than 1 or a pH equal to or greater than 12.

All work areas where formaldehyde solutions in concentrations greater than or equal to 0.1% are handled.

2. Provisions for Emergency Showers

a. 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 pyrophoric, corrosive or severely irritating to the skin or which is toxic by skin absorption.

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

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.

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

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

Substances with pH equal to or less than 1 or a pH equal to or greater than 12.

All work areas where formaldehyde solutions in concentrations greater than or equal to 1% are handled.

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

d. 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 ASU EH&S Department for any exceptions or if an evaluation is needed.

e. 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. All work areas where strong corrosive chemicals (< 1pH or >12pH) are store and used shall have the eyewash station and safety shower immediately located adjacent to the hazard (i.e. in the same room as the work being performed).

2. All work areas not using strong corrosive chemicals shall have emergency eyewash and shower equipment 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.

3. 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.

4. A door is considered an obstruction. Where the hazard is not corrosive, 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).

E. Performance Requirements

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

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.

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.

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).

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.

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.

3. Plumbed emergency eyewash and shower equipment shall be connected to domestic potable water sources.

I. Design for Maintenance and Use

1. Shut-off valves

   a. 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.

2. Where feasible, eyewash basins and showers should be plumbed to sanitary sewer drains.

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

J. Installation

1. Emergency eyewash and shower equipment shall be installed in accordance with the manufacturer's installation instructions.

K. Verification and Testing

1. Verification Upon Installation

   a. 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. Tags to allow monthly testing records to be kept must be affixed to the showers and eyewash fountains.

2. Monthly Testing

   a. Plumbed shower and eyewash equipment should be inspected and tested. Eyewashes should be activated weekly for a period of time long enough to verify operation and ensure that flushing fluid is available. Guidance for routine testing is available from

EH&S. Please contact EH&S or your departments EH&S Compliance Officer if there are questions about testing frequency, or if guidance is needed for setting up routine testing by laboratory personnel.

b. Plumbed eyewash and shower equipment should 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.

L. Self-Contained Units

1. 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.

M. Supplemental Equipment

1. Supplemental equipment, including personal eyewash units or drench hoses which meet the requirements of ANSI Z358.1 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.

N. Americans with Disabilities Act Compliance

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