

Updated November 2018

FLORIDA INSTITUTE OF TECHNOLOGY
CHEMISTRY SAFETY MANUAL

INTRODUCTION

Safety is important to all members of the Florida Institute of Technology community. The Florida Tech Chemistry Safety Manual addresses safety issues associated with all research and instructional laboratories within the Chemistry Program.

DISTRIBUTION

The Safety Manual is distributed to all faculty, graduate students, and graduate student assistants (GSAs) in the Chemistry Program at Florida Tech.

STATEMENT OF RESPONSIBILITIES

Safety in the laboratory is the responsibility of all individuals.

The BCES Department Head has the overall responsibility for safety in the department. It is the responsibility of the department head to see that a departmental safety plan is developed, maintained and implemented.

The faculty member assigned to teach a laboratory course or the faculty member assigned to supervise the research facility is primarily responsible for the safety of the course or facility.

For instructional laboratory courses taught by a GSA, the assigned GSA has direct responsibility for implementing and enforcing all safety procedures and maintaining a safe working environment.

Individual students working in an instructional laboratory or research laboratory are responsible for learning and understanding all safety policies associated with the laboratory and following these policies.

WHAT TO DO IN CASE OF AN EMERGENCY

In case of any injury, fire, explosion or other emergency serious enough to require emergency help, take the following actions:

1. Assign one person to dial 9911 from an on campus phone (or 911 from an off campus phone) and describe the nature of the emergency and the location. Then dial 8111 to obtain additional help from campus security and medical personnel.

It is important to call both 911 and campus security at 8111. If the phone does not work, ask to use another person's cell phone or office phone or send someone to the security office (building 114, below Shaw Hall) to get help.

2. Assign one person to activate the fire alarm and evacuate the building. THE FIRE ALARM IS USED TO ALERT THE BUILDING OCCUPANTS OF AN EMERGENCY. IT IS NOT CONNECTED TO THE FIRE DEPARTMENT OR POLICE DEPARTMENT. TO SUMMON HELP YOU MUST DIAL 911.

Keep the area clear so that emergency personnel can reach the scene. It is especially important to keep hallways, stairwells and doorways clear.

3. Assign one person to stay with any injured party if it is safe to do so. First aid for bleeding and/or CPR should be given only by trained individuals. If an injured person is in immediate danger from a fire or other life-threatening danger, they should be moved. Otherwise, they should not be moved.
4. Keep injured person warm and calm. Stay with the injured person until trained medical personnel arrive if it is safe to do so.

In case of chemicals splashed onto clothes or skin, use the safety shower and/or eyewash to rinse exposed area thoroughly using copious quantities of water. For small areas of chemical exposure, wash with copious quantities of water. When in doubt, use the safety shower. Always use the eyewash instead of the sink for chemicals that splash into a person's face or eyes. In any accident in which a foreign material enters the eye, medical treatment must be obtained. DO NOT attempt further treatment such as application of a neutralizing chemical.

In the case of a small fire, perform the following steps if it is safe to do so:

1. Determine the source of the fire (organic solvent, electrical, paper, etc).
2. Alert people in the area and instruct them to move away.
3. Send another person to get help from a Chemistry program faculty or staff member or GSA.
4. Remove combustible material from the area.
5. If possible, shut off any pressurized gases (e.g. methane, propane, other fuels/oxidants), which may contribute to a fire or explosion.
6. If possible, shut off electrical power to any equipment associated with a fire or explosion.
7. Fight a small fire with fire extinguishers, sand, water hose or other appropriate means.

8. Dial 911, activate the fire alarm and evacuate the building if the fire cannot be safely extinguished.

After addressing an emergency situation, file an accident report regardless of the outcome of the emergency (i.e. even if you extinguished the fire with no injuries or damage).

POLICY ON THE LABELING OF CHEMICAL COMPOUNDS AND REAGENTS

All chemical compounds, reagents or solutions, which are to be stored or used over a period of time, must be clearly labeled. The minimum requirement is for the label to have an unambiguous, proper chemical name for each substance in the container, which identifies the contents and its concentration (if a solution). Formulas or abbreviations may also be helpful but are not a substitute for the chemical name.

Inclusion of additional identifying information on the label, such as the date prepared, reference number, name of researcher, etc. is strongly encouraged.

Materials, mixtures or solutions, which are part of a current process or have been prepared for immediate use (within one day without overnight storage), are exempt from the labeling requirement.

Unknown sample materials or materials being investigated are also exempt from the labeling requirement. They can be identified by whatever technique is common practice for the laboratory, e.g., sample number, notebook page number, etc.

POLICY ON EYE PROTECTION

Eye protection is always an important safety consideration. A variety of eye hazards can exist in a laboratory ranging from projectiles from the surface of a grinding wheel, chemicals splashed from a reaction, to ultraviolet radiation or high-energy laser beams.

The use of appropriate safety goggles or face shields is mandatory for the following operations:

- Any grinding operations
- Any use of unshielded high energy lasers
- Any use of unshielded UV radiation
- Any operation in which there is a danger of splashed chemicals

In all other situations the decision concerning use of face shields or safety goggles in a particular laboratory facility or for a particular laboratory process always lies with the faculty member responsible for the facility or the course.

All safety goggles or face shields used in Florida Tech facilities must be OSHA approved.

Contact lenses: The use of contact lenses in a laboratory can present unexpected eye hazards. Fumes and dusts, which would otherwise cause no problems, can collect under the lens and cause eye damage. In the event of a material accidentally introduced into the eye, the contact lens can aggravate the damage.

It is the responsibility of the faculty member in charge of course or facility to determine if there are operations that would present undue hazards when combined with contact lenses. If it is determined that there are, the use of contact lenses must be prohibited or the use of safety goggles must be required.

POLICY ON ELECTROMAGNETIC RADIANT SOURCES

Any source of radiant energy which poses a danger because of its power, intensity or wavelength must be employed in such a manner as to minimize risk to operators and any casual visitor. Potentially dangerous radiation sources include but are not limited to: any radiation source in the x-ray, ultraviolet or microwave region of the EM spectrum and high-energy laser systems.

Whenever feasible, shielding should be employed.

Any system which cannot be fully shielded and which is used on a continuing basis must employ warning signs and warning lights outside the room in which the radiation source is operated and safety goggles, if appropriate, for all people within the room where the radiation source is operated.

POLICY ON EXPOSED ELECTRICAL COMPONENTS

Any apparatus, equipment or experimental set up which employs or generates any combination of electrical potential, power or frequency which poses a personal injury danger must be employed in such a manner as to minimize risk to operators and casual visitors.

Whenever feasible, shielding should be employed.

Any system, which cannot be fully shielded should be constructed and/or positioned in such a way as to minimize accidental contact with dangerous components.

Any systems, which cannot be fully shielded, must have warning signs posted.

POLICY ON EXPOSED MACHINERY

Any mechanical system, which involves gears, belts, pulleys or shafts with any form of rotational or reciprocating motion and has sufficient power to cause bodily injury, must be shielded. Such mechanical systems include belt drives for compressors or vacuum pumps.

POLICY ON PRESSURIZED GASES AND GAS CYLINDERS

All gases cylinders, whether in active use or being stored, must be firmly secured in such a way that they cannot be accidentally knocked over.

Gas cylinders designed to stand on the floor must be secured to a wall or bench. Either heavy chain or a commercial cylinder strapping device must be used.

Because of the difficulty in the proper disposal of lecture bottles, their use is not allowed.

Movement of pressurized gas cylinders over long distances (e.g. across a room or down a hall) is accomplished by strapping the cylinder to a cylinder cart designed for such a purpose.

POLICY ON FIRE EXTINGUISHERS

Each laboratory must contain an adequate number and type of fire extinguishers.

All campus extinguishers are routinely inspected and maintained by a university contractor.

If you need information on types of extinguishers or instruction on their use, contact the Department Laboratory Safety Committee.

POLICY ON STORAGE OF FLAMMABLE SOLVENTS

An individual laboratory may have up to 4 liters of an individual flammable solvent on open shelving or on the bench. This should be restricted to solvents in current use.

All small quantities of flammable solvents not in current use must be stored in an approved flammable solvent storage cabinet (or external storage area).

All large quantities of flammable solvents being stored for future use must be stored in an approved external storage facility.

Every effort should be made to avoid stockpiling large quantities of flammable solvents. If possible, flammable solvents, which are routinely employed, should be purchased on a periodic basis to avoid the necessity of storing large quantities.

POLICY ON INSTRUCTIONAL LABORATORY COURSES

The faculty member or GSA assigned to the course is responsible for all safety aspects of the course.

Safety instruction must be provided in every laboratory course. Safety instruction can be provided by a prepared safety lecture, which the laboratory instructor is required to present on the first day of lab for the course. As a minimum the safety lecture must include the following:

Point out all identified hazards. This should focus on any specific items or procedures which are unique to the course or which may reasonably be expected to be new to the student.

Describe proper way to deal with above.

1. Identify all safety equipment and explain its proper use.
2. Clearly state all special rules which are in effect in the laboratory.
3. Indicate what to do in an emergency.
4. Make MSDS sheets available to students within the laboratory room.

All students working in the laboratory must be currently enrolled in the laboratory course.

Maintain a clean, organized laboratory environment. It is a definite safety hazard to have wet or dirty work areas, including floors. It is the GSA's responsibility to see that students clean up. If the laboratory session is over but the room is not clean, it is the responsibility of the GSA to clean it up. This also applies to the balance room.

A clean prep room is also required. Any GSA who uses the prep room is responsible for cleaning it up. Return chemicals to the stockroom shelves. Wear goggles while preparing chemicals in the prep room. No undergraduates are allowed in the prep room, with the exception being work study students employed to work in the stockroom.

Follow these guidelines when applying first-aid:

1. Rinse burns with cold water.'
2. Rinse chemicals on the skin with copious amounts of cold water.
3. If the burn or affected skin area is large enough, use the safety shower.
4. If the eye area is affected, use the eye wash station.

5. If a student faints, lay them flat with feet propped up until conscious; when conscious, send them (with a partner) to the Health Center.
6. All injuries should be reported using the Employee/Student Accident Report (available in the main office) , no matter how minor.
7. Students with serious injuries should be taken to the Health Center immediately. If you are unsure, send the student anyway (ALWAYS with a partner). If the student asks to go, even if the injury is minor, LET THEM GO.

The student health center is located on Country Club Road near University Blvd. (brick and white building). For the student health center, call 8078. For security, call 8111. For more serious emergencies, call 9-911 (on campus phone) or 911 (off campus phone).

If any emergency or accident occurs, regardless of its outcome (i.e. even if nobody is hurt or equipment damaged), notify the Laboratory Coordinator and/or Laboratory Manager.

POLICY ON RESEARCH LABORATORY FACILITIES

The faculty member assigned to the laboratory is responsible for all safety aspects of the laboratory.

The faculty member must regularly review the safety aspects of the laboratory and take appropriate, professional action to insure that safe conditions exist and that proper procedures are employed.

All personnel working in the laboratory must be instructed by the faculty member on all safety aspects of the laboratory including:

1. All procedures unique to the laboratory or that are new to the personnel.
2. Proper operation of all equipment, especially any equipment, which by its nature is regarded as hazardous.
3. Proper use of all safety equipment, especially any unusual equipment or equipment that is new to the personnel.
4. All safety hazards associated with chemical materials.

A file of MSDS sheets must be maintained in the laboratory or in another convenient location. All personnel must be informed of this location and how to interpret an MSDS sheet.

Appropriate safety warnings must be clearly posted in the laboratory to bring attention to safety aspects of any equipment or regularly performed procedures which are known to be especially dangerous.

Only approved personnel may work in a Chemistry research laboratory. Approved personnel may be members of the Chemistry faculty, graduate students in chemistry, undergraduate students majoring in chemistry, post-doctoral fellows in chemistry or employees of the BCES Department. Others may work in research laboratories only by specific permission of the Chemistry Program Chair.

Undergraduate students, regardless of their academic major, may not work unsupervised (i.e. without knowledge by a Chemistry faculty member).

**FLORIDA INSTITUTE OF TECHNOLOGY
EMPLOYEE/STUDENT
ACCIDENT REPORT**

EMPLOYEE/STUDENT NAME _____ HOME PHONE _____

EMPLOYEE/STUDENT FULL HOME ADDRESS _____

DATE & TIME OF ACCIDENT _____ DEPT NAME _____

DATE & TIME OF REPORT _____ DEPT # & EXT. _____

OCCUPATION _____ IMMEDIATE SUPERVISOR _____

LOCATION OF ACCIDENT _____ PART OF BODY INJURED _____

HOW INJURY HAPPENED (describe fully) _____

LIST ALL WITNESSES _____

HAS INDIVIDUAL RETURNED TO WORK/SCHOOL? YES (date _____) NO

HOW MANY SHIFTS/DAYS MISSED? _____

EMPLOYEE/STUDENT WAS SENT TO: Student Health Center Other

IF OTHER, GIVE NAME, ADDRESS, & PHONE # _____

WAS THERE A VIOLATION OF WRITTEN SAFETY RULES OR AN UNSAFE CONDITON? _____

(if yes, describe) _____

COULD THIS ACCIDENT HAVE BEEN PREVENTED? (if yes, describe) _____

SUGGESTED FOLLOW-UP _____

EMPLOYEE/STUDENT SIGNATURE PERSON COMPLETING FORM IMMEDIATE SUPERVISOR

THIS COMPLETED FORM MUST BE RETURNED IMMEDIATELY TO THE CHEMISTRY OFFICE. NO OTHER FORM IS REQUIRED. DO NOT DELAY IN REPORTING THIS ACCIDENT.

FLORIDA TECH LABORATORY INSPECTION REPORT

✓ = satisfactory x = not satisfactory NA = not applicable

T = item tested (safety shower, alarm, hood, etc)

1. HOUSING KEEPING

Aisles _____
 Floors _____
 Exits _____
 Material storage _____

2. MACHINERY

Belt guards, etc _____
 Lock outs, etc _____
 Other _____

3. ELECTRICAL

Wiring _____
 Outlets _____
 Grounding _____
 Extension cords _____

4. VENTILATION

General _____
 Hoods _____

5. PERSONAL PROTECTION

Eye & face _____
 Hand _____

6. Procedures and Practices

As observed _____

7. FIRE SAFETY

Fire exits _____
 Extinguishers _____
 Fire hose _____
 Alarm _____

8. FIRST AID KIT

SHOWER _____

9. CHEMICAL STORAGE AND USAGE

Labels _____
 Crowding _____
 Accessibility _____
 Incompatibility _____
 Defective _____
 Containers _____

10. SPECIAL HAZARDS

Pressurized gases _____
 Toxic compounds _____
 Flammables _____
 Explosion hazards _____
 Biohazards _____
 Radiation hazards _____
 Other _____

COMMENTS (Comments on any items found not satisfactory)
