



# **THE Lafayette** Experience

**Department of  
Civil and Environmental Engineering**

**Laboratory Safety  
&  
General Instructions**

## Emergency Phone List

### Lafayette College

#### College Security and Safety

Information      330-5330  
*Emergency*      5333 or 4444

#### Plant Operations

Main Office      330-5373

#### College Health Center

Main Office      330-5001

### Outside of College

#### Police

Easton            330-2200  
 State            258-0816

#### Fire

On Campus      9-911  
 Off Campus      911

#### Easton Hospital

Main Number    250-4000  
 Emergency Rm. 250-4002

#### Ambulance

Main Number    258-3571

## **Your Health and Safety**

The purpose of this safety manual is to provide general safety rules and guidelines to ensure safe working laboratory conditions for all members of the Lafayette community and their visitors. The contents of this manual are not necessarily comprehensive; therefore, supplemental safety procedures may be required as each situation warrants.

Safe laboratory practice is an attitude, knowledge and an awareness of potential hazards. Safety is a mutual responsibility and requires the full cooperation of everyone in the laboratory. This cooperation means that each student, instructor and researcher must observe safety precautions and procedures and should:

- 1) Follow all instructions carefully.
- 2) Become thoroughly acquainted with the location and use of safety facilities such as fire extinguishers, showers, exits and eye wash stations.
- 3) Assure that necessary safety equipment is readily available and in usable condition.
- 4) Become familiar with safety precautions and emergency procedures before undertaking any laboratory work.
- 5) Become familiar with the method of operations and all potential hazards involved before beginning an experiment.

Many accidents can result from an indifferent attitude, failure to use common sense and failure to follow instructions. Be aware of what your neighbors are doing, since you may be a victim of their mistakes. Do not hesitate to comment to a neighbor engaging in an unsafe practice or operation.

**REMEMBER: TREAT CHEMICALS, RADIOLOGICAL AGENTS, BIOLOGICAL AGENTS AND LAB EQUIPMENT WITH CAUTION AND RESPECT.**

## General Laboratory Procedures

### Do:

- Pour acid into water.
- Keep only the amount of chemicals you need for the immediate job in the lab.
- Perform lab work in the lab, not in storage or other areas.
- Store toxic substances in unbreakable containers. Keep them in a clearly marked, ventilated area.
- Wrap evacuated glass containers to protect against explosion.
- Check stored chemicals regularly for deterioration and broken containers.
- Store breakable containers in chemically-resistant trays or overwrap containers.
- Dispose of chemical, broken glass and other waste in containers specifically approved for that use.
- Clean up broken glass and spills immediately.
- Post signs to warn others of toxic or radioactive hazards in the lab.
- Keep the lab clean and neat.
- Learn how to dispose of materials safely and legally.
- Practice good personal hygiene in the lab.
- Know what to do in an emergency.

### Don't:

- Don't pour water into acid.
- Don't use damaged glassware.
- Don't store chemicals near heat or sunlight, or near other substances with which they might react dangerously.

- Don't carry materials between lab and storeroom by hand. Use rubber carriers, trays, racks and carts.
- Don't store chemicals in hoods or on bench tops.
- Don't store materials on floors or other places where people could trip over them.
- Don't keep chemicals that are no longer needed.
- Don't leave equipment unattended when it's operating.
- Don't leave chemicals out at night -- put them back into storage areas.
- Don't fool around in the lab.
- **Don't put custodians and fellow workers in danger** -- store and dispose of dangerous items like biologicals and syringes according to procedures.

The following comment are presented in the interest of personal safety, maintaining a clean and safe environment in which to work, and preserving the laboratory equipment.

### **A. Personal Safety**

- 1) Safety glasses must be worn in the laboratory at all times. If you are found not wearing eye protection in the lab, you will be subject to disciplinary action.
- 2) Contact lenses should not be worn in or about the laboratory.
- 3) Never work in the laboratory alone. If a student is required to make up a lab due to absence during his/her regular lab hours, then a make-up period will be assigned during normal lab hours.
- 4) Eating, drinking and smoking are not allowed in the laboratory.
- 5) Appropriate clothing must be worn in the lab. Jeans, sneakers and a cotton shirt, not shorts or open-toe shoes, are usually the best laboratory attire.
- 6) No chemicals or equipment may be removed from the lab without specific permission and supervision of the instructor.
- 7) Familiarize yourself with the location of various safety equipment (such as fire extinguishers, safety showers, eyewashes and first aid kits), evacuation routes and other safety practices of the lab.
- 8) Wash your hands often during the laboratory period, and wash them thoroughly upon leaving the lab.
- 9) In case of an injury:
  - a) Notify your instructor/lab supervisor immediately. All injuries, no matter how small, must be reported.
  - b) Flushing with copious amounts of water for at least 15 minutes should treat burning of the eyes. Excessive washing with water usually treats burning of the skin. Seek medical attention promptly.
  - c) If you get a burning sensation on your skin or in your eyes after lab hours, report to the health center and explain your symptoms, as well as their possible connection to the lab.
  - d) All chemical spills, glassware breakage and fires must be reported to you instructor/lab supervisor.

- e) If there is an extensive chemical spill on a person, use the safety shower. Remove all contaminated clothing. There is no room for embarrassment in emergency situations. It could be the difference between life and death.
- f) If your clothes are on fire, roll on the floor. DON'T RUN to the fire blanket or shower. Attending laboratory personnel should douse you with water or wrap you in the fire blanket. Get medical attention promptly.

## **B. Prevention of Chemical Injuries**

- 1) Obtain and thoroughly review all Material Safety Data Sheets (MSDSs) or chemical file sheets for the chemicals you will be using.
- 2) Be aware of what your neighbor is doing. If his/her actions indicate confusion or ignorance, inform your instructor.
- 3) Never leave glassware set up or a reaction unattended.
- 4) Never pipette any liquid by mouth. Use a pipette bulb instead.
- 5) Flammable liquids (ether, acetone, etc.) must not be heated in an open container or used in a room where an open flame is burning. It is best to use these types of reagents under a hood.
- 6) Never heat a closed system.
- 7) Read the reagent bottle -- TWICE! Make sure you have selected the correct chemical.
- 8) Place waste reagents in the proper waste receptacles.
- 9) Clean up your work area completely when finished.
- 10) Do not smell or taste any chemical.

## **C. Chemical Storage and Disposal**

- 1) All potentially dangerous chemicals should be properly labeled, stored and handled.
- 2) All waste material (chemical, radioactive, biohazard or other) should be labeled and/or disposed of according to established Lafayette College procedures so as to minimize any safety hazards.

- 3) All radioactive materials should be handled in compliance with the Lafayette College Radiation Safety Program.
- 4) All broken or cracked glass should be disposed of in well-marked and sealed containers (e.g., cardboard boxes) separate from solid waste baskets to prevent injury.

#### **D. Fire Safety**

In case the fire alarm sounds:

- 1) EVACUATE IMMEDIATELY, checking your immediate area to ensure that everyone leaves the building. Close doors when leaving.
- 2) USE THE STAIRS, NOT THE ELEVATORS!
- 3) Touch closed doors with your hand before opening to check for heat that may indicate a fire on the other side. Look through the window for signs of smoke.
- 4) If you must travel through smoke, stay low and breathe through a wet cloth if possible.
- 5) Do not enter the building until safety personnel give an all-clear signal.
- 6) While you are thinking about it, locate all the fire safety equipment near your laboratory and office. Memorize your escape routes, including how many flights of stairs are associated with each one.

#### **E. Miscellaneous**

- 1) Any medical conditions, such as epilepsy, should be reported to the instructor. This information can be helpful in an emergency.
- 2) Every individual at Lafayette College has a right to know about the hazards of the chemicals he/she is working with and the measures he/she can take to protect himself/herself.

#### **F. Glossary of Terms**

Absorption	A mode of entry of a toxic substance into the body in which the substance enters through the unbroken skin.
ACGIH	American Council of Governmental Industrial Hygienists



Acute	A health effect that is the result of a short time exposure to very high concentration of a toxic material. The effect is usually immediately seen, not more than several hours after the exposures.
Carcinogen	A material that can cause cancer.
Chronic	A toxic effect that occurs only after exposure to a material for a long time, usually months or years. The amount of exposure is usually very low, and often symptoms are not immediately noticeable.
Concentration	The amount of a material in the air, for example 50 parts per million. May also refer to the amount of a substance in a mixture, for example 10 percent ammonia in water.
Dose	The amount of a substance that enters the body. The amount depends on the rate at which the substance enters the body and the length of time the substance continues to the body. For example, a worker may inhale 10 milligrams of dust per day for 10 days. The total dose is 100 milligrams. Not all of the substance may remain in the body; some is eliminated, possibly as fast as it enters.
Exposure	Similar to dose. The combination of concentration of a substance in the air and the amount of time a worker is exposed to that concentration gives the total exposure or dose.
Flammable Limits	The range of concentrations in air of flammable vapors of a substance between which the vapors will ignite and continue to burn, possibly resulting in an explosion. The lower limit is the Lower Flammable (or Explosive) Limit (LFL), and the upper limit is the Upper Flammable (or Explosive) Limit (UFL). Below the LFL, there is not enough vapor to support combustion. Above the UFL, there is too much vapor; the mixture is too much to burn. NOTE: The MSDS uses Explosive Limit, but the preferred term is Flammable Limit. The terms are synonymous.
Flash Point	The temperature at which enough vapor is produced from a flammable liquid to reach a concentration equal to the LFL (see Flammable Limits). A substance with a high flash point is less hazardous than one with a low flash point.
LFL or LEL	Lower Flammable Limit or Lower Explosive Limit
MSDS	Material Safety Data Sheet
OSHA	Occupational Safety and Health Administration - This Federal agency is responsible for promulgating standards to provide a safe and healthy work environment.
PEL	Permissible Exposure Limit - OSHA's number that tells the concentration of a chemical in air that a worker may breathe for a given period of time without experiencing adverse effects. See TLV.
TLV	Threshold Limit Value - A number that tells the concentration of a chemical in air that a worker may breathe for a given period of time (dose) without

experiencing adverse effects. ACGIH publishes TLVs for about 500 substances. OSHA uses similar limits called Permissible Exposure Limits (PELs).

Toxic

Poisonous and capable of causing damage to the body. A substance is more toxic if a small amount can cause the damage. The degree of hazard of a substance depends partly on how toxic it is.

UFL or UEL

Upper Flammable Limit or Upper Explosive Limit.

***PLEASE***  
**BE CAREFUL**  
**THINK SAFETY**  
**WORK SAFELY**