



College of Engineering

Cain Department of Chemical Engineering

MINIMUM SAFETY REGULATIONS

These rules are intended to apply to all students, postdoctoral fellows, and staff engaged in laboratory work in a working lab. A working laboratory is a room used for any purpose other than solely office space. When reading these rules keep three things in mind: first, that they are in place to protect everyone; second, that they are based on and are consistent with established LSU safety regulations as published by the Safety Office (System Safety Practice documents, SSPS); and third, that they are far less detailed or restrictive than what is common practice in typical research laboratories and industrial facilities. Consider safety endeavors here as both good common sense and valuable training for future employment. Although no universal designation system for chemical hazards exists, in the rules below a flammable material is any material with a DOT class I or II rating. A hazardous chemical is one which meets either of the following criteria: (1) a TLV (Threshold Limit Value, the airborne concentration of a substance to which one may be exposed in the working day without ill effect; the PEL, or Permissible Exposure Limit, is a similar measure of toxicity) less than 500 ppm (or 2 mg/m³ for a solid) in either the OSHA or ACGIH listings; or (2) a suspected human or experimental carcinogen in either the OSHA or ACGIH listings. A toxic chemical meets either of the following criteria: (1) a TLV less than 10 ppm; or (2) a human carcinogen. These definitions are consistent with SSP 11-84; the hazard data may be found in Sax, "Dangerous Properties of Industrial Materials," in Bretherick, "Handbook of Reactive Chemical Hazards," or in the Merck Index. The safety committee chairperson and the Chemistry library have copies of one or more of these books. In addition, Middleton Library (Government Publications Room in basement, section HE.20.71xx) receives most of the publications of the National Institute of Occupational Safety and Health (NIOSH), including the Registry of Toxic Effects of Chemical Substances (RTECS). The Registry contains the most detailed information available on the health hazards of particular substances.

- (1) All students must have or be supplied with a pair of safety glasses. Side shields are available from the Safety Committee (SSP-4-85).
- (2) Safety glasses and possibly additional eye protection (goggles, face shield) will be worn at all times by all students engaged in laboratory or shop work. In working laboratories, only students at desks are exempted. Students should wear their hair in such a manner as not to interfere with laboratory work. Long hair must be worn pulled back so as not to catch on moving equipment or other apparatus (SSP-4-85).

- (3) Smoking, eating, and drinking are prohibited in laboratories. The only exception to this rule is eating and drinking at your desk (SSP-5-77).
- (4) Neoprene or other approved (Safety Committee) gloves are to be worn when handling strong acids, strong bases, hazardous, or toxic materials (SSP-4-85).
- (5) The proper cartridge respirator is to be worn when handling a toxic chemical, even in a fume hood (SSP-4-85). For pesticides, the respirator is color coded black with an orange stripe; for organic vapors and acid gases, the coding is yellow; for organic dusts, fumes, and mists, it is black with an orange stripe; for chlorine, it is white with an orange stripe; and for ammonia and methylamine, it is green with an orange stripe.
- (6) Hazardous or toxic materials are to be handled only in a fume hood with a velocity of 60 fpm or greater or in a closed system with all exhausts to a fume hood. Flammable materials should be treated in the same manner wherever possible. In particular, "flammable" materials may be distilled or reacted only in a fume hood or closed system with all exhausts to a fume hood (SSP-7-77).
- (7) A mechanical filter respirator (particle mask) should be worn when handling any fine powder or dust. For hazardous solids, a respirator should be worn regardless of the particle sizes (SSP-4-85).
- (8) All laboratory equipment connected to any high voltage electrical supply must be grounded, all wiring insulated, all screw terminals protected, with exceptions to be approved by the Safety Committee (SSP-3-75).
- (9) No refrigerator for chemical storage may be used for food or drink (SSP-9-78).
- (10) Laboratory doors must remain unlocked while occupied. Papers and posters that block the view from the laboratory door must be removed, with exceptions to be approved by the Safety Committee. There must be at least one unobstructed, unlocked fire-door while the laboratory is occupied.
- (11) Students working in laboratories at night (after 6:30 pm), on weekends, or on staff holidays should be certain that at least one other person on the same floor knows their whereabouts. This rule is in place so that if there is an emergency first responders can determine who is in the building and where they are located. Meetings with outside visitors should not take place in a laboratory unless the meeting concerns the laboratory and all safety regulations are followed.
- (12) In the event of fire:
 - (a) If the fire is small (e.g., on a bench top), attempt to extinguish it using the nearest approved extinguisher. If unable to extinguish it immediately, sound the alarm.
 - (b) If the fire is large, or if a small fire begins to spread, sound the alarm.
 - (c) When the alarm sounds, the building is to be evacuated immediately. The assembly point will be the cannon in front of the ROTC building (old Chemical Engineering Building) or the parking lot in front of Facility Services (New Chemical Engineering Building).
- (13) Any material classified as a human carcinogen may only be used in small quantities (less than 100 ml of the pure compound), and with the approval of the safety officer (SSP-8-78).
- (14) Waste Storage - (SSP-11-84).
Each laboratory or group of laboratories should store (not dispose of) its waste

materials according to the following minimum guidelines. These wastes must be given to the Campus Safety Office on Waste Collection days. There is typically at least one Waste Collection day per semester; however, more frequent waste collection is strongly recommended.

- (a) Glass bottles or plastic (polyethylene, polypropylene) containers used for waste storage must be thoroughly cleaned at first. Metal containers should be used only as approved by the Safety Committee. All waste storage containers must be kept in secondary containment (e.g., plastic bins) following university policies.
- (b) The waste should be segregated according to the following minimum categories: Flammable organic liquids; (2) Other organic liquids; (3) Aqueous metal wastes; (4) Mercury wastes; (5) Organic solids; (6) Other solids.
- (c) Solid waste should be sealed in plastic bags, or glass or plastic bottles, which must be labeled.
- (d) Small quantities of acids, bases, or common salts may be dumped down the drain after careful dilution. Heavy metal wastes are not to be disposed of, even in solution
- (e) A tag or label must be kept on each waste container giving an approximate description of its contents. The tag or label should be updated on each waste addition.
- (f) Used lecture bottles of non-toxic gases must be emptied before disposal. Emptying consists of slow release through a water or oil bubbler into a fume hood with a face velocity of greater than 60 fpm. Used lecture bottles of toxic gases must be disposed of in the same manner as hazardous wastes.

(15) Chemical Storage (SP-6-77)

The following categories must be kept in separate storage locations: (1) organic liquids and solids; (2) strong acids; (3) strong bases; (4) strongly oxidizing inorganic compounds such as perchlorates or permanganates; (5) other inorganic compounds. For categories (4), (5), the storage should be in cabinets away from direct sunlight. For category (1), the maximum amount of any one flammable liquid per laboratory is one gallon (if in glass), or two gallons (if in a safety can). All chemicals must be labeled; as a minimum rule, the contents must be specified. When large (gallon) glass reagent bottles are transported outside of laboratories they should be carried in rubber pails or similar safety carriers. When moving between floors, the elevator should be used.

- (16) Compressed Gases - All gas cylinders should be strapped or chained to a wall or laboratory bench. The cylinder carts, available in the U.O. laboratory, shop, or the cage behind the building (lock combination - 1426) must be used to move cylinders outside of a laboratory. All gas cylinders should be shut off at the main cylinder valve when not in use. Natural gas must be turned off at the laboratory bench valves when not in use.
- (17) In case of a laboratory accident, no matter how minor, involving injury, one or more persons should administer to the needs of the injured person, while another person should immediately notify either the department chairperson or the Safety Committee Chairperson. In case of a laboratory accident involving a spill or uncontrolled release of a toxic, hazardous, or flammable material, no matter how minor, the department chair or Safety Committee Chairperson must be notified. The phone numbers for Campus Medical and other emergency services are located on each phone in the building.
- (18) It is the students' responsibility to identify all necessary safety training and safety regulations required for work in their particular laboratory. Students are required to meet

with their major professor prior to starting laboratory work to (1) identify all necessary supplemental safety training modules, (2) review all safety training and protocols needed for any and all equipment used in the laboratory, and (3) receive in-person safety training specific to their research project. For example, students working in a BSL-2 laboratory are required to complete additional online safety training modules on blood borne pathogens and NIH-specific guidelines. These students are also required to follow all regulations for BSL-2 certified laboratories. Students working with radioactive materials must complete the required safety modules, review the criteria for safely working with radioactive materials, and follow the protocol for safe disposal of all radioactive materials. Students working with high power lasers must receive training on how to safely use the equipment. It is the students' responsibility to ensure all safety regulations have been identified and all training has been completed. It is the responsibility of the major professors to provide their students with all the necessary training and materials to safely perform research in their laboratory. As many training modules are research area specific, it is the policy of the department that students and their major professors work together to identify all safety regulations, complete all safety training, submit all necessary documentation, and follow all established protocols to safely perform research in the department.

- (19) All students working in a BSL-2 (Biosafety level 2) laboratory are required to provide documentation of a Hepatitis B vaccine. It is the responsibility of major professors to cover the costs of vaccination of their students who have not been previously vaccinated and want to receive one. Otherwise, students must sign a declination form provided by their major professor.

ONLINE LABORATORY SAFETY TRAINING

The LSU web-based training package for laboratory safety works in conjunction with the EHS Assistant (environmental management database) to meet the regulatory based training requirements.

Please go to <https://sites01.lsu.edu/wp/ehs/online-laboratory-safety-training/> to complete the LSU Environmental Health & Safety Training. There are a number of online training modules offered by LSU EHS. It is the responsibility of all students and their major professors to identify which modules are needed to safely conduct research in their laboratories.

Bring signed acknowledgement to the Graduate Coordinator (room 116).

I have read, understand, and will comply with the Department of Chemical Engineering Minimum Safety Regulations.

Signature

Date

Printed Name