Benedictine University

Emergency Eyewash/Drench Hose and Shower Program

Table of Contents

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PURPOSE AND APPLICABILITY

The general purpose of this program is to ensure that all emergency eyewashes/drench hoses and showers supply clean, potable water and are in proper working condition. This program explains the procedures for emergency use; installation and placement; guidelines for activation, inspection, testing and maintenance of emergency eyewash/drench hose and shower stations.

This program applies to all emergency eyewash/drench hose and shower stations in university buildings. Annual flow rate inspections will be conducted by Facilities Management.

The Occupational Safety and Health Administration (OSHA) regulation that applies to emergency eyewashes/drench hose and safety showers is applicable to all facilities that require this equipment as a form of first aid. This regulation (29 CFR 1910.151 (c), Medical Services and First Aid) states that:

> "Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use."

OSHA penalties substantially increased, by as much as 80% since 2016 in all OSHA-regulated states. OSHA defines serious violations as "when the workplace hazard could cause an accident or illness that would most likely result in death or serious physical harm." A fine of thousands of dollars is likely in penalties. For repeat violations, the fine doubles or even triples, if the violations are not corrected the first time.

The American National Standards Institute (ANSI) and the International Safety Equipment Association (ISEA) standard Z358.1-2014, "Emergency Eye Wash and Shower Equipment" provides guidance for selection, installation, operation and maintenance of this equipment to meet OSHA requirements.

In most cases, the initial first aid treatment for a chemical splash is to rinse the affected area with water for at least 15 minutes prior to seeking any other medical treatment. It is often critical that the eyes be flushed during the first few seconds following a chemical splash with contaminant free water if injury is to be minimized.

DEFINITIONS

Drench hose – a device intended solely as supplemental equipment and may not be used in place of dedicated eyewash units. These devices meet the provisions of the standard.

Emergency shower – a device specifically designed and intended to deliver flushing fluid in sufficient volume to cause that fluid to cascade over the entire body.

Flow pressure – the pressure in the water supply pipe near the water outlet while the faucet or outlet is fully open and flowing.

Flushing fluid – fluid that is either water or else a sterile buffer solution designed specifically for eyewash and shower units.

Hazardous material – any substance or compound that has the capability of producing adverse effects on the health and safety of humans.

Plumbed eyewash – an eyewash unit permanently connected to an uninterruptible water supply that is capable of delivering a minimum of 0.4 Gallons per Minute (GPM) for 15 minutes.

Portable eyewash – a supplemental device to plumbed or self-contained eyewashes, which can deliver immediate flushing fluid to the eyes or body and is not connected to a plumbed water supply. These units use a combination of water and a sterile solution which is kept in a tank within the device.

Self-contained eyewash – a stand-alone eyewash device containing flushing fluid that is capable of delivering a minimum of 0.4 GPM for 15 minutes.

Tepid – a flushing fluid temperature conducive to promoting a minimum 15 minute irrigation period. A suitable range is 60-100° F.

*****EMERGENCY EYEWASHES AND SHOWERS ARE NOT A SUBSTITUTE FOR THE USE OF PERSONAL PROTECTIVE EQUIPMENT (GLASSES, GOGGLES, GLOVES, LAB COATS, APRONS, ETC.)*****

LOCATION OF EMERGENCY EYEWASH/DRENCH HOSE AND SHOWER PROGRAM

The written Emergency Eyewash/Drench Hose and Shower Program is available for review by all Benedictine University faculty and staff at the following central location:

S:\University Info\General Information\Emergency Information

Students may request a copy of the program from any supervisory personnel.

RESPONSIBILITIES

Responsibility for the administration of this program rests with the Emergency Preparedness Manager/Safety Specialist. The Emergency Preparedness Manager/Safety Specialist, in cooperation with Chemical Hygiene Office (CHO) and Facilities Management, will have the responsibility of issuing guidelines and procedures necessary for the implementation and coordination of the Emergency Eyewash/Drench Hose and Shower Program.

Chemical Hygiene Officer

CHO is responsible for the training of departmental faculty, staff and student employees. Lab assistants, teaching assistants and interns who perform work for the University, even though not paid directly, are quasi employees; therefore, are treated as employees.

The CHO may delegate safety and health-related responsibilities to a department safety representative but it's the responsibility of the CHO to make sure requirements are being met.

1. Work with department chairs to ensure that emergency eyewash/drench hose and shower stations are provided for laboratories and other areas as required by this program.
2. Ensure that emergency eyewash/drench hose and shower stations located in all areas of the building including laboratories, corridors or common areas are tested and inspected as specified by the manufacturer and the ANSI/ISEA Z358.1-2014 standard located in the maintenance section of this program. This includes weekly testing and annual inspection of eyewash/drench hose and shower stations
3. Are responsible for reporting problems with the eyewash/drench hose and shower stations to Facilities Management immediately.
4. Ensure that all personnel are familiar with the location and operation of the emergency eyewash and shower stations.

Facilities Management

Facilities Management is responsible for the maintenance, testing and repair of the eyewash/drench hose and shower stations located on campus.

1. Ensure that emergency eyewash/drench hose and shower stations installed in University buildings are tested weekly and inspected annually as specified by the manufacturer and the ANSI/ISEA Z358.1-2014 standard located in the maintenance section of this program.
2. Facilities Management and the CHO are responsible for the weekly testing of all eyewash and shower units on campus.

Emergency Preparedness Manager/Safety Specialist

The responsibility of the Emergency Preparedness Manager/Safety Specialist is to:

1. Develop and maintain the Emergency Eyewash/Drench Hose and Shower Program.
2. Maintain a master map of locations and types of all emergency eyewash/drench hose and shower stations.

TRAINING AND REQUIREMENTS

Training

Simply installing emergency eyewash/drench hose and shower stations is not a sufficient means of assuring safety. All employees and students who might be exposed to a chemical splash must be trained by their department or lab instructor on the following topics:

1. The specific location of the eyewash/drench hose and shower stations serving the area.
2. How to properly activate and use the specific type of unit.
3. Eyewash/Drench Hose – eye injury – Individuals should be instructed to hold the eyelids "open" and roll the eyeballs continuously so fluid will flow on all surfaces of the eye and under the eyelid for a minimum of 15 minutes. Seek medical attention immediately and bring a copy of the Safety Data Sheet (SDS).
4. Shower – body injury – Remove all contaminated clothing, flush body for a minimum of 15 minutes. Seek medical attention immediately and bring a copy of the SDS.
5. Facilities Management staff – Training to perform weekly testing of shower and eyewash/drench hose stations in all buildings to maintain minimum performance requirements.

Requirements

In general, the standard provides that emergency equipment be installed within 10 seconds walking time from the location of a hazard (approximately 55 feet). The equipment must be installed on the same level as the hazard. Accessing the equipment should not require going up or down stairs or ramps. The path of travel from the hazard to the equipment should be free of obstructions and as straight as possible. A door is considered an obstruction in the current standard.

Where workers are handling particularly strong acids, caustics or other materials where the consequences of a spill would be very serious, emergency equipment should be installed immediately adjacent to the hazard.

- Eyewash/drench hose and shower stations should be available for immediate use, located within 10 seconds of the hazardous operation (approximately 55 feet), on the same level as hazard.
- Identify eyewash/drench hose and shower stations with highly visible sign. (**See Labeling section**)
- Area around eyewash/drench hose and shower stations shall be well-lit and unobstructed.
- The activating valves/levers should be highly visible and easy to use – requiring no more than a one-handed operation. Once the lever has been activated, no hands should be needed to maintain water flow.
- The eyewash/drench hose and shower stations should provide a "minimum" of a 15-minute uninterrupted flush of tepid water (60-100°F) provided by a temperature mixing valve. Legionella lives in water temperatures ranging from 77-113°F.

Eyewash Specific Requirements

- Controlled, low velocity flow rinses both eyes and is not injurious to user.
- Water flow is sufficiently high to allow user to hold eyes open while rinsing.
- Unit must deliver at least 0.4 GPM for 15 minutes.
- Outlet heads shall be positioned between 33” and 53” from the floor and at least 6” from the wall or nearest obstruction.
- Protect spray heads from airborne contaminants. Covers shall be removed by water flow.
- Valve actuator shall be easy to locate and readily accessible to user.
- “Hands-free” stay-open valve activates in one second or less.
- Unit washes both eyes simultaneously. Water flow covers area indicated on test gauge at no more than 8” above spray heads.

Shower Specific Requirements

- “Hands-free” stay-open valve activates in one second or less and remains open until manually closed.
- Water supply shall be sufficient to supply at least 20 GPM in the required pattern for 15 minutes.
- Height of water column shall be between 82” and 96” above floor.
- Center of the water pattern shall be at least 16” from any obstructions.
- At 60” above floor, the water pattern must be a least 20” in diameter.
- Easily located, accessible actuator no higher than 69” above floor.

Eyewash/Drench Hose Specific Requirements

- Water flow is sufficiently high to allow user to hold eyes open while rinsing.
- Spray heads are protected from airborne contaminants. Covers are removed by water flow.
- Unit delivers at least 0.4 gallons (1.5 liters) of water per minute for 15 minutes.
- Hands-free stay-open valve activates in one second or less.
- Valve actuator is easy to locate and readily accessible to the user.
- Water flow pattern is positioned between 33” and 53” from the floor and at least 6” from the wall or nearest obstruction.
- Unit washes both eyes simultaneously. Water flow covers area indicated on test gauge at no more than 8” above spray heads.

Benedictine University Emergency Eyewash/Drench Hose and Shower Program

APPLICATION

Emergency Eyewashes – A plumbed or self-contained eyewash shall be provided in all work areas where faculty, staff or students are exposed to a potential hazard of injury to the eye due to contact with a hazardous chemical or biological material of BSL-2, and radioactive materials. Such work areas include, but are not limited to:

- Laboratories, storerooms, maintenance rooms and other work areas;
- Laboratories or other areas where work with biological materials that are at BSL-2 is occurring;
- Laboratories using radioactive materials;
- Pesticide storage or mixing facilities;
- Battery repair areas.

Emergency Showers – An emergency shower shall be provided in all work areas where faculty, staff or students are exposed to a potential hazard of injury to the skin due to contact with a corrosive, severely irritating or toxic chemical. Such work areas include, but are not limited to:

- Research laboratories, storerooms, maintenance rooms and other work areas;
- Pesticide storage or mixing facilities;
- Laboratories using radioactive materials;
- Battery repair areas.

Eyewash/Drench Hose – Eyewash/drench hose unit shall be provided in work areas where faculty, staff or students are exposed to a potential hazard of injury to the skin due to contact with a corrosive, severely irritating or toxic chemical. Such work areas include, but are not limited to:

- Research laboratories, storerooms, maintenance rooms and other work areas;
- Where strong acids or caustics are being handled, emergency eyewash/drench hose unit should be located adjacent to the hazard.

INSTALLATION

Plumbed, Self-Contained Eyewash and Eyewash/Drench Hose Units:

1. Plumbed eyewashes shall be installed so that they are capable of delivering to the eyes a minimum of 0.4 GPM of flushing fluid for 15 minutes (1.5 liters per minute).
2. Self-contained eyewashes shall be installed with the water nozzles 33-53” from the floor and 6” minimum from the wall or nearest obstruction.
3. Be in accessible locations that require no more than 10 seconds or 55 feet to reach. The eyewash shall be located on the same level as the hazard. For a strong acid or strong caustic, the eyewash should be immediately adjacent to the hazard inside the lab.
4. Be located in an area identified with a highly visible sign positioned so the sign shall be visible within the area served by the eyewash. The area around the eyewash shall be well-lit.

5. Be connected to a supply of flushing fluid per the manufacturer's installation instructions to produce the required spray pattern for a minimum period of 15 minutes. If shut off valves are installed in the supply line for maintenance purposes, provisions shall be made to prevent unauthorized shut off.
6. Deliver tepid flushing fluid (60 - 100° F).
7. Eyewash/drench hose unit washes eyes simultaneously and covers area affected at no more than 8" above spray heads.
8. Hands-free stay-open valve activates in one second or less.

Emergency Shower Units:

1. Emergency shower heads shall be installed so that they are capable of delivering a minimum of 20 GPM of flushing fluid for 15 minutes.
2. Be positioned so that the shower pattern is dispersed such that the top °of the flushing fluid column is at least 82 inches and not more than 96 inches from the surface on which the user stands. The center of the spray shall be at least 16 inches from any obstruction.
3. The spray pattern shall have a minimum diameter of 20 inches at 60 inches above the surface on which the user stands.
4. The manual actuator triangle pull shall not be located more than 69 inches above the surface on which the user stands.
5. The clear floor space directly under the shower head should be at least 30 inches wide by 48 inches from the wall.
6. Deliver tepid flushing fluid (60 - 100° F).

LABELING

The emergency eyewash, drench hose and shower stations should have the following visible signs:

MAINTENANCE PROCEDURES

Emergency eyewash/drench hose and shower stations shall be activated weekly for a period long enough to verify operation and ensure that flushing fluid is available and clean. This flushing helps clean out any rust, scale deposits or bacteria that may accumulate and cause additional injury. In addition, all eyewash/drench hose and shower stations shall be inspected annually to ensure conformance with the requirements of the standard.

Weekly Eyewash/Drench Hose Testing (Performed by Facilities Management staff, CHO and PI)

- Ensure that access to the eyewash/drench hose is unobstructed.
- Visually inspect the eyewash/drench hose to ensure that there are no broken parts, leakage, etc.
- Verify that protective covers are properly positioned, clean, intact and operate properly when activated.
- Activate eyewash/drench hose unit – flush pipes: check that the spouts are clean and that the water flow is effective and continuous. Operate the eyewash for approximately three (3) minutes.
- The unit must deliver low-pressure "soft" flow to both eyes so it does not injure the open eye.
- Check that the unit's valve activator remains open without the use of the operator's hands.
- Ensure each station has a highly visible emergency sign.
- For portable (non-plumbed units), verify expiration date is not exceeded and fluid levels are full.
- Maintain an inspection tag for this weekly testing. (**See Attachment 1**)
- If the equipment failed the weekly test due to low water pressure or if the water is a dirty or rusty color, attach an **"Out of Service"** tag to the eyewash station. (**See Attachment 2**)
- Run eyewash/drench hose test simultaneous to shower (if applicable) to make sure pressure is not depleted from either unit.

Annual Eyewash Inspection (Performed by Facilities Management staff)

- Verify flow rate of the device annually. Let the water run for exactly one minute to verify collection of at least 1.5 liters (0.4 gallon) of water for eyewash units with a minimum water pressure of 30 PSI.
- Open the valve on the eyewash and verify that it fully opens in one second or less and that it stays open.
- Check for tepid water temperature (60 - 100° F).
- Maintain an inspection tag for this annual test. (**See Attachment 1**)

Weekly Shower Testing (Performed by Facilities Management staff)

- Ensure that access to the shower is unobstructed.
- Visually inspect the shower to ensure that there are no broken parts, leakage, etc.
- Activate shower unit – flush pipes: check that the flow is effective and continuous. Operate the shower for approximately six (6) seconds into a five (5) gallon bucket with a line indicating two (2) gallons. The shower water should fill to the two-gallon line in six seconds.
- Check that the unit remains activated without the use of the operator's hands.

- Maintain an inspection tag for this weekly testing. (**See Attachment 1**)
- Ensure that problems identified during the inspection are turned in to Facilities Management immediately. If the equipment failed the weekly test due to low water pressure or if the water is a dirty or rusty color, attach an **"Out of Service"** tag to the shower station. (**See Attachment 3**)
- Run shower test simultaneous to the eyewash to make sure pressure is not depleted from either unit.

Annual Shower Inspection (Performed by Facilities Management staff)

- Flow rate of the device should be conducted annually. Let the water run for exactly one minute to verify collection of at least 75.7 liters (20 gallons) of water at a minimum water pressure of 30 PSI. This can also be accomplished in a 15 second increment to fill a five gallon bucket.
- Determine that flushing fluid is substantially dispersed throughout the pattern.
- Open the valve on the unit and verify that it fully opens in one second or less and that it stays open.
- Maintain an inspection tag for this annual test. (**See Attachment 1**)

SUMMARY OF EYEWASH, DRENCH HOSE AND SHOWER LOCATIONS

Basement Birck Hall:

NMR Room BK018 (1 Eyewash only – test performed by CHO)

First Floor Birck Hall:

Chemical Stock Room, 141 (1 Portable eyewash unit - test performed by CHO)
Flammables Room, 141A (1 Drench hose – test performed by CHO)
Hallway, outside 118 and 149 (2 Eyewash/2 Shower – test performed by Facilities)
Chemistry Prep Room, 117 (1 Drench hose – test performed by CHO)
Gen Chem Teaching Lab, 149 (1 Drench hose – test performed by CHO)
Instrumental Analysis Lab, 150 (1 Drench hose – test performed by PI)
Botany Lab, 151 (1 Drench hose – test performed by PI)
Gen Biology Lab, 105 (1 Drench hose – test performed by PI)
Natural Science Lab, 106 (1 Drench hose – test performed by PI)
Research Lab A, 107 (1 Drench hose – test performed by PI)
Research Lab B, 108 (1 Drench hose – test performed by PI)

Third Floor Birck Hall:

Hallway, outside 317 and 363 (2 Eyewash/2 Shower – test performed by Facilities)
Anatomy Lab, 369 (1 Eyewash only – test performed by PI)
Research Lab F, 345 (1 Drench hose – test performed by PI)
Research Lab G, 346 (1 Drench hose – test performed by PI)
Research Lab H, 347 (1 Drench hose – test performed by PI)
Biology BSL 2 Lab, 354 (1 Drench hose – test performed by PI)
Cell Biology Lab, 356 (1 Drench hose – test performed by PI)
Biochemistry Lab, 357 (1 Drench hose – test performed by PI)
Organic Chemistry Lab, 360 (1 Drench hose – test performed by PI)
Research Techniques Lab, 365 (1 Drench hose – test performed by PI)

Anatomy Lab, 369 (1 Drench hose – test performed by PI)
Instrumental Analysis Lab, 372 (1 Drench hose – test performed by PI)

First Floor Scholl Hall:

Art Department, 121 (1 Eyewash and 1 Shower, separate units – test performed by Facilities)

Powerhouse:

2 Eyewash units, 1 with a drench hose; 1 with a shower/eyewash combo – test performed by Facilities

Lower Level Krasa:

Maintenance Area (1 Eyewash/Shower combo – test performed by Facilities)

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Attachment 1

WEEKLY EMERGENCY EYEWASH/DRENCH HOSE AND SHOWER TEST RECORD

INSPECT THIS UNIT CAREFULLY BEFORE SIGNING INSPECTION RECORD

DATE:	BY:	DATE:	BY:

ANNUAL EMERGENCY EYEWASH/DRENCH HOSE AND SHOWER TEST RECORD

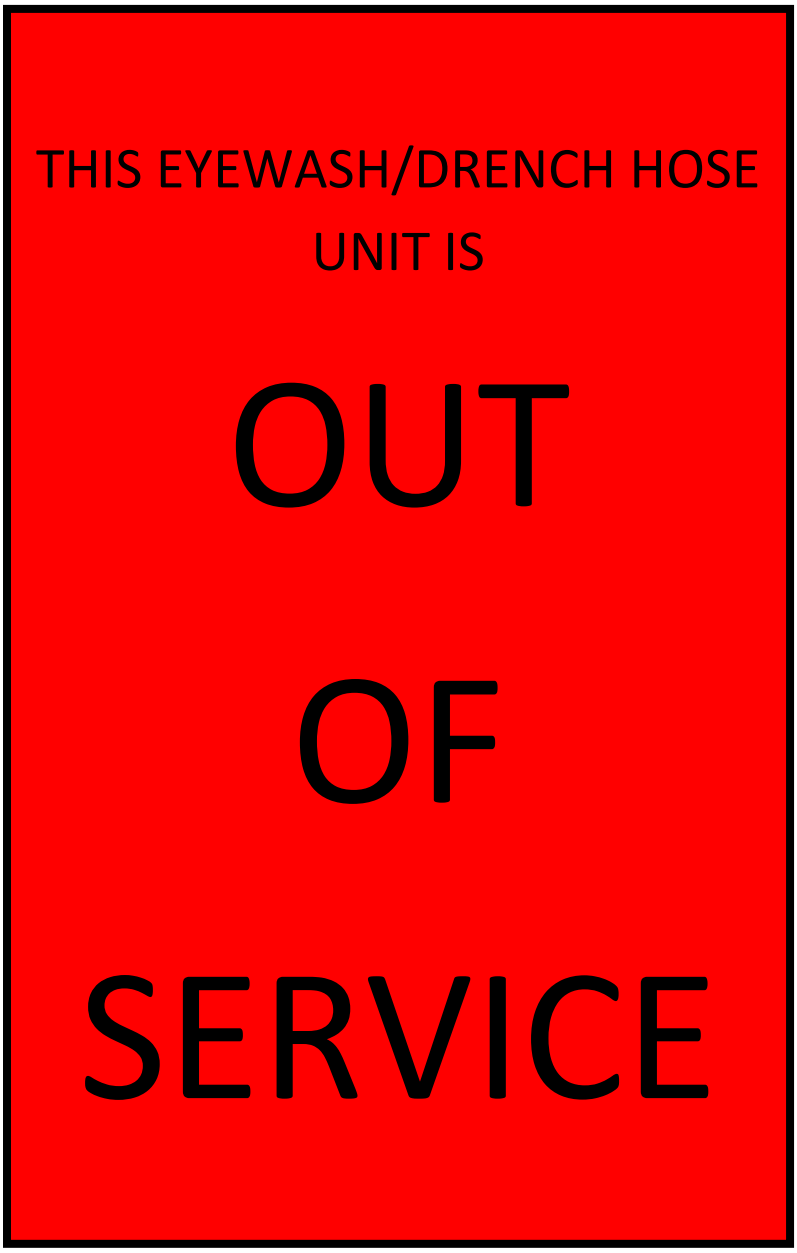
INSPECT THIS UNIT CAREFULLY BEFORE SIGNING INSPECTION RECORD

DATE:	BY:

Attachment 2

Attachment 3

Attachment 4



Attachment 5

Acronyms

ANSI	American National Standards Institute
BSL	Biosafety Levels
GPM	Gallons per Minute
ISEA	International Safety Equipment Association
OSHA	Occupational Safety and Health Administration
PI	Principal Investigator
PSI	Pounds per Square Inch
SDS	Safety Data Sheet

REFERENCES

American National Standards Institute (ANSI) Z358.1-2014 edition. Emergency Eyewash and Shower Equipment.

Guardian Compliance Checklist ANSI Z358.1-2014.

National Safety Council. (2012). *Selecting an emergency eyewash station*. http://www.nsc.org/safetyhealth/Pages/selecting_an_emergency_eyewash_station.aspx

Occupational Safety & Health Administration 29 CFR 1910.151(c) Medical services and first aid.

Southwestern University Emergency Eyewash and Shower Program (2007).

University of Massachusetts Emergency Eyewash and Drench Shower Program (2010).