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Emergency Eyewash and Shower

1. Purpose / Background

MIT is committed, as per its Environmental, Health and Safety (EHS) Policy, to "excellence in environmental, health and safety stewardship on our campus…" and to minimize "the adverse EHS impacts of our facilities, activities and operations to protect human health…"

Emergency showers and eyewash stations are provided as a first aid treatment to help reduce the effects of an exposure to hazardous material. They provide rapid flushing of the eyes, face and/or body of an individual who has been splashed by a hazardous material.

Eyewashes or emergency showers are not a substitute for prevention and protection but should be used in conjunction with these controls to ensure the safety and health of the MIT community. Engineering controls should be the first level of protection. An additional level of protection to the user is proper primary protective devices. Personal Protective Equipment should be worn as described in the PPE hazard assessment for each lab/shop. Improving procedures to eliminate or minimize hazards may also prevent injuries.

There are hundreds of eyewashes and emergency showers on the MIT Campus. This Standard Operating Procedure (SOP) describes when eyewashes and/or emergency showers are needed; how to choose, install and test them; when and how to use them; and who to contact in case of emergency or to obtain additional information.

2. Scope

This document applies to all Departments, Labs, and Centers (DLC's) at MIT. The following types of equipment are covered: emergency showers, hand-held drench hoses, eyewashes, combination shower/eyewash and self-contained eyewashes.

This document summarizes the OSHA and Massachusetts requirements as well as ANSI, NIH and other consensus standards and EHS best practices.

The following sections of this SOP would be of interest to Project Managers and Repair and Maintenance Supervisors in the Department of Facilities and DLC Facilities Managers:

4.1 When do we need an eyewash or an emergency shower?
4.2. What are the specifications for equipment and water/fluid supply?
4.3 How do we have the equipment installed?
4.5. How to test, inspect, and repair emergency showers and/or eyewashes?
4.6. Access and signage

3. Prerequisites

The supply should be tempered, potable water and installed in a manner that prevents the stagnation of water in the piping. This is a prerequisite for MIT Department of Facilities (DOF) to obtain a permit from the City of Cambridge Plumbing Inspector.

4. Procedures

Eyewashes and emergency showers should be located in areas where a hazard exists that could be injurious to the eyes or body. This equipment should be readily accessible and the locations clearly marked with signage. Regular testing and inspection (i.e. DLC Level I and Level II, DOF Preventive Maintenance tests) should be performed to ensure that the equipment will function well in the event of an emergency.

4.1 When do we need an eyewash or an emergency shower?

Emergency eyewashes and showers are to be installed in all laboratories and other types of non-lab work areas, which have hazards that include but are not limited to those listed below. Non-lab work areas and operations that may require these devices include: pH neutralization system locations, battery charging areas, spraying operations, high dust areas, printing areas, shops, etc. Note that the need for eyewashes and showers in hazardous waste (satellite and main) accumulation areas are addressed in the Design Guideline for Hazardous Waste Handling Design Issues.

If the current hazards do not trigger the need for this equipment, piping shall be installed during the current renovation (left capped at either end to avoid “dead legs” and labeled for future use). This is to facilitate installation of eyewashes and/or showers when hazards change (often before the renovation is completed or soon after) or during a future space change. The goal is to reduce the cost of, time involved, and impact of the installation on the users.

4.1.1

Legal requirements, consensus standards, and MIT references for eyewashes and emergency showers are as follows:

Citation	Legal requirements for Emergency Showers and Eyewashes	Factors that MIT considers when applying the criteria
OSHA 29 CFR 1910.151(c)	…”where the eyes or body of any person may be exposed to injurious corrosive materials”	Quantity, volume, concentration, and manual manipulation of the hazardous material
OSHA 29 CFR 1910.178	Battery acid is handled and/ or wet cell batteries are charged 29 CFR 1910.178(g) requires certain precautions to be taken when charging electric batteries of powered industrial trucks.	Includes uninterrupted power supply battery racks and charging stations for battery operated vehicles.
	Formaldehyde If there is any possibility that an employee's eyes/ skin may be splashed with solutions containing 0.1 percent	Include solutions of formaldehyde and formalin

Citation	Legal requirements for Emergency Showers and Eyewashes	Factors that MIT considers when applying the criteria
OSHA 1910.1048(i 2 & i3)	or greater formaldehyde, the employer shall provide acceptable eyewash/ shower facilities within the immediate work area for emergency use.	
OSHA 1910.1030(e)(3)(i)	Bloodborne pathogens Each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area.	
Massachusetts Comprehensive Fire Safety Code, 527 CMR 1.00	Any room wherein corrosives or flammable liquids are handled or where open flame devices are used.	Include chemical stockrooms and Hazardous Waste Storage Areas (less than 90 days)
Uniform State Plumbing Code 248 CMR 10.13	Any room wherein corrosives or flammable liquids are handled, chemicals are stored or used, or where open flame devices are used.	Include chemical stockrooms and Hazardous Waste Storage Areas (less than 90 days)
NRC	Note that there are no requirements for eyewashes or showers when using radioactive materials.	Reactor RPP requires eyewashes
Source	**Consensus standards and other recommendations**	**Factors that MIT considers when applying these**
CDC/ NIH Biosafety in Microbiological and Biomedical Laboratories, 4th edition	Biosafety level 2 “an eyewash station is readily available.” Biosafety level 3 “an eyewash station is readily available inside the laboratory.”	BL2 includes BL2+ BL1 labs should be designed as a BL2 with an eyewash because the research often becomes BL2. An eyewash should be installed in the tissue culture room if the nearest eyewash is in an adjacent lab with a door in between.
NIH Policy Manual Protection of NIH Personnel Who Work with Nonhuman Primates (NHP)	**“**And for eye, mouth or nose splashes, that flushing of the area with saline solution or at an eye wash station (ocular exposures) should also be initiated within 5 minutes and continue for at least 15 minutes.”	Includes areas where non-human Primates (NHP) are handled. There is a risk of disease transmission if the NHP’s saliva and/ or body fluids come in contact with the person’s eyes, nose, and/ or mouth (any mucous membrane). There is also a risk of disease transmission when people medically treat wounds and clean contaminated instruments, equipment, and containments.

Citation	Legal requirements for Emergency Showers and Eyewashes	Factors that MIT considers when applying the criteria
AAALAC	Similar to NIH guidance above	
NFPA 99 11-6 (Health Care Facilities / Chapter on Laboratories)	Where the eyes or body of any person can be exposed to injurious corrosive materials.	
ANSI/SEA Z358.1 Emergency Eyewash and Shower Equipment	"Emergency showers shall be in accessible locations that require no more than 10 seconds to reach. The shower shall be located on the same level as the hazard and the path of travel shall be free of obstructions that may inhibit the immediate use of the equipment…. [Eyewashes must be installed according to the same specifications as Emergency Showers.] For a strong acid or strong caustic, the eyewash unit should be immediately adjacent to the hazard."	
	MIT References	
MIT Building Systems Design Handbook, section on labs	References all of the above. Refer to the Shower and Eyewash section of the Design Handbook. Also refer to Design Guideline for Hazardous Waste Handling Design Issues. This can be accessed on the EHS Campus Design and Construction web page.	
MIT Division of Comparative Medicine	DCM refers to NIH policy above Wear eye protection and check that an eyewash is nearby when using syringes to inject any type of animal with a hazardous material. Animals other than NHPs are involved in the lab's research that includes chemicals, biohazards, and/ or radioactive materials. When DCM quarantines the new NHPs, the risk is much higher for the caretakers until the test results are negative.	
MIT SOPs	Perchloric Acid that is heated in Hoods Hydrofluoric Acid is used in any amount in any process. Etchers and Spinners that are used in Clean room type labs. Many hazardous chemicals are used with this type of equipment.	
MIT Chemical Hygiene Plan Template	Every laboratory where the use of materials that are either corrosive or that otherwise present a significant skin/eye contact or absorption hazard must have access to an unobstructed safety shower and eyewash facility that meets the requirements of OSHA regulations (29 CFR 1910.151(c)).	

4.1.2 What are the alternatives to plumbed eyewashes that can be used safely?

- **Self-contained Eyewashes:** If the unit meets the ANSI standard for Emergency Eyewash and Shower Equipment and contains supply of sterile wash solution that will flow for 15-minutes, it could be used as an interim solution until a plumbed eyewash is installed:
  - in areas where water is not available
  - in areas where only non-potable **or** non-tempered, potable water is currently available and a Facilities project has to be funded and scheduled to install the systems needed to supply the required water to the building/lab
  - when small quantities of chemicals are used that have minimal hazards and are not used in ways that create any hazard to the eye
- **Bottled eyewash:** The typical bottle (8-16 oz.) will not provide enough solution to irrigate the eyes for more than a couple of minutes, especially if both eyes and/or face are splashed. Moreover, the victim won't be able to hold their eyes open to irrigate both eyes simultaneously. If your lab or work area has any of the risk factors described above, the EHS Office does not recommend having a bottled eyewash. If this is the only option, then stock at least two large bottles and plan to have the lab buddy help the injured person.

4.2 What are the specifications for equipment and water/fluid supply?

4.2.1 The specifications include the following:

- Comply with the latest ANSI/SEA Z358.1 Standard for Emergency Eyewash and Shower Equipment.
- The lever that you push, pull or squeeze to activate the eyewash/ shower should be designed to remain on without requiring the use of the operator's hands. It should be easy to operate in an emergency.
- The water or fluid should flow until intentionally shut off.

Regarding eyewash models only:

- Fluid should be provided to both eyes simultaneously via two nozzles or other means.
- Nozzle protection should automatically come off when the water/ fluid starts to flow.
- Eyewashes must be located where they can be effectively used hands free by all researchers, once the unit is engaged.

4.2.2 Refer to the MIT Design Standards Lab Design Thematic Folder and EHS Thematic Folder, Emergency Shower and Eyewash section. For details about specifications, refer to the DOF Plumbing design guidelines. These can be accessed on the EHS Campus Design and Construction web page.

4.2.3 ADA Compliance: Emergency wash equipment that meets the ADA requirements should be installed when new buildings are constructed or when the building is

renovated. Designers of new labs should refer to the Massachusetts Access Architectural Board (MAAB) guidelines for approach and reach.

For the existing buildings, ADA compliant models are preferred even if not code required when installing an eyewash and/or shower in a lab that is not generally accessible to persons with disabilities. However, in a given area accessible to disabled students or personnel, accessible and ADA compliant models of eyewashes and emergency showers should be provided.

Refer to the MIT Design Standards DOF Plumbing Design Guidelines for the current requirements for water temperature, pressure, quality, etc. Sterile Saline is an acceptable alternative to potable water. Preservatives that are added to tap water in large reservoirs are not recommended because bacteria multiplies quickly in the reservoir.

It is ultimately the responsibility of the Department of Facilities (DoF) to have the water lines traced and to insure that the emergency equipment is connected to potable water. The DoF shutdown procedure will be followed so the Shutdown Coordinator and DoF Repair and Maintenance (R&M) Plumbing Supervisor will oversee that the piping is correctly identified and marked. (**Note**: It would be unlikely that the plumbing inspector would pick up this type of connection given the complexity of the systems.)

Cambridge Inspectional Services reviewed the requirement that MIT labs flush their eyewashes once a week as part of the Level 1 inspection program. They also reviewed the DOF Preventive Maintenance program to test emergency showers twice a year. In 2019, Cambridge Inspectional Services approved MIT's plan to comply with the 2018 update of 248 CMR requirement to flush emergency showers once a week by installing these so the water recirculates in a manner that prevents the stagnation of water in the piping. Refer to details in the DOF Plumbing Design Guidelines. Existing showers installed prior to 2018 will be retrofitted when a renovation project is done and a Plumbing Permit is required per 248 CMR.

4.3 How do we have the equipment installed?

DOF Repair and Maintenance Plumbing Services is responsible for replacing one or more existing eyewashes that can't be repaired. DOF R&M Plumbing could replace an old eyewash that has a single nozzle (not broken), move an existing shower head a few feet to improve safety (not over equipment, electrical panel), etc. This will be billed back to the DLC or lab.

DOF Campus Construction will manage larger projects outlined below (not Repair and Maintenance). The lab or DLC Facilities Manager will submit a CRSP request.

- Install several showers and/or eyewashes in a building that has a tempered potable water system and piping that is run throughout the building or at least in the part of the building that the lab is in.
- Install several showers and/or eyewashes as well as a tempered potable water system and piping when there is none in the building or at least in the part of the building that the lab is in.

A DLC managed project could install one shower, one new eyewash (where there is no existing eyewash) or similar scope. The process is as follows:

- Review the need for a shower and/or eyewash with EHS.
- FEG Review of the infrastructure. If the change is attainable without major infrastructure upgrades, FEG will develop a scope of work and drawings.
- Submit a DLC Managed Project Request.
- Once this DLC Managed Project Request is approved, request bids for the work (FEG provides support if needed). Contractor is hired and the work is coordinated through the DLC Facilities Manager (includes generating a schedule, lab preparation, shutdowns, etc.).

Installation/ Testing for Commissioning:

- The Plumbing Contractor (for a renovation or new construction Project) shall test and flush newly installed emergency fixtures before turning over the site to MIT. The Department of Facilities Project Manager will inform the Facilities Preventive Maintenance Office about new installations. This office will tag a new emergency shower, add it to the database and create work order for periodic testing. Refer to the section on testing and maintenance for details. The Project Manager also notifies Facilities Engineering Group (Plumbing), which inspects each fixture installed by the project. Then the Director of Campus Services & Maintenance signs the letter to the Cambridge Plumbing Inspector that confirms MIT will do weekly testing of the shower(s).

- The EHS Office reviews plans for renovations and new buildings to verify that emergency wash equipment will be installed in rooms that meet the criteria in Section 4.1 above.

4.4 How to choose the best location?

4.4.1 The following summarizes the various requirements and criteria to consider when selecting a location for a shower or eyewash. The combined requirements to be within the 10 second travel distance, but not greater than 50 feet.

Standard	Eyewash	Emergency Shower
OSHA **29CFR 1910.151(c)**	*…within the work area for immediate emergency use.*	
ANSI **Z358.1-** 2014 7.7.4 and 4.6.1	*…in accessible locations that require no more than 10 seconds to reach (…),on the same level as hazard* (i.e. on the same floor)*. The path of travel (to the safety equipment) should be free of obstructions** (i.e. locked doors, boxes, etc.). It is acceptable to go through an unlocked door.	
	…for a strong acid or caustic, (it) should be immediately adjacent to the hazard.	
527 CMR **1.00** 248 CMR 10.13	*Should not be located greater than 50' from an experimental area.*	

4.4.2 Choose a location that is adjacent to the hazard, but there must be enough room so that the victim and emergency responders will be safe. (For example, installing an eyewash/ shower "*immediately adjacent"* to an exhaust hood is not recommended.) The emergency shower and eyewash unit must be located on the same level of the hazard and the path of travel must be free of obstructions* that would inhibit the immediate use of the equipment. ***Note**: The Cambridge Plumbing Inspector will not issue a permit to install an eyewash or a shower if the door does not swing in the direction of the path of travel because they consider this to be an obstruction.

An eyewash should be installed in the tissue culture room if the nearest eyewash is in an adjacent lab with a door in between.

The ANSI standard for Emergency Eyewash and Shower Equipment specifies the distance of the unit from the standing surface and the wall (or the nearest obstruction). This is to ensure that the unit will be reachable by any user and that the user will not be injured.

Eyewash units must be located within the laboratory and, where possible, eyewash units should be installed at sinks for proper draining to allow for required weekly testing of the units. Eyewashes that are activated by pulling one vertical arm downward have a much smaller footprint compared to the swing activated (horizontal) type, which spray water on the bench during testing.

If an eyewash is installed at a lab sink, it should not be located on the counter where the lab ware will often block it (inspection finding). It should spray towards the user so they do not have to twist and bend to flush their eyes. Where eyewashes are not installed at sinks, appropriate provisions must be made in the plumbing design to allow for required testing. In some cases where 2-3 lab rooms are interconnected without intervening doors, an eyewash could be installed in the middle room or the room where the hazard is greatest. This equipment could be shared by the occupants within the 10 second travel distance but not greater than 50 feet.

The water from testing an eyewash or emergency shower can go down the drain per the MWRA regulations. When an eyewash is used after an accident, the quantity of hazardous materials is very small, but the EHS Office will determine if it needs to notify the MWRA or DEP. The EHS Office will determine how to dispose of the water when a safety shower is used after an accident.

4.4.3 Emergency showers should be located within the laboratory as close to the main door as possible. This minimizes water possibly being sprayed on to electrical equipment or an electrical panel that may be in the lab and it is less likely that items will block access to the shower. An electrical outlet should be at least 3 feet from a shower.

If the equipment is installed outside the lab, then the lab door must swing out, and the doorway must be recessed so pedestrians will not be hit by the door. Most lab doors swing into the lab to comply with building code.

4.4.4 The EHS OCSP may be contacted for advice regarding the proposed location of the emergency shower and/or eyewash.

4.5 How to test, inspect, and repair emergency showers and/or eyewashes?

4.5.1 Emergency Showers: Emergency showers are tested twice a year by Facilities if these were installed prior to the Mass. Plumbing Board changing their policy and regulation in 2018. Showers installed after this must be tested weekly (ANSI Z358.1). Please refer to the DOF testing procedures. The Facilities Preventive Maintenance Office creates PM work order for each shower and the Plumbing Supervisors schedule these tests. The test date is recorded on a tag attached to the shower and on the Preventive Maintenance request (electronic). The inspection tag should be not be tied to the activation handle. The Facilities R&M Support Office generates work orders if the shower did not operate properly, and they will notify the EHS Office if a shower is blocked and cannot be tested. The EHS DLC team will work with the lab EHS Representative and the EHS Coordinator to resolve the cause of the blocked shower. The EHS Rep will send a photo to confirm that the shower is no longer blocked, and then EHS will notify the R&M Support Office that the test can be rescheduled.

4.5.2 Plumbed Eyewashes: Each EHS laboratory Representative is responsible for flushing eyewashes, whether sink or wall-mounted, for about 1 minute, once a week as part of the weekly Level I inspection. This procedure will flush out any bacteria that might grow in the stagnant water. It will also minimize the residue that will clog up the eyewash. The eyewash should be tested in the upright position, which is how it would be used to flush one's eyes. Best practice is to:

- Check that the water pressure is high enough so the stream will adequately wash the eyes.
- Test that the water stays on until turned off so the person could use both hands to lift eyelids.
- If the eyewash is not working, the EHS Rep or Coordinator will submit a work order by following the instructions in the Repair Requests section below.

If the eyewash is not next to a sink (wall-mounted eyewashes or is a combination shower/eyewash on a pole), then use a large bucket or bin to catch the water so that no one slips. Consider using a large plastic trash bag (open on both ends) to place around the eyewash spouts and help guide water into the bucket/bin.

The DLC can determine if it is necessary that their EHS Rep use a tag or a list to record when the eyewash is flushed.

4.5.3 Self-contained Eyewashes and Wall Units: Lab personnel should inspect these on a monthly basis following manufacturer's instructions and replace the solution before the expiration date. This could be included in the weekly Level I Inspection. After any activation (emergency or other reason), replace the solution ASAP. If during the inspection it's apparent that the seal has been damaged or

removed, the solution should be replaced. The lab is responsible for ordering appropriate replacement solutions as soon as possible.

4.5.4 Repair Requests: If the equipment needs to be repaired, submit an Atlas Facilities Services Repair Request. The number on the asset tag (for showers only) and the location (building-room number) should be included. Eyewashes will not have an asset tag so the building-room number, an identified location (ie: "near X"), and the description of the problem should be included instead. The EHS Coordinator can create an inspection finding, if applicable, and include the work request number from the Atlas confirmation.

4.6 Access and Signage

4.6.1 Each emergency shower or eyewash location "*should be identified with a highly visible sign* and *the area around the equipment should be well lighted" (according to ANSI Z358.1)*. The signs must have contrasting color of green and white and be at least 70 square inches in area (527 CMR 1.00). For existing equipment, the EHS Rep is responsible for obtaining a sticker from EHS and installing it. For new installations, DoF or their contractor will install the sign that the manufacturer provides, which meets the standard.

4.6.2 If at any time lab personnel observe that a safety shower or eyewash is blocked, they should take action to correct the situation. A lab representative should also be checking this during the weekly Level I Inspection of the lab.

4.6.3 If the safety equipment is consistently blocked, the EHS Coordinator should include this in the inspection findings that are sent to the PI. One recommendation is to install a large sticker ("Shower--keep area clear") on the floor to denote that the area should be kept clear.

4.7 When do we or do we not use an eyewash?

4.7.1 High-speed foreign objects (metal, glass, wood or plastic chips/ fragments/ particles) have the potential for penetrating the protective coats of the eye and enter the inner cavities of the eye. Serious damage often results regardless of the nature of the foreign object. The patient should not use an eyewash because the water pressure will push the object further into the eye. Their co-workers should call 100 or 617-253-1212 so the patient can be immediately taken to MIT Urgent Care, or, if it is closed, to the Mass Eye and Ear Institute for treatment by eye professionals. No attempt should be made by an untrained person to remove foreign objects from the eyes because more serious injury can result from the attempted removal of the foreign object. **Exception**: If the patient's eye/ face is also contaminated with a hazardous material, then decontaminate first with an eyewash to prevent chemical burns and secondary contamination of the emergency responders.

4.7.2 If small wood dust particles (not metal or plastic chips as described above) are irritating the eyes or a hazardous liquid is splashed in someone's eye(s), then immediate and copious irrigation of the eyes is critical. This should be done initially

on-site using eyewashes (see Section 4.8). The patient should be taken to MIT Medical Urgent Care, or, if it is closed, to the Mass Eye and Ear Institute.

When eyewashes are installed in shops, makerspaces, labs and other areas that use machine tools and/or use glassware for reactions, it is important to educate everyone not to use an eyewash in case of injury involving any type of high speed chip/fragment (abbreviated chip). The eyewash will be ineffective in removing the chip, and the water pressure may push it further into the eye and cause more damage. The only exception is in case of injury involving both a high speed chip and a liquid hazardous material. The supervisor/PI is responsible for educating users, for making an informed decision about first aid, and for informing emergency responders.

4.8 How do we use an eyewash or emergency shower?

4.8.1 Prior to an incident, each EHS Rep should train their lab personnel on how to use their own emergency wash equipment because the procedure varies depending on the model. Refer to Appendix B for a template that can be quickly tailored depending on the type of equipment in each lab. Eyewashes and emergency showers will continue to flow until purposeful steps are taken to stop the flow. Learn how to shut off the shower in your lab since there are various models with different shut off mechanisms. Prior to an incident, review the first aid requirements as described by SDS.

4.8.2 If the victim wears contact lens, begin eye irrigation immediately and remove contact lenses as soon as practical (when hands are decontaminated). Lenses may fall out on their own during irrigation. For more information, refer to the NIOSH guidelines about contact lenses: http://www.cdc.gov/niosh/docs/2005-139/pdfs/2005-139.pdf

4.8.3 Call 100 or 617-253-1212 to report what happened and what is being done to decontaminate the victim. Specify whether the victim was exposed to small amount of a hazardous material on a small area of the body or contaminated with a large amount over a large area of the body (see Section 10: Definitions). Alert the EHS Coordinator / Rep in the DLC and the supervisor or principal investigator of your lab.

4.8.4 The City of Cambridge emergency responders and the Boston area hospital emergency departments require a complete decontamination of the victim before transporting them to MIT Medical or any of the Boston area hospitals. A victim will be required to remove contaminated clothing/ shoes and use an emergency shower and/ or eyewash. The goal is to prevent secondary contamination of the emergency responders, their equipment, the ambulance, and hospital emergency staff and the emergency department. Contamination could shut down an entire hospital and take an ambulance out of service. The Cambridge Fire Department Chief at the scene will decide how much decontamination is sufficient.

4.8.5 The City of Cambridge emergency responders and hospital emergency departments require that the lab provide a copy of the SDS to the emergency responders when they take the victim to MIT Medical or to a hospital. Also provide any other relevant information about the hazards and whether exposure to the patient could result in secondary contamination or infection. Describe what has been done to

decontaminate the victim and ask the emergency responders if they require additional decontamination. The guideline is in Appendix A.

4.8.6 The victim may not be able to convey this information or obtain a copy of the SDS. The other people who were working in the area at the time will have to play this essential role. This is why it is important not to work alone.

4.8.7 The emergency responders will determine where the patient will be taken for examination, additional irrigation, and treatment by eye professionals. MIT Medical has Urgent Care and eye services available (check their website for current hours). The Mass Eye and Ear Institute is used for further evaluation if needed.

4.9 Following up after an incident

4.9.1 Wastewater may contain hazardous materials that should not be introduced into a sanitary or storm drain. The Operations Center will contact Custodial Services to collect the water with wet vacuums. EHS Environmental Management Program staff will determine if the wastewater could be disposed of via the sanitary sewer or as hazardous waste.

4.9.2 Supervisors must submit the Injury/Illness Report within 24 hours of the incident. To submit the Supervisor's Report, go to: https://ehs.mit.edu/workplace-safety-program/occupational-injury-or-illness-reporting/

4.9.3 Lab personnel should immediately reorder the saline solution when the self-contained eyewash has been used.

5. Roles & Responsibilities

5.1 PI/EHS Representative

Although the PI is responsible for the lab, s/he could designate the EHS Rep or any other person within the DLC (i.e. the EHS Coordinator or Facilities Manager) to complete the following responsibilities:

- Install eyewashes or emergency showers depending on the hazards of the lab's activities. The factors they need to consider are detailed in Section 4.1 of this SOP.
- Confer with the EHS OCSP to choose the best location.
- Test the eyewashes weekly as part of the Level I Inspection program and request repairs if necessary.
- Order appropriate replacement solutions for self-contained eyewashes when needed.
- Ensure that lab personnel have been trained to locate and use the eyewashes and emergency showers. This can be done as part of the lab specific chemical hygiene training.
- Prevent the obstruction of emergency showers and eyewashes.
- The lab's supervisor, PI or their designee has to report any injury to EHS Office within 24 hours. (Refer to Section 4.9.2).
- Update lab's emergency information/lab specific training and the Atlas PI Space Registration database when a new emergency shower and/or eyewash is installed or other changes are made.

- Obtain a sticker/sign from EHS and install it when existing equipment doesn't have signage.

5.2 EHS Office/Occupational and Construction Safety Program

The Occupational and Construction Safety Program (OCSP) will complete the following responsibilities:

- Assist the DLC's to evaluate their need for emergency showers and eyewashes depending on their specific situation.
- Advise the EHS Rep on the location of the equipment within the lab/shop.
- Ensure that the testing and maintenance program is effective and will help to resolve issues with damaged or malfunctioning equipment.
- If signage was not posted when the equipment was installed, the EHS Office will provide a sticker/sign to identify the emergency wash equipment.
- Offer training related to General Chemical Hygiene and Biosafety that includes the use of emergency wash equipment.
- Investigate any incident involving the use of emergency wash equipment.
- Evaluate the general effectiveness of this SOP on a periodic basis.
- EHS EMP will determine if the rinsate needs to be disposed of as hazardous waste.

5.3 Department of Facilities

- Install emergency wash equipment and perform required testing.
- Post signage provided by the manufacturer when installing new equipment.
- Plumbing Supervisor and Project Managers will inform the Preventive Maintenance Office about new installations.
- Preventive Maintenance Office will schedule periodic testing and the Repair and Maintenance Support Team will process work orders for maintenance if necessary (see Section 4.5).

6. Training

6.1 Lab personnel working with chemicals are required to take General Chemical Hygiene training and those working with biologicals are required to take the Biosafety trainings offered by EHS Office.

6.2 Each EHS Rep should train their lab personnel on the location of the eyewash and/or shower and how to turn these on/off because the procedure varies depending on the model. This is part of Lab Specific Chemical Hygiene training. The new EHS Lab Rep should also be trained on the way to test eyewashes.

7. Monitoring Requirements

7.1 Pressure, temperature and quality of the water supply for emergency wash equipment as well as the condition of the equipment are monitored as described in Section 4.5 of this SOP. The MIT Central Utility Plant (CUP) tests water quality in the buildings, but this does not meet these requirements.

7.2 Access to emergency wash equipment should be continuously monitored within the lab and any blockage should be removed ASAP.

8. Record Management

8.1 The Department of Facilities Plumbing Supervisor and Project Managers will inform the Preventive Maintenance Office about new installations. This office will maintain the testing records in SAP.

8.2 Department of Facilities will record emergency showers testing on the tag attached to them and in SAP.

8.3 EHS PI Space Registration database will be updated when a new emergency shower and/or eyewash is installed or other changes are made. This will keep this information accurate. The EHS Rep or the Coordinator will update this information.

8.4 MIT EHS Occupational and Construction Safety Program (OCSP) will maintain injury records as required by OSHA.

8.5 The EHS and Facilities databases will be compared periodically to correct discrepancies and ensure that all of the active equipment is tested. The SOP owner will request that EHS IT generates this report from PI Space Registration.

9. References

For more information, refer to the following documents.

9.1 Standards

- **ANSI/SEA Z358.1 Standard for Emergency Eyewash and Shower Equipment:** (Most recent edition). This standard applies to the design, location, testing, performance and maintenance of eyewash and emergency showers. The latest edition of ANSI standard Z358.1 is available from the Barker Engineering Library or EHS Office.

- **OSHA 29 CFR 1910.151** describes the OSHA requirements for emergency eyewashes and showers.

- **527 CMR 1.00** Massachusetts Comprehensive Fire Safety Code is available online and through the EHS Office and contains additional requirements for emergency showers and eyewashes.

- **248 CMR** Uniform State Plumbing Code section 10.13 **Note**: This includes similar requirements as 527 CMR 1.00

9.2 Other SOP/SOGs

To view the SOPs/SOGs go to https://ehs.mit.edu/sops/ and search for the SOP/SOG listed. MIT Certificates are required to view SOPs/SOGs.

- EHS-0038: Personal Protective Equipment
- EHS-0014: Laboratory Start-up
- EHS-0008: Reporting Work-Related Injuries and Illness of OSHA-covered Personnel

9.3 Supplementary Documents

- Chemical Hygiene Plan of the Lab
- Building Systems Design Handbook
- Level I Inspection Checklist
- National Institute of Health (**NIH**) **Policy Manual Protection of NIH Personnel Who Work with Nonhuman Primates.** Review the latest version on the NIH site.
- **AAALAC** International publishes "Recommendations for Prevention of and Therapy for Exposure to B Virus (*Cercopithecine Herpesvirus* 1)." Review the latest version on the AAALAC site.
- CDC and NIOSH also recommend immediate flushing but do not state that an eyewash should be installed.
- **NFPA 99 11-6** *(Health Care Facilities / Chapter on Laboratories)* includes recommendations about Emergency Wash Equipment.
- **NIOSH Current Intelligence Bulletin #59** about Contact lens use in a Chemical Environment: http://www.cdc.gov/niosh/docs/2005-139/pdfs/2005-139.pdf

10. Definitions

- **A.N.S.I:** American National Standards Institute

- **BL 1 / 2/ 3:** Biosafety Level 1/2/3 Laboratory is the level of physical containment necessary to protect personnel and the environment for standard laboratory experiments. A Biosafety Level 1 (BL-1) is the least restrictive, while Biosafety Level 3 (BL-3) is applicable for work with indigenous or exotic agents that may cause serious or potentially lethal disease.

- **C.M.R.:** Code of Massachusetts Regulations

- **Contaminated Victim:** When there is a large amount of hazardous material on a large area of the victim's body.

- **Corrosive Chemical:** A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. *(OSHA definition of corrosive in 29 CFR 1910.1200 App. A)*

- **Emergency Shower:** An assembly consisting of a showerhead controlled by a stay open valve and operated by an approved control valve actuator. *(ANSI definition) This is also known as a safety shower.*

- **Exposed Victim:** When there is only a small amount of hazardous material on a small area of the victim's body.

- **Eyewash:** A device used to irrigate and flush the eyes.

- **Flushing Fluid:** Potable (suitable for drinking) water, preserved water or buffered saline solution, or other medically acceptable solution manufactured and labeled in accordance with applicable government regulations. *(ANSI definition)*

It should be clear and visibly free from foreign particles. For eyewashes, it should ideally have a pH close to 7.4 as well as a saline content similar to the fluid in the eye.

- **g.p.m.:** gallon(s) per minute. A measure of flushing fluid flow.
- **Hand-held drench hose:** An emergency-washing device connected to flexible hose and used to irrigate and flush the face or other parts of the body.
- **MAAB**: Massachusetts Access Architectural Board that publishes guidelines for approach and reach
- **OSHA:** Occupational Safety and Health Administration
- **Plumbed Eyewash:** An eyewash unit permanently connected to a source of potable tempered water.
- **Primary Protective Devices:** Any protection device designed to prevent splashing of chemicals to the face or eye (such as spectacles, shields, screens). They must be used in conjunction with eye glasses or goggles.
- **Self-Contained Eyewash:** An eyewash device that contains its own flushing fluid that must be refilled or replaced after each use. Some, mounted on walls are also called *Wall Units.* Portable ones are commonly called *Bottled Eyewashes*.

Appendix A: Guidelines for Pre-ER Decontamination after Laboratory Exposures

Intent: This guide has been developed to help clarify the type and extent of decontamination a patient(s) should receive following an accidental laboratory exposure. The primary objective of this effort is to assure timely treatment of the exposed patient, protection of first responders and emergency medical personnel, and prevention of contamination of facilities and equipment. It outlines specific information that must be provided by representatives of the facility or the patient to the first-responders and emergency-medical-personnel to help evaluate the situation and determine the extent of personnel-decontamination appropriate for the exposure incident.

Guideline for Laboratory Facility:

In the event of personnel exposure to laboratory chemicals or other hazardous materials, the following information shall be provided to First-Responders, and transported along with patient to Emergency-Medical-Facility. PROVIDE:

1. Name of hazardous material(s) involved in writing.
2. A copy of SDS for the hazardous material(s).
3. Description of signs and symptoms the patient is experiencing from exposure.
4. Detailed description of the extent of exposure/contamination (parts of body, amount of material, etc.) of the patient.
5. Detailed description of what has been done in-house to decontaminate the patient (specifics on type and extent of decontamination).
6. Information in writing on any "special concerns" regarding this exposure. Explain whether exposure to the patient could result in secondary contamination or infection.
7. The name & phone number in writing of a knowledgeable-person who can be contacted for further information/clarification (This may be the lab manager and/ or a representative from the EHS Office.).
8. Any other relevant information.

Guideline for Emergency Personnel:

When faced with a potential chemical or other hazardous material exposure in a laboratory the following steps shall be used as guidance in determining if full body decontamination is needed prior to transporting a patient to a medical facility.

Request information:

1. Is product known? If so, what is it?
2. Is there a copy of the SDS available for the hazardous material(s)?
3. What signs and symptoms is the patient displaying?
4. What is the extent of exposure/contamination (parts of body, amount of material, etc.)
5. What has been done regarding the exposure (specifics on type and extent of decontamination)?
6. What is the secondary contamination potential?

Using this information, first responders can determine how extensive the decontamination of the patient must be in order to protect themselves, their equipment, and hospital personnel from secondary contamination or exposure. If unable to get answers for these questions or if conditions dictate, full body decontamination may be undertaken.

NOTE: As always, it is the prerogative of the first-responders and/or emergency-medical-personnel to require additional precautionary measures and/or decontamination beyond what

this guideline would recommend. This guide is not intended to supersede the judgment and expertise of emergency responders, merely to support them in making informed decisions on the extent of personnel-decontamination suited to the situation.

CAMBRIDGE LEPC: PERSONNEL DECONTAMINATION SURVEY SHEET FOR TRANSPORT TO MEDICAL

Name: _____ Date/Time: _____ MIT Location: _____

Radioactive: ☐ Biological: ☐ Chemical: ☐ MSDS Attached: ☐

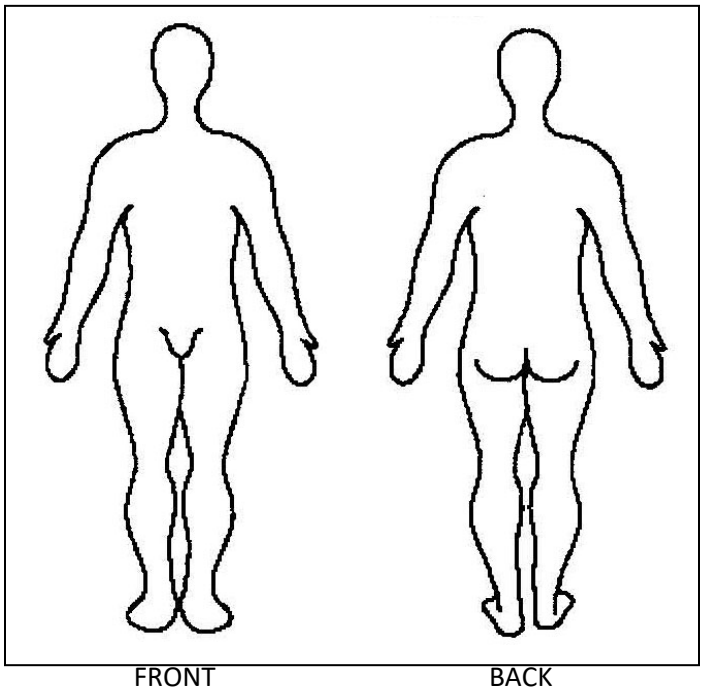
Name of Hazardous Material: _____

Injuries: _____

CIRCLE AREAS THAT WERE CONTAMINATED ON THE DIAGRAMS BELOW.

SIGNS/SYMPTOMS:

- ☐ Blindness
- ☐ Bruising
- ☐ Burns
- ☐ Coughing
- ☐ Irritation: Skin/Eyes
- ☐ Lacerations
- ☐ Light-headed
- ☐ Rash
- ☐ Shortness of Breath
- ☐ Unconscious
- ☐ Watery Eyes
- ☐ Other



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DECONTAMINATION PROCEDURES PERFORMED

	Removal of Primary Clothing
	Deluge Shower
	Eye Wash
	Local Decontamination of Affected Area
	Other_____

SPECIAL CONCERNS REGARDING HAZ MATERIAL:

Decontamination Performed By: _____

Responding EHS Personnel: _____ Phone: _____

EHS Coordinator: _____ Phone: _____

Appendix B: Template for How to Use an Eyewash and Shower

Instructions for EHS Reps: We recommend that you add how to use eyewash/shower to your lab specific training and post a copy next to each eyewash/shower. Edit the steps in red font based on the specific type of eyewash/shower that are in your lab/shop. Delete the options that don't apply. Delete this section when finalizing the document.

Template
It's essential that everyone who works in labs knows how to use an eyewash and safety shower so they can decontaminate effectively or be a lab buddy and help someone else.

How do I use an eyewash?

- Get to the eyewash ASAP. Your lab buddy probably will have to guide you because it will be hard to see.
- Remove contaminated gloves and/or rinse off your hands. Your lab buddy should help.
- (Enter the specific method to turn on the water). Push the paddle/ squeeze the handle/ pull vertical arm down/ swing horizontal arm over sink) to start the water flowing and then let go. The water will stay on until you turn it off (for vertical and horizontal models add--until you push it back to its original position).
- Lean over so both eyes are in the water stream.
- Hold your eyes open because they will want to close. Lift eyelids and roll eyeballs around to ensure effective rinsing of the eyes.
- (If applicable) Remove contact lenses unless they fall out. They can prevent the eyewash from rinsing away the hazardous chemicals.
- Don't rub your eyes to prevent further damage.
- Flush for a full 15 minutes. Don't stop before time is up. A lab buddy should keep track of the time.
- (Enter the specific method to turn off the water). Pull the paddle/ unlock the handle/ push vertical arm up/ swing horizontal arm to the side of the sink to turn water off.
- Get medical treatment immediately. **Serious injury:** Call x100 for ambulance (to a local hospital). Even if you think you are okay, walk to MIT Medical Bldg E23.
- Complete LEPC Decon Form if ambulance responds. (Forms are in [enter location]). Provide a Safety Data Sheet for the chemical.

Do **not** use in case of high-speed chip/shard unless also splashed with hazardous material.

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How do I use a safety shower?

- Get to the safety shower ASAP. (Add hallway etc. if not in the same room). Your lab buddy will probably have to guide you.
- Push the wall handle down to turn on the water and stand under the shower.
- Take off your lab coat and any clothes that are contaminated while you continue rinsing. Remove your shoes and socks because these can trap chemicals.
- If you also need to rinse your eyes, use the eyewash because the shower's water pressure is too high to be comfortably tolerated.
- Don't rub your skin to prevent further damage to injured tissue.

- Flush for a full 15 minutes. Don't stop before time is up. A lab buddy should keep track of the time.
- (Lab Buddy or someone else) obtain the Don-It personal privacy kit or lab's equivalent and LEPC decontamination form that are stored [add location(s)].
- Hold up [gown or X] to provide privacy.
- (Enter the specific method to turn off the water). Pull the paddle/ unlock the handle/ push vertical arm up/ swing horizontal arm to the side of the sink to turn water off.
- Give victim towel first, then gown and foot covers (from privacy kit or revise this based on lab's equivalent).
- Get medical treatment immediately. **Serious injury:** Call x100 for ambulance (to a local hospital). Even if you think you are okay, walk to MIT Medical Bldg E23.
- Complete LEPC Decon Form if ambulance responds. (Forms are in [enter location]) Provide a Safety Data Sheet for the chemical.