



Lab Inspection and Safety

Environmental Health and Safety Department
800 West Campbell Rd., SG10
Richardson, TX 75080-3021
Phone 972-883-2381/4111 Fax 972-883-6115

<http://www.utdallas.edu/ehs>

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INTRODUCTION

The purpose of the Chemical Safety Section is to provide information useful in the recognition, evaluation, and control of workplace hazards and environmental factors existing within and/or associated with the laboratories of the University.

This section is not intended to be an exhaustive reference, but rather, a guide to assist investigators, laboratory managers, and other technically qualified individuals. Further advice concerning the hazards associated with specific substances may be obtained from The Office of Environmental Health and Safety or from your supervisor.

Each program shall provide a supplement to this Chemical Safety Section which addresses specific hazards in its program area. A copy of this supplement should be provided to the Office of Environmental Health and Safety, which will provide it to the local fire department and other emergency responders as appropriate.

The University Radiation Safety Section should be consulted for specific safety information concerning radioactive materials and/or radiation-producing devices.

CHEMICAL LABORATORY SAFETY GUIDELINES

The following guidelines provide an overview of the areas to be considered during the planning and conduct of laboratory activities involving chemical usage.

These guidelines are divided into nine categories.

Please contact the Office of Environmental Health and Safety (ext. 4111) if you have any questions or require further information.

I. PERSONNEL

- A. The principal investigator and all laboratory personnel must review the University safety policies and understand their responsibilities.
- B. Laboratory personnel must attend appropriate training courses (i.e., Radiation Safety Short Course, fire safety seminars, chemical and biological safety seminars, Texas Hazard Communication Act training).
- C. Laboratory personnel must receive specific training from principal investigators/laboratory supervisors regarding hazardous materials and procedures.

II. GENERAL LABORATORY PRACTICES

- A. Mouth pipetting is prohibited.

- B. Required/appropriate caution and warning signs must be posted and removed when necessary.
- C. Personnel working with extremely hazardous materials are prohibited from working alone in the laboratory. They should wash their hands frequently and before leaving the laboratory.
- D. Personnel are required to confine long hair, loose clothing, ties, jewelry, etc., when working in the laboratory.
- E. The wearing of contact lenses is prohibited.
- F. Glassware must be checked for cracks, sharp edges, and defects and discarded in approved marked receptacles.
- G. The use of laboratory glassware, ice, chemical or other laboratory materials for human use/consumption is prohibited.
- H. Doors must be locked when the laboratory is unoccupied for extended periods of time (e.g., lunch break, end of the work day, weekend, etc.).
- I. Storage of food and drink in laboratory refrigerators is prohibited.
- J. Eating and drinking are prohibited in the laboratory.

III. WORKING ENVIRONMENT

A. HOUSEKEEPING

1. Working surfaces must be kept clean and orderly.
2. Absorbent padding used on work surfaces must be changed regularly.
3. Floors must be kept clean and clear of obstructions, slip and trip hazards.
4. Adequate lighting must be provided for each task.

B. VENTILATION

1. Local ventilation (i.e., dilution or exhaust) must be provided where necessary.
2. Laboratory personnel must review the University guidelines for Chemical Fume Hood Use.
3. Fume hoods should be used primarily for handling and not for storage of hazardous materials.

4. Work within fume hoods should be conducted at least 6 inches inside the front face of the hood.
5. Materials that must be stored in fume hoods should be stored in secure and supported shelves.
6. Fume hood air flows are to be measured at least semiannually by the Safety Department.
7. Laboratory personnel should be aware of and respect notices posted on fume hoods concerning maintenance and repair activities.
8. Unobstructed space should be available within and in front of the fume hood to allow sufficient air flow into the hood and access by all personnel.
9. Portable nonexhausting fume hoods are not to be used to control fugitive emissions on a permanent basis.

IV. MATERIAL HANDLING AND STORAGE

A. GENERAL

1. An inventory is to be maintained of all hazardous chemical, biological, and radioactive materials in the laboratory.
2. All primary and secondary containers of hazardous materials must be properly labeled.
3. Cabinets and shelves shall be secured and supported.
4. Hazardous materials, especially liquids, are not to be stored at or above 5 feet.
5. Large or heavy containers shall be confined to lower shelves.
6. Protective edges are to be provided on laboratory bench island shelves.
7. Catch trays shall be used for containment of hazardous liquids when necessary.
8. Carrier buckets or carts with side rails should be used to transport chemicals.
9. Containers of hazardous liquids (e.g., over 5 gallons) are not to be kept in the laboratory.
10. Proper physical separation of incompatibles must be maintained (i.e., segregation of acids from bases and flammables from oxidizers).
11. Chemical storage areas must be adequately ventilated.

12. Perchloric acid or concentrated nitric acid is not to be stored near organics (i.e., wood, organic solvents).
13. The University policy concerning the handling and storage of Peroxide Forming Chemicals in Appendix 4 should be followed.
14. Face shields and/or suitable barriers are provided for work with highly reactive or explosive materials.

V. FIRE SAFETY

A. GENERAL

1. An explanation of the University fire emergency procedures is to be posted in the laboratory and must be reviewed by all laboratory personnel.
2. Fire extinguishers must be available in the laboratory.
3. Personnel must be trained in the use of portable fire extinguishers.

B. FLAMMABLES AND COMBUSTIBLES

1. University guidelines are to be followed regarding possession limits for flammable and combustible materials located outside of approved storage cabinets.
2. Flammable liquids that must be refrigerated should be stored only in laboratory safe or explosion proof refrigerators and/or cold rooms.
3. Volatile liquids are to be stored away from sources of heat or electrical spark and sunlight.
4. Flammable or combustible materials may only be heated using appropriate laboratory appliances.
5. Open flame devices are not to be utilized in areas where flammable or combustible liquids or gases are in use.

VI. COMPRESSED GASES/CRYOGENS

A. COMPRESSED GASES (See Compressed Gas Safety Policy)

1. The contents of all gas cylinders must be legibly identified.
2. Fuel gases and oxygen cylinders must be stored separated.

3. All gas cylinders should be secured against falling by the use of appropriate clamps and/or brackets.
4. Cylinders, when not in use, must always be shut off at the main valve stem and not through the use of regulators.
5. Appropriate regulators are to be used to control gas flow from cylinders.
6. Valve protection caps should be in place when cylinders are not in use and also during transport.
7. Empty and full gas cylinders should be stored in separate storage areas.

B. CRYOGENS

1. Cryogenics (liquified gases or dry ice) are to be used only in well ventilated areas.
2. Cryogenic fluids should be used and transported in appropriate containers.
3. Personnel should not accompany an asphyxiant in an elevator.
4. Tygon tubing must not be used for conveying cryogenics.

VII. EQUIPMENT

- A. Indicator lights on all equipment must be in working order.
- B. Operation manuals for all laboratory equipment must be provided if available.
- C. Protective guards are to be provided for machinery moving parts.
- D. Hoses and tubing must be free of cracks and abrasions.
- E. Electrical cords must be free of breaks, exposed wires, or poor insulation.
- F. Electrical equipment should not be operated in areas containing explosive vapors.
- G. Refrigerators are to be clearly labeled as either laboratory safe, explosion proof, or non-explosion proof.
- H. All electrical outlets and equipment must be grounded. Ground fault interrupters should be installed in all outlets within 6 feet of a water source.
- I. Overloading of circuits is prohibited.
- J. Electrical panels are to be identified and to be accessible.

VIII. WASTE DISPOSAL

- A. All laboratory personnel should be familiar with the UTD waste disposal procedures for chemicals.
- B. All waste containers must be properly segregated and clearly marked regarding contents, hazards, and other pertinent information.
- C. Waste materials are not allowed to accumulate excessively in the laboratory and in no case longer than 180 days. The date accumulation began should be marked on the container.
- D. Needles and broken glassware are to be segregated in appropriately labeled containers away from other waste.
- E. Chemicals are prohibited from being disposed of through the sanitary sewer system.
- F. Liquid and solid organic waste must be segregated.
- G. Inorganic liquid waste should be segregated from other waste.
- H. Chlorinated solvent waste should be segregated from nonchlorinated solvent waste.
- I. Chemicals that have become hazardous or unstable because of age are to be disposed of properly.

IX. PERSONAL PROTECTION AND EMERGENCY EQUIPMENT

- A. Personal protective equipment is to be made available for all laboratory personnel including appropriate eye and face protection, hand protection, foot protection, body protection and respiratory protection.
- B. Laboratory personnel are required to wear body, hand, and eye and face protection for all laboratory procedures involving hazardous materials.
- C. Watertap eye wash stations are to be made available in working order.
- D. Squeeze-bottle type eye wash stations are prohibited in the laboratory.
- E. Safety showers and eye wash stations are to be accessible to all laboratory personnel.
- F. Spill control kits or suitable absorbents must be in each lab.
- G. The UTD emergency phone number label and sign should be posted in the laboratory.
- H. A first aid kit is to be available in each lab.

I. At least one member of the laboratory must have completed first aid training.

Appendix 2

LABORATORY SAFETY INSPECTION REPORT

INSPECTED BY:

DATE:

TIME:

BLDG & ROOM NO:

LAB NAME:

BY:

CHEMICAL STORAGE

1. Are all containers of chemicals properly labeled?
2. Are liquid chemicals and materials stored at or below eye level?
3. Are protective lips or edges provided on lab bench island shelves?
4. Are five gallon containers of chemicals not kept in the lab?
5. Are chemical storage areas adequately ventilated?
6. Are perchloric acid or concentrated nitric acid stored away from organics (wood, organic solvents)?
7. Are there no more than 10 gallons of flammable liquids stored on shelving and no more than 50 gallons in storage cabinets in the lab?
8. Is there a flammable liquids storage cabinet in lab?
9. Is there a sign on sink ("Do Not Dispose of Chemicals in This Sink?")?

ELECTRICAL

10. Does the lab have adequate lighting?
11. Are electrical cords free of breaks, exposed wires, or insulation?
12. Are all electrical outlets and equipment grounded?
13. Are eating and drinking prohibited in the lab?
14. Is there food or drink in lab refrigerators?
15. Is the Laboratory Safety Poster displayed?
16. Are the following items available for use in the lab?
 - Lab coats
 - Eye protection
 - Respirators
17. Are fire extinguishers available in the lab?
18. Have personnel been trained in the use of portable fire extinguishers?
19. Is a fire blanket readily accessible to lab personnel?
20. Are eyewash stations available and accessible?
21. Are eyewashes and showers positioned so they can be used simultaneously?
22. Are a safety shower and eyewash accessible to all laboratory personnel?
23. Is the University emergency phone number sign and label posted in the laboratory?
24. Does the University Emergency Poster have responsible person's name, office, and home telephone number on it?
25. Is a first aid kit readily available, accessible, and properly stocked?

FUME HOODS

26. Are fume hoods used primarily for handling and not storage of materials?
27. Is work within fume hoods conducted at least six inches inside the front face of the hood?

GAS CYLINDERS

28. Are the contents of all gas cylinders legibly identified?
29. Are all gas cylinders secured against falling by the use of appropriate clamps and/or brackets?
30. Are cylinders always shut off at the main valve stem and not through the use of regulators?
31. Are valve protection caps on cylinders in place when not in use and during transport?
32. Are empty and full gas cylinders stored in separate storage areas?

WASTE MATERIALS

33. Are all waste containers properly segregated and clearly marked regarding contents, hazards, and other pertinent information?
34. Is there no more than one container of each type of hazardous waste stored in the lab?
35. Are spill control kits available and accessible for emergencies?
36. In case of a spill, are the following items available?
 - Respirators
 - Protective clothing
37. Does this lab use hypodermic needles or scalpels?
38. If yes, is there a labeled sharps disposal container?

MISCELLANEOUS

39. Are desks not being used as lab work benches?
40. Is a notice posted about handling chemical waste?

RADIATION LABORATORY SAFETY REPORT

1. Is laboratory identified by radiation sign at all hallway entrances?
2. Is film badge report posted in lab?
3. Are lab benches and hoods identified where radiation is used?
4. How many personnel are in lab during inspections?
5. How many personnel are wearing film badges?
7. Is storage of food and drink in lab refrigerators prohibited and enforced?
8. Are beta boxes in hall refrigerator locked?
9. Is a waste container for radioactive waste marked by using orange plastic bags?