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111. LABORATORIES AND CHEMICAL STORAGE SAFETY RULES. (7-1-97)

01. Scope: (7-1-97)

a. This section contains fundamental requirements essential to providing a safe work area. Nothing in this section shall be construed to prohibit better or otherwise safer conditions than specified herein. Laboratory and chemical storage shall comply with all other applicable requirements of this standard, as well as the following provisions. (7-1-97)

02. Definitions. For definitions of other terms used in this section, see sub-section 010 of this standard. (7-1-97)

a. Chemical Hygiene Plan is a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment, and work practices that are capable of protecting personnel from the health hazards presented by hazardous chemicals and processes. (7-1-97)

b. Laboratory is a place equipped for experimental study in a science or for testing and analysis (7-1-97)

03. General Requirements: (7-1-97)

a. Laboratory safety is everyone's responsibility. The laboratory supervisor shall monitor the safe operation of the physical facilities, laboratory apparatus, chemicals, and laboratory procedures. (7-1-97)
b. Laboratories and chemical storage rooms shall not be used as eating or food preparation places. (7-1-97)

c. Laboratory refrigerators shall not be used for food storage. (7-1-97)

d. The following emergency telephone numbers shall be posted: Fire Department, Physician or Hospital Emergency Room, Poison Control Center, Police, and Rescue. (7-1-97)

e. Laboratories and chemical storage rooms shall be maintained in a clean and orderly condition at all times. (7-1-97)

f. No one shall work with hazardous or toxic materials alone in a laboratory. (7-1-97)

g. Laboratories and chemical storage rooms shall be constructed and ventilated so that fire, toxic, and noxious fumes and vapors cannot be dispersed to other parts of the building through either the ventilation system or through ceiling spaces. (7-1-97)

h. Fume hood exhaust ducting shall be kept under negative pressure until the exhaust ducting passes to the outside of the building. (7-1-97)

i. Fume hood exhaust shall discharge a minimum of ten (10) feet above the roof and away from ventilation intakes. (7-1-97)

04. Chemical Hygiene Plan: (7-1-97)

a. The employer shall develop a chemical hygiene plan to protect personnel from hazardous chemicals and processes. (7-1-97)

b. The chemical hygiene plan shall be readily available to all affected personnel. (7-1-97)

c. The chemical hygiene plan shall include each of the following elements and shall indicate specific measures that shall be taken to ensure laboratory personnel protection: (7-1-97)

i. Standard operating procedures relevant to safety and health considerations to be followed during laboratory operations; (7-1-97)

ii. Criteria that will be used to determine and implement control measures to reduce exposure to hazardous chemicals or processes including engineering controls, the use of personal protective equipment, and hygiene practices; (7-1-97)

iii. A requirement that fume hoods and other protective equipment are functioning properly and specific measures that shall be taken to ensure proper and adequate performance of such equipment; (7-1-97)

iv. Provisions for employee information and training; (7-1-97)
v. The circumstances under which a particular laboratory operation, procedure, or activity shall require prior approval before implementation; (7-1-97)

vi. The circumstances and provisions for medical consultation and medical examinations; (7-1-97)

vii. Designation of personnel responsible for implementation of the chemical hygiene plan; (7-1-97)

viii. Provisions for additional personnel protection for work with particularly hazardous substances and procedures. (7-1-97)

d. The employer shall apprise personnel of the hazards present in their work area. Such information shall be provided at the time of initial assignment, prior to assignments involving new exposure situations, and annually. (7-1-97)

e. The employer shall inform personnel of the location and availability of the chemical hygiene plan, the permissible exposure limits for chemicals and other substances, signs and symptoms associated with exposures to chemicals and other substances used in the laboratory, and the location and availability of known reference material on the hazards, safe handling, storage, and disposal of chemicals and other hazardous substances found in the laboratory including, but not limited to, material safety data sheets. (7-1-97)

f. Personnel training shall include: (7-1-97)

i. Methods and observations that are used to detect the presence or release of a hazardous chemical or substance; (7-1-97)

ii. The physical and health hazards of chemicals and other substances in the laboratory or storage area; (7-1-97)

iii. The measures personnel can take to protect themselves from these hazards, including specific procedures that have been implemented to protect personnel from exposure to hazardous chemicals, substances, and operations, such as appropriate work practices, emergency procedures, and personal protective equipment to be used. (7-1-97)

g. The employer shall provide to all personnel who work with hazardous chemicals and substances an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines necessary, under the following circumstances: (7-1-97)

i. Whenever personnel develop signs or symptoms associated with hazardous chemicals or substances to which personnel may have been exposed in the laboratory, personnel shall be provided with the opportunity to receive appropriate medical examination. (7-1-97)
ii. When exposure monitoring reveals an exposure level routinely above the action level or in the absence of an action level, the permissible exposure level, medical surveillance shall be established for the effected personnel as prescribed by the particular standard for the chemical or substance. (7-1-97)

iii. Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected personnel shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination. (7-1-97)

h. A lab safety guide shall be developed and provided to all laboratory users. (10-1-06)

i. The employer shall appoint a Chemical Hygiene Officer to keep the Chemical Hygiene Plan current and to provide training to all personnel who fall under the plan. (10-1-06)

05. Chemicals: (7-1-97)

a. Unlabeled, contaminated, or undesirable chemicals shall be disposed of in accordance with approved practices. Chemicals shall be disposed of upon expiration of their shelf life. (7-1-97)

b. Poisons shall be marked with a skull and crossbones and the word "Poison". (7-1-97)

c. All chemical containers shall be labeled and have an expiration date on the label. (7-1-97)

d. Non-durable containers of dangerous materials shall be placed in a durable and non-reactive secondary container before being moved from one (1) location to another. (7-1-97)

e. Strong acids shall be isolated from toxic substances, all metals, flammable substances, organic materials, and substances that may react and release other corrosive, toxic, or flammable fumes as a result of reaction. (7-1-97)

f. Hands shall be washed before leaving the laboratory and especially before eating or drinking. (7-1-97)

g. Material Safety Data Sheets (MSDS) shall be readily available for all chemicals, substances, and materials in the laboratory and chemical storage room. (7-1-97)

06. Storage: (7-1-97)

a. The storeroom floor shall be unobstructed and shall not be used as a storage area. (7-1-97)

b. The storeroom floor shall be equipped with a drainage system of sufficient capacity to provide fast and thorough flushing of spilled reagents. The drainage system shall direct the flow of hazardous materials to an approved location, or the room, building, or area shall be designed to provide secondary containment for the hazardous materials. Secondary containment shall be designed to contain a spill from the largest single container or tank plus the flow rate of the
automatic fire-extinguishing system, for a flow period of twenty (20) minutes, for the area of the room or area in which the storage is located or the system design area, whichever is smaller. (7-1-97)

c. The chemical storage cabinets or storage room shall be kept under lock and key and controlled by the person in charge. (7-1-97)

d. Only those areas of the storage room specifically designed for chemical storage and meeting other requirements of this section shall be used for chemical storage. Heavy bottles and large bottles of acids shall be stored near the floor and protected from breakage. (7-1-97)

e. Chemicals shall not be stored above the eye level of the person handling the chemicals. (7-1-97)

f. Chemicals which react with each other shall not be stored in close proximity to each other. (7-1-97)

g. Adequate shelving shall be provided to prevent the chemicals from becoming overcrowded and inaccessible. (7-1-97)

h. An inventory, which is updated periodically, of all chemicals shall be maintained with the MSDS and be readily available. (10-1-06)

i. Only small amounts of hazardous, explosive, or dangerous chemicals shall be kept on hand. (7-1-97)

j. Laboratory storage rooms shall have manual or mechanical ventilation providing six (6) air changes per hour. (10-1-06)

k. Chemical storage shall be on shelving with protective safety lips. (7-1-97)

l. Chemical storage room shall be equipped with a heat and smoke detector to warn persons not to enter incase of fire. (10-1-06)

m. Chemicals shall be stored in chemically compatible families.

n. Store only the minimum quantity of flammable chemicals needed. (7-1-97)

o. Store flammables in approved flammable storage cabinets. (7-1-97)

p. The floors of chemical storage rooms shall not be carpeted. The floor covering of a chemical room shall be of a material that will not react with stored chemicals. (7-1-97)

q. Laboratory fume hoods shall not be used for the storage of chemicals. (7-1-97)
r. Flammable liquids shall not be stored in refrigerators unless the refrigerator is designed and approved for flammable storage. (7-1-97)

s. Chemicals shall not be stored near, over, or under a sink. (7-1-97)

t. Flammables and oxidizers shall not be stored near each other. (7-1-97)

u. Nitric acid shall not be stored with other acids unless the storage cabinet is provided with a separate compartment specifically for nitric acid. (7-1-03)

v. Appropriate hazard warning signage shall be placed on doors to chemical storage areas. (10-1-06)

07. Laboratory Equipment: (7-1-97)

a. Laboratories shall have a fire blanket and an approved fire extinguisher(s). (7-1-97)

b. Laboratories and chemical storerooms shall have a spill control center equipped with commercial spill control products, fine clay, kitty litter, or vermiculite. Additionally laboratories and chemical storerooms shall have materials for neutralization of chemicals in their spill control center. (7-1-97)

c. Every chemical laboratory shall be equipped with fume hoods of sufficient quantities for the processes involved. (7-1-97)

d. Every chemical laboratory shall be equipped with emergency eye wash stations capable of meeting the flushing requirements of the most hazardous chemical that could be encountered in the laboratory. (7-1-97)

e. Every chemical laboratory shall be equipped with an emergency overhead shower. (7-1-97)

08. Personnel Protection: (7-1-97)

a. Open toed shoes, canvas shoes, or sandals without protective covering shall not be permitted in laboratories. (7-1-97)

b. Hanging jewelry, unrestrained long hair, long or loose neck ties shall not be permitted in laboratories. (7-1-97)

c. Loose or balloon sleeves, shorts or cut-offs, and short dresses or skirts shall not be permitted in laboratories unless a long laboratory coat with long sleeves is worn. (7-1-97)

d. Absorbent watch straps shall not be worn in laboratories. (7-1-97)

e. When working with chemicals appropriate safety goggles shall be worn. (7-1-97)
f. Safety goggles shall be kept clean and sterile and shall be stored in a sanitary container. (7-1-97)

g. Squeeze bottle eye washes shall not be used as an eye wash in laboratories or chemical storage rooms. (7-1-97)

09. Educational Laboratories: (7-1-97)

a. Educational laboratories shall comply with the requirements of this section in addition to the requirements of this sub-section. (7-1-97)

b. Students shall not work in the laboratory without an instructor or laboratory assistant present. (7-1-97)

c. The instructor or laboratory assistant shall be able to see all laboratory students from their normal vantage point(s) in the laboratory. (7-1-97)

d. Laboratories shall not be used for other than laboratory purposes i.e. study halls or general classroom use. When not in use laboratories shall be kept locked. (7-1-97) e. Portable liquid propane containers are not allowed for use in educational laboratories. (10-1-06)

10. Electrical: (7-1-97)

a. All electrical installations shall be in compliance with the National Electrical Code and this standard. (7-1-97)

b. Electrical receptacles used in laboratories shall be GFCI protected. (7-1-97)

c. Electrical receptacles used in laboratories and chemical storage rooms subject to wetting, caustic, or acid atmospheres shall be in moisture proof enclosures. (7-1-97)

112. -- 119. (RESERVED)