

Guidance Document

Eye Protection in Laboratories

Assessment, Selection, Use and Maintenance

MIT EHS 2-3477

Background: Eye injury from chemical splash or release is a concern in research laboratories where hazardous chemicals are used. The Committee on Toxic Chemicals has directed that the 2010 Chemical Hygiene Plan Template be updated to incorporate new language with respect to eye protection. The objective is to assure that where individuals are potentially exposed to chemical hazards appropriate eye protection is being used. The eye protection policy is summarized as follows:

Eye Protection - For every laboratory room where hazardous chemicals are stored or are in use, a determination must be made as to the level of eye protection that shall be required. The determination of the level of eye protection required for each laboratory room shall be made by **the principal investigator** in charge of the laboratory or supervisor in charge of the work area, in consultation and with the approval of the DLC EHS Coordinator and/or DLC EHS Committee (as designated by the Department Head). The level of eye protection required shall be identified in writing. This written identification could take a number of forms. It may take the form of a discussion in the DLC Chemical Hygiene Plan, a section of the individual "laboratory manual" of a research group, a safety orientation document provided to new laboratory members as part of their required "Initial Lab Specific Chemical Hygiene Training", signage posted in the laboratory, or some combination of the above.

Purpose. The purpose of this document is to compile existing MIT guidance for selecting personal protective equipment (PPE), specifically eye protection, based on an assessment of eye hazards. Much of the information in this document is taken from the Personal Protective Equipment SOP at https://web.mit.edu/environment/pdf/sop/sop_0038.pdf and the Personal Protective Equipment Web Page at <http://web.mit.edu/environment/ehs/ppe.html>.

Basic requirement. All eye protection provided must meet requirements of either ANSI Z87.1-1989; Z87.1 1989, rev 1998; or Z87.1 2003; or be demonstrated by the employer to provide equivalent protection to one of these standards., unless otherwise specified in table below. OSHA regulations (29 CFR 1910.133) require that "the employer shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation."

Hazard assessments. The PI for the lab must be involved in the hazard assessment process and must review and approve eye protection decisions made unless use of eye protection is mandatory for all areas of the lab. Hazard assessments are for the purpose of determining not only where and when eye protection is needed, but what type of eye protection is appropriate. Even when basic eye protection (safety glasses with side shields) is required in an area, it may be necessary to supplement that protection with additional protection such as goggles or a faceshield, depending on the task. Considerations that will affect the level of eye protection required include the quantity of the hazardous chemicals present in a particular laboratory room, the frequency in which the chemicals are in active use, and the types of hazards associated with the chemicals. Some tools for making a hazard assessment include the Lab Specific SOP form found in section 3 of the Chemical Hygiene Plan, or the form at the following link: http://web.mit.edu/environment/pdf/ppe_form.pdf. Departments can develop their own tools.

Types of protective eyewear available include:

- safety glasses with side shields (built in or clip on) for basic eye protection from flying objects and low chemical splash risk
- goggles with indirect vents for chemical splash and mist
- goggles with direct vents for chips, and dust
- face shields to supplement eye protection above for work with chemicals or materials with a high potential for splashing or otherwise injuring the face.

Tasks or exposures and recommended eye protection.

The table below provides information on recommended eye protection for typical lab hazards.

Hazard to eyes, face and neck	Type of Protective eyewear	Comment
Hazardous chemical splash, liquid Hazardous chemicals include acids, corrosives, toxics, eye irritants, chemicals that penetrate skin.	Goggles with indirect vents Face shield, as necessary	Safety glasses designed for the laboratory may be adequate when small amounts of chemicals are used. Note: Eye protection is required even for work in a lab hood.
Hazardous chemicals, dry Hazardous chemicals include acids, corrosives, toxics, eye irritants, chemicals that penetrate skin.	Safety glasses with side shields	Eye protection is required even for work in a lab hood.
Cryogenics	Safety goggles and faceshield	
Highly reactive or explosive materials	Safety Glasses with Side shields or goggles and Faceshield	
Chips, particles, dust, glass shards	Safety glasses with side shields	
Potentially infectious material splash	Goggles and Face shield	When working in a biosafety cabinet, eye protection is not needed.
Systems under pressure (Compressed gas systems, vacuum systems)	Safety Glasses with side shields, minimum, faceshield. More may be needed, depending on what is under pressure.	
Radioactive Materials (liquid or powder)	Safety glasses with side shields, or goggles	
Lasers	laser glasses and goggles that meet ANSI Z136.1	RPP should review for appropriate shade of lens.
Ultraviolet light	Face shield that is specially treated	RPP contact for DLC can provide guidance
Other light sources such as intense visible light		RPP contact for DLC can provide guidance.
Soldering- spatter of flux, or hot metal	Safety glasses with side shields or safety goggles.	
Furnaces, molten metal or glass, heat, sparks, glare	Goggles, reflective face shield.	Not a typical lab hazard
Welding	Welding goggles, helmet or face shield	Not typically a lab operation

Use of eye protection. DLCs are responsible for providing eye protection to anyone who works in, studies in, or visits in an area where there are hazards to the eyes. When an employees job duties require eye protection and the employee needs prescription lenses, DLCs are responsible for providing either prescription safety glasses or protective eyewear that goes over prescription glasses without interfering with the prescription. The procedure for obtaining prescription safety glasses is detailed in Appendix E of the Personal Protective Equipment SOP referenced above.

Wear eye protection whether you are working with a hazardous material, observing, or visiting. It may even be necessary if you are working or studying next to someone who is doing eye hazardous work, though you may not be. This is because the statistics on eye injuries show that a very high percentage of injuries occur when something strikes the eye from the side, i.e., not due to your activity. Eye hazards could be released when something explodes, implodes, spills, breaks, falls, or by activities that produce chips, dust, and other flying particles.

Working in or visiting any space that is posted with the sign "Eye Protection Required" or equivalent requires the use of eye protection.

Visitor safety glasses must meet the ANSI requirements noted above. Visitors with normal prescription glasses must wear ANSI approved safety glasses over their prescription glasses, as prescription glasses generally do not meet ANSI requirements.

Maintenance. Safety glasses should be kept clean and stored in a manner to prevent contamination in between use. Common use goggles or face shields should be cleaned after use with soap and water and stored in a protected location or manner, e.g. wrapped in a plastic bag. Visitor's safety glasses should be cleaned after use with soap and water.