

# EMERGENCY EYEWASH AND SHOWER EQUIPMENT

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## INTRODUCTION

### PURPOSE:

Many work areas at Duke University, especially laboratories, conduct operations where the eyes or body of employees or students may be exposed to injurious materials. Duke University's policy is to take every precaution to protect its employees against occupational injuries resulting from exposure to these materials.

### APPLICABILITY:

This guideline is applicable to all work environments that use or have the potential for future use of chemicals which may cause skin or eye damage, infectious material, or when required by regulation.

## GENERAL REQUIREMENTS

All emergency eyewash and shower equipment, including drench hoses, drench hose-eyewash combination units, and any self-contained/mobile emergency drench devices at any Duke facility shall conform to and be installed in accordance with the requirements listed in ANSI/ISEA Z358.1 (most recent revision), *American National Standard for Emergency Eyewash and Shower Equipment*, developed with the International Safety Equipment Association (ISEA).

Devices must be installed in a location and configuration so that they are protected from contamination and do not present additional hazards during use. For example, the location shall not expose the user to electrical hazards, sharp edges, or protruding objects. Note that for eyewashes and eye/face washes, the nozzles shall be installed at least 6 inches from the wall or nearest obstruction and between 33 and 45 inches in height above the surface on which the user stands. For showers, the valve actuator shall be within 69 inches of the surface on which the user stands and the top of the dispersed water column between 82 and 96 inches with the center of the spray at least 16 inches from any obstruction.

Emergency showers shall deliver tepid water as specified by ANSI Z358.1. Tempering is not necessary for eyewashes, eye/face washes and drench hoses unless installed in outside locations.

The specific devices described in this policy are required in all newly constructed, modified, or renovated areas. Existing areas with similar hazards to those mentioned in this policy may use existing quick-drench equipment unless OESO determines that the existing equipment is not adequate and provides a written recommendation for upgraded equipment.

## **SPECIAL REQUIREMENTS FOR LABORATORIES**

### **DRENCH HOSE/EYE WASH COMBINATION UNITS**

Drench hose-eyewash combination units shall be installed in newly constructed laboratories as well as modified, upgraded, or renovated laboratories. These units shall comply with the requirements for eye/face wash equipment in ANSI Z358.1. At a minimum, one of these units shall be installed in each laboratory room having a sink. When room areas are larger than 500 square feet, additional units should be added as recommended by OESO. These devices will typically be installed at the back or to the side of the sink, and oriented so that the eyewash function can, once activated, be used without requiring the use of the operator's hands. Note that if the countertop is deep, installing at the back will likely place it too far away for some users to flush their eyes/face with it stationary (unless it has a pull-down or swing-away design).

### **EMERGENCY EYEWASH AND SHOWER EQUIPMENT**

Combination drench hose-eyewash units will meet the requirements for most laboratories; however, there may be some circumstances that require safety showers or eyewash-safety shower combination units. Typically these circumstances will involve the use of large quantities of corrosive materials or methylene chloride or formaldehyde solutions (>1%). (For the purposes of this policy, "large" quantities will mean any container larger than 4 liters and/or any 1 gallon or 4 liter container that is easily breakable (e.g., glass without a protective PVC coating).) When such equipment is necessary, they shall be installed in accessible locations that require no more than 10 seconds to reach. Preferably, these units should be located in hallways where they are accessible to many laboratory employees, thus reducing the number of shower units to be installed.

## **SPECIAL REQUIREMENTS FOR NON-LABORATORIES**

There are many instances where non-laboratories require the installation of emergency drench hose, eyewash, and/or shower equipment. In most cases, the recommended device is a drench hose-eyewash combination unit that meets all eye/face wash requirements of ANSI Z358.1. In some cases, depending on the quantities of chemicals used, a shower or eyewash-shower unit may be required. In situations where a plumbed device is not feasible (i.e., outdoors), a suitable mobile device (meeting requirements of ANSI Z358.1) shall be used.

The following areas require a suitable emergency drench device:

- Mechanical areas in which water treatment chemicals are handled.
- Areas where employees perform high-level disinfection of medical devices.
- Areas where employees handle solutions containing more than 0.1% methylene chloride or 0.1% formaldehyde.
- Areas where employees may be splashed with corrosive chemicals or chemicals that are highly toxic by skin absorption.
- Battery charging areas for acid-containing batteries requiring maintenance (e.g., adding water) where there is a potential for acid splash.
- Chemical waste handling areas.

For other circumstances similar to those identified above, contact OESO for recommendations.

## VOLUNTARY INSTALLATION OF EQUIPMENT

In the case that departments wish to install emergency eyewash and shower equipment when not specifically required, such installations are permissible under the following guidelines:

- The department must contact the appropriate safety officer to ensure suitability of the equipment and the planned location.
- The department must adhere to all requirements under Inspection and Maintenance.

## INSPECTION AND MAINTENANCE

All eyewashes, emergency showers, and combination devices shall be inspected and maintained in accordance with manufacturer's instructions. All equipment shall be on a routine maintenance schedule as follows:

- **Weekly** Eyewashes (and other devices that may be used to flush the eyes) shall be actuated weekly by personnel within the work area to flush and verify proper operation. This activity will be documented (date of inspection and initials of inspector) on or near the device (on a tag or nearby check sheet) or through an electronic system. **Note: Some units, because of their configuration, may not allow good drainage or capture of water during testing. For devices where no plumbed drain is accessible and the water cannot be collected in a container such as a bucket or drain pan, users must arrange for a quarterly check by the maintenance provider or must request that their maintenance provider reconfigure the device to allow for weekly flushing by the user.**
- **Quarterly** Eyewashes and drench hoses that cannot be flushed weekly by the user (because of a configuration not conducive to capturing water) must be actuated quarterly by the maintenance provider to flush and verify proper operation. This activity will be documented per standard practice of the responsible maintenance group.
- **Annually** All emergency eyewashes, drench hoses, and safety showers shall be inspected annually by either the user or the maintenance provider to assure conformance with ANSI Z358.1 requirements. This activity will be documented per standard practice of the responsible group.

### Recommended Procedure for Eyewash/Drench Hose Checks:

#### **Weekly Check:**

1. Ensure that the path to the eyewash/drench hose is not obstructed.
2. Verify that nozzle caps are in place to prevent contamination and that the nozzles, nozzle caps, and bowl/sink are clean and sanitary.

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3. Place a catch pan or bucket under the unit if a plumbed drain is not available.
4. Actuate valve to full open position. Water must flow within 1 second.
5. Verify that nozzle caps come off when the eyewash or drench hose is activated.
6. Verify that water continues to flow until manually turned off and can be used without requiring the use of the operator's hands.
7. Look at the flow pattern. It should provide a gentle non-injurious flow. If a dual-stream eyewash, both streams should rise to equal height in a pattern that will flush both eyes simultaneously.
8. Continue to flush until water is clear.
9. Put nozzle caps back in place.
10. Report problems to your building maintenance provider.

### **Annual Inspection/Flow Test (in addition to weekly check requirements)**

1. Check that the device is in a well-lit area and identified by a highly visible sign.
2. Perform a flow test. This may be done with a flow meter or by timing the flow into a suitable container. Ensure that fluid flow is not less than 1.5 liters per minute (0.4 gallons per minute) for eyewashes or 11.4 liters per minute (3.0 gallons per minute) for eyewash-drench hose combination units.
3. Inspect all components for corrosion or other damage. Check piping connections for leaks.
4. Using a temperature gauge or other means, determine that the water is 100 °F or less.
5. If unit is functioning correctly, document the annual check.
6. Report problems to your building maintenance provider.

### **Recommended Procedure for Safety Shower Checks:**

#### **Annual Inspection/Flow Test (by Maintenance)**

1. Ensure that the path to the shower is not obstructed.
2. Check that the device is in a well-lit area and identified by a highly visible sign.

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3. Inspect all components for corrosion or other damage. Check piping connections for leaks.
4. Place a drum or other container under the unit (unless a serviceable drain that can handle 20 gpm is available and water will not harm building materials).
5. Actuate valve to full open position. Water must flow within 1 second.
6. Verify that water continues to flow until manually turned off.
7. Look at the flow pattern. It should provide a gentle non-injurious flow, and the flow should be substantially dispersed. Specifically, check that spray pattern has a minimum diameter of 50.8 cm (20 in.) at 152.4 cm (60 in.) above the surface on which the user stands, and that the center of the spray pattern is located at least 40.6 cm (16 in.) from any obstruction.
8. Continue to flush until water is clear.
9. Perform a flow test. This may be done with a flow meter or by timing the flow into a suitable container. Ensure that fluid flow is not less than 75.7 liters per minute (20.0 gallons per minute) for showers.
10. Using a temperature gauge or other means, determine that the water is between 85 and 100°F if provided with tempered water or 60-100°F if not.
11. Plan maintenance for any problems found.
12. If unit is functioning correctly, document the annual check following standard practice of the responsible maintenance group. Note the date of inspection and initials of inspector on or near the device (on a tag or nearby check sheet) or through an electronic system.