

Practicing safety in the laboratory involves more than just keeping your lab area clean and wearing the proper protective equipment. It requires the cooperation and involvement of everyone associated with laboratory work. 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in Laboratories, provides strict guidelines for laboratory safety. Key components of the standard include having a Chemical Hygiene Plan and providing employees with training and information.

The standard applies to labs meeting the following criteria:

- A facility where the laboratory use of hazardous chemicals occurs.
- A workplace where relatively small amounts of hazardous chemicals are used on a non production basis.
- The use or handling of hazardous chemicals is manipulated on a laboratory scale.
- Multiple chemical procedures or chemicals are used.
- Procedures are not part of a production process.
- Protective practices and equipment are available and minimize the potential for employee exposure to hazardous chemicals.

The definition of hazardous chemicals includes chemicals regulated under 29 CFR 1910 subpart Z, and those meeting the definition under the Hazard Communication Standard, 29 CFR 1910.1200 (c). (See *EZ Facts Document #150* for more information on the Hazard Communication Standard.)

**"Laboratory scale"** refers to work with substances in which the containers used for reactions, transfers and other handling of substances are designed to be easily and safely manipulated by one person.

Laboratories covered by this standard must assure that lab employees' exposures do not exceed permissible exposure limits (PEL) specified in 29 CFR 1910 subpart Z. (See *EZ Facts Document #232* for more information on *Exposure Limits for Air Contaminants*.)

### Chemical Hygiene Plan

A Chemical Hygiene Plan written by the employer describes the procedures for protecting employees against chemical hazards. The plan includes work practices, policies and standard operating procedures for working with hazardous chemicals. The plan also outlines measures to prevent overexposure to hazardous chemicals. A Chemical Hygiene Officer is designated and responsible for the implementation of the plan. If appropriate, the employer may also establish a Chemical Hygiene Committee. The effectiveness of the plan is evaluated and updated annually.

The major elements of the Chemical Hygiene Plan are:

- Employee Exposure
- Training
- Medical Consultation
- Hazard Identification
- Respirators
- Recordkeeping
- Fume Hood Program

### Employee Exposure

Employers must measure exposures to any substance regulated by an OSHA standard, which requires monitoring. Measuring exposures is particularly important when there is reason to believe exposure levels exceed the action level or PEL. If initial monitoring discloses exposures over the action level or PEL, monitoring provisions of the relevant regulation need to be followed and additional or periodic monitoring may be needed. The action level is the concentration designated in 29 CFR 1910 for a specific substance. The level is calculated as a time-weighted average, which initiates a required activity, such as air monitoring. Monitoring can be terminated according to the particular standard. Results of monitoring must be disclosed to the employee within 15 working days after the receipt of the results. For each employee, the employers must keep records of any exposure monitoring, medical consultations and exams.

- Physical and health hazards of chemicals in the workplace.
- Measures employees can take to protect themselves, including specific procedures, appropriate work practices, emergency procedures and proper protective equipment.
- The details, contents and location of the Chemical Hygiene Plan and the Laboratory Standard.
- Notification and training whenever a new hazard is introduced.
- Permissible exposure limits for hazardous chemicals.
- Signs and symptoms associated with exposures to hazardous chemicals used in the lab.
- Location and availability of reference materials on chemical hazards, handling, storage and disposal of chemicals found in the lab (including Material Safety Data Sheets).

### Training

The employer must provide training and information on the hazards of all the chemicals present in the work area. This is to be provided at the time of an employee's initial assignment; follow-up training is provided as determined by the employer. Training must cover the following topics:

- Methods and observations used to detect the presence or release of hazardous chemicals (monitoring devices, odors, etc.).

### Medical Consultation

Employees can request medical consultation without loss in pay or cost to the employee if:

- The individual develops signs or symptoms associated with chemical hazards to which they have been exposed.
- Monitoring reveals exposure levels routinely above the PEL.
- Events such as spills, leaks or explosions result in a likely hazardous exposure.

The purpose of the consultation is to determine the need for a medical examination. All medical examinations and consultations must be performed by licensed physicians. The employer then obtains any written opinions, recommendations, results of tests, and medical conditions revealed during the exam. The written opinions shall not reveal any findings unrelated to occupational exposure.

### Hazard Identification

The provisions for hazard identification include labeling and the maintenance of Material Safety Data Sheets. (See [EZ Facts Document #200](#) for more information on chemical labeling requirements.) Labels on incoming containers of hazardous chemicals cannot be defaced or removed. MSDSs received with the shipments need to be retained and made accessible to the laboratory employees.

Chemical substances developed in the lab are subject to the following provisions:

- If the composition of a chemical produced exclusively for laboratory use is known, the employer determines if it can be defined as hazardous. Appropriate training is then required if the substance is determined to be hazardous.
- If the chemical produced is a by-product and the composition is unknown, the employer assumes the substance is hazardous.
- If the chemical is produced for another user outside the laboratory, the employer must comply with the Hazard Communication Standard.

### Respirators

To maintain exposures below the PEL, respirators may be necessary. They are selected according to the guidelines in 29 CFR 1910.134 and provided at no cost to the employee (See [EZ Facts Document #275](#) for more information on respirator selection, types and use.)

### Fume Hoods

Hoods need to be routinely evaluated to determine if they are functioning properly. Evaluation may include taking an inventory of all hoods in the lab, and taking periodic surveys of the performance of the hoods (face velocities, continuous monitoring devices, etc.). An individual can be designated to perform the evaluations, report the results and correct any hood deficiencies.

Specific safety considerations are made for particularly hazardous chemicals, including select carcinogens, reproductive toxins and substances with acute toxicity. Provisions include:

- Establish a designated work area for these hazards.
- Use containment devices (fume hoods, glove boxes).
- Develop procedures for removal of contaminated waste.
- Develop procedures for decontamination.

### Conclusion

The development of a successful and complete program takes time and the involvement of all laboratory employees. Implementing and

communicating the safety guidelines specific to the laboratory's hazards and risks are important goals in preventing injury and controlling hazardous exposures in the laboratory.

## **Commonly Asked Questions**

**Q. *How does OSHA define a Hazardous Chemical?***

**A.** A chemical which has significant evidence based on at least one study conducted according to scientific principles that acute or chronic health effects may occur in exposed employees.

**Q. *What is the relationship between the Hazard Communication Standard and the Laboratory Standard?***

**A.** As laboratories started to implement the Hazard Communication Standard, it became clear that some aspects of the regulation were burdensome. OSHA modified the requirements for labs to encompass only labeling requirements, retaining MSDSs received with shipments of chemicals, training and information. The Laboratory Standard went into effect in 1990.