

# **STANDARD OPERATING PROCEDURE EMERGENCY EYEWASH AND SHOWER EQUIPMENT**

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Accidental chemical exposures can still occur even with good engineering controls, personal protective equipment and safety precautions. Emergency eye/face washes and showers provide an immediate mechanism to mitigate chemical exposure and further injury by allowing employees, students and volunteers a method of decontaminating areas of the body which have been exposed to an injurious material.

## **1.0 PURPOSE**

The purpose of the standard is intended to provide guidance concerning the minimum performance requirements, use, test procedures, and training of emergency eyewash and shower equipment in accordance with California Code of Regulations (CCR) Title 8 and ANSI/ISEA Z358.1-2009

## **2.0 SCOPE**

This standard establishes the minimum performance requirements for eye wash and shower equipment for the emergency treatment of the eyes or body of an employee, student, and volunteer who has been exposed to injurious materials. It covers the following types of equipment: emergency showers, combination showers and eyewashes or eye/face washes.

**2.1 Plumbed eyewash unit** shall be provided for all work areas or classroom settings where, during normal operations or foreseeable emergencies, the eyes of an employee, student or visitor may come into contact with any substance which can cause corrosion, severe irritation, or permanent tissue damage or which is toxic by absorption. Drench and water hoses; sink faucets, or showers are not acceptable eyewash facilities. If there is any possibility that an

individual's eyes may be splashed with cryogenic materials such as liquid nitrogen or solutions containing 0.1 percent or greater formaldehyde, the employer shall provide acceptable eyewash facilities within the immediate work area for emergency use.

**2.2 Emergency shower** shall be provided for all work areas or classroom settings where, during normal operations or foreseeable emergencies, areas of the body may come into contact with any substance which can cause corrosion, severe irritation, or permanent tissue damage or which is toxic by absorption.

### **3.0 DEFINITIONS**

**American National Standards Institute (ANSI):** Is a non-profit organization that coordinates the standardization and conformity assessment systems in the United States.

**Combination Units:** An interconnected assembly of emergency equipment supplied by a single source of flushing fluid. The unit consists of both the emergency shower and an eye/face wash.

**Drench Hose Units:** A supplemental, hand-held device consisting of a flexible hose connected to a flushing supply and used to provide fluid to irrigate and flush face and body areas.

**Emergency Shower:** A device which delivers flushing fluid that utilizes a valve which remains open during use to enable the user to have water cascading over the entire body while the hands are free.

**Emergency Units or Equipment:** general term for emergency eyewash, eye/face wash, shower, drench hose and combination units.

**Eyewash:** a unit that flushes water specifically to the eyes.

**Eye/Face Wash:** device that flushes both eyes and face.

**Hazardous/Injurious Material:** any substance that could cause corrosion, severe irritation, or permanent tissue damage or is toxic by absorption.

**Plumbed Eyewash:** eyewash unit permanently connected to a source of potable water.

**Potable Water:** water that is suitable for drinking.

**Stay-Open Valve:** a valve that manually opens and closes the emergency units.

**Tepid:** A flushing temperature conducive to promoting a minimum 15 minute irrigation period. A suitable range of 16°-38°C (60-100°F)

**Valve Actuator:** A device connected to the valve to facilitate its operation.

*Note: Self-contained or personal washes will not be addressed in this document*

## **4.0 RESPONSIBILITIES**

### **4.1 Office of Environment, Health & Safety**

- Ensures that each department is aware of their responsibilities under this standard.
- Reviews the standard periodically and updates as necessary.
- Verifies inspection records and locations of all emergency units/equipment.
- Assists with plan review and placement of new equipment during new construction or major renovation.
- Provides consultation and guidance concerning the operations and testing of eyewash units to Principal Investigators and Supervisors.

### **4.2 Facilities Management/Contractor**

- Performs inspections, monthly flushing test and annual flow test of emergency eye/face wash and safety shower equipment.
- Maintains accurate record of locations of all emergency eyewash and shower stations.
- Provides equipment and protocols required to perform testing and flushing of eyewash, shower, combination eyewash shower units.
- Ensures that inspections and activations are recorded on inspection tags.
- Coordinates immediate modifications, maintenance, repair and replacement of equipment as deemed necessary to meet current standards.
- Informs Environmental Health and Safety of any new installations and current repair status of existing equipment.

### **4.3 Principal Investigators (PI's)/Supervisors**

Each has the following responsibility under this standard to:

- Ensure that any individual under the supervisor's purview understand their responsibilities and comply with this standard.
- Ensure that all employees, students and volunteers have received instruction in the proper use and operation of the emergency unit/equipment provided for the area.
- Ensure that procedures, equipment and materials appropriate for the specific work locations are provided to protect the health and safety of all employees, students and volunteers.
- Prior to assigning work involving the potential for hazardous materials to splash onto the skin or into the eyes, PI's/Supervisors must verify that:
  - Emergency Units/Equipment i.e.-Emergency showers, eyewash equipment, eye/face wash equipment, or combination shower and eyewash or eye/face wash equipment are provided in the work place and are accessible and operable.
  - All shut-off valves between the sanitary water supply and the eyewash and/or safety shower are secured in the open position.
  - Any individual working in the area is comfortable with their use.
- Performs and or assigns weekly/*monthly* testing and documentation of plumbed eyewash units for their areas.
- Routes to the shower/eyewash station and the area around the equipment are kept clear.

- Promptly submit a work order to Facilities Management when any unit is not functioning properly. Clearly tag the unit- “DO NOT USE”-Out of Service.

#### **4.4 Employees, Students and Volunteers**

Each employee and student is responsible for knowing the following when working in an area where emergency units/equipment is required:

- How to properly use emergency units/equipment.
- The location of the nearest emergency units/equipment.
- The routes to the emergency units/equipment and the area around them are kept clear of obstructions at all times.
- The equipment is operable and has passed the required inspection/maintenance test.
- When any unit is not functioning properly notify the supervisor immediately and clearly tag the unit-“DO NOT USE”-Out of Service

#### **5.0 APPLICATIONS**

Where the eyes or body of any person may be exposed to hazardous, injurious or corrosive materials, suitable emergency units or equipment for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Some area examples would be:

- Where corrosive or injurious chemicals are used, such as:
  - Solutions of inorganic/organic acids or bases with a pH of 2.0 or less, or 12.5 or more,
  - Other organic or inorganic materials that is corrosive or irritating to eyes or skin (with methylene chloride and phenol as just two examples.)
  - Organic or inorganic materials that is significantly toxic by skin absorption (e.g. phenol.)
- Areas where operations involve the use of air or water reactive liquids or solids.
- All work areas where formaldehyde solutions in concentrations greater than or equal to 0.1% are handled.
- Other materials to include irritants, sensitizers, carcinogens, highly toxic materials, any (*neurotoxins, hepatotoxins, nephrotoxins*), biological and radioactive materials.
- Storage areas where breakable containers of injurious or corrosive materials (1 gal or more) are handled outside their original shipping cartons.
- Waste accumulation areas that could contain corrosive waste materials.
- Where cryogenic materials are dispensed.
- Areas where corrosive chemicals are used in a closed or pressurized systems that can catastrophically fail and cause the chemicals to leak.

#### **6.0 GENERAL REQUIREMENTS**

- Emergency units shall be located in immediately accessible locations that require no more than 10 seconds (approximately 25 feet) for the injured person to reach along unobstructed pathways within the laboratory or work area and where the user shall not have to pass through a door to reach the unit.

- Emergency unit shall be identified with a highly visible sign in well lighted area.
- The area around the emergency units shall be clear, unobstructed and have no items hanging on them.
- There shall be no sharp projections anywhere in the operating area of the unit.
- The valve actuator shall be designed so that the water flow remains in the on position without the use of the operator's hands and must remain open until manually shut off. The valve shall be large enough to be easily located and operated by the user.
- Any electrical apparatus, telephone and thermostats should not be located within 18 inches of the units. Where electrical outlets are necessary, they must be protected by ground fault interrupters.
- The eyewash and eyewash/face equipment shall be located to provide enough room to allow the eyelids to be held open with the hands while the eyes are in the water stream.
- Emergency eyewash equipment shall ensure that a controlled flow of potable tepid water is provided to both eyes simultaneously at a velocity low enough not to be injurious to the user.

## **7.0 OPERATIONS AND PROCEDURES**

The American National Standards Institute (ANSI) Standard for Emergency Eyewash and Shower Equipment (ANSI Z358.1-2009) recommends that the affected body part must be flushed immediately and thoroughly for at least 15 minutes using a large supply of clean fluid under low pressure. Water does not neutralize contaminants -- it only dilutes and washes them away.

Begin flushing as quickly as possible after the eye comes in contact with a harmful substance as the first 10 seconds are critical. Toxic substances, when coming in contact with the eye, immediately begin to damage sensitive eye tissues. The longer they remain in contact, the greater the damage to the eye. Besides tissue damage, acids and alkali can change the pH in the eye itself. When the pH of the eye begins to get out of the narrow tolerable range, severe eye damage, including blindness, may result.

However, other references recommend a minimum 20-minute flushing period if the nature of the contaminant is not known. The flushing or rinsing time can be modified if the identity and properties of the chemical are known. For example:

- A minimum 5-minute flushing time is recommended for mildly irritating chemicals,
- At least 20 minutes for moderate-to-severe irritants,
- 20 minutes for non-penetrating corrosives, and
- At least 60 minutes for penetrating corrosives.

Non-penetrating corrosives are chemicals which react with human tissue to form a protective layer which limits the extent of damage. Most acids are non-penetrating corrosives. Penetrating corrosives, such as most alkalies, hydrofluoric acid and phenol, enter the skin or eyes deeply. Penetrating corrosives require longer water flushing (a minimum of 60 minutes) than non-penetrating corrosives (a minimum of 20 minutes). In all cases, if irritation persists, repeat the flushing procedure. It is important to get medical attention as soon as possible after first aid has

been given. A physician familiar with procedures for treating chemical contamination of the eyes and body should be consulted.

### **General checklist to use for chemical exposures**

- In case of chemical exposure, flush skin or eyes with cool water for at least 15 minutes-or more and if possible until medical assistance arrives. **DO NOT RUB!**
- Contact Public Safety (714) 997-6763 (or dial 911 from a campus phone) in order to get medical assistance as soon as possible. Provide Materials Safety Data Sheets (MSDSs)/Safety Data Sheets, (SDSs) to medical personnel.
- Know the effects of chemicals with which you are working. Read, ask questions about, and understand MSDSs/SDSs for each chemical with which you work.
- Always wear personal protective equipment to include eye, face, body and foot protection.
- Learn the location and use of all emergency equipment, even if you are working in a new area for only a brief time.
- Know how to help others reach showers or eyewashes and how to help them get medical assistance.
- Hold your eyes open with your hands while using eyewash to be sure water reaches the eyes.
- While assisting injured person provide clean cover for privacy while removing contaminated clothing after the shower has been activated.
- Immediately wash off even small amounts of chemicals.
- Notify supervisor as soon as emergency has subsided.
- Supervisor should immediately notify the Risk Manager and EH&S

## **8.0 TESTING**

### **8.1 Eyewashes**

#### **Weekly**

- Plumbed eyewashes shall be activated when labs are in use for a period long enough to verify operation and ensure flushing is available. The test will be documented on the tag provided.
- If there is a period of time where a laboratory area is inactive, the weekly flushing may be deemed unnecessary, but must be documented on the tag provided.

#### **Monthly**

- **Visually inspect the unit** for leaks or pipe damage and proper placement of protective covers. This should be done prior to testing in order to avoid further damage to the unit and risk of injury to users. Ensure that the unit is free of any obstructions.
- **Activate unit.** Ensure that the water flow is continuous, evaluate that the unit can maintain flow for 15 minutes, and is not injurious to the user's eye or face. Valve actuator must activate water flow in one second or less.
  - Valve actuator must stay on unless manually turned off and must activate water flow in one second or less.

- Controlled flow of flushing fluid must be provided to both eyes simultaneously.
- The unit must be capable of delivering not less than 0.4 gallons per minute of flushing fluid for 15 minutes.
- **Sanitize water supply through *monthly* flushing.** In order to relieve the unit of any rust and other pipe build-up, flush the unit until the water runs clear.
- **Document test with dates and initials on unit tag.**

### **Annual**

Flow rate test to be conducted by outside contractor.

## **8.2 Eye/face washes, Combination Units**

### **Monthly and Annual**

Flush and Flow Rate testing to be performed by an outside contractor.

## **9.0 REGULATIONS, STANDARDS AND REFERENCES**

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

American National Standards Institute/ International Safety Equipment Association  
(ANSI/ISEA), Z358.1

American national Standard for Emergency Eyewash and Shower Equipment  
Approved September 14, 2009

## **10.0 PROGRAM REVIEW**

*Date Reviewed:* DRAFT presented September 14, 2010 by: Karen Swift, EH&S Specialist  
Approved by Science Safety Committee November 11, 2010