

University of Louisiana Monroe (ULM)

Chemical Hygiene Program

1. Introduction
2. Scope
3. General Principles for Working with Chemicals
4. General Program Management
5. How to Prepare a Chemical Hygiene Plan
6. Basic Rules and Procedures for Working with Chemicals
7. Chemical Procurement, Distribution, and Storage
8. Environmental Monitoring
9. Housekeeping, Maintenance, and Inspection
10. Requirements covering Testing of Emergency Eyewash/Showers
11. Medical Program
12. Records
13. Signs and labels
14. Spills and Accidents
15. Information and Training Program
16. Waste Disposal Program
17. Waste Chemical Compatibility Chart
18. Engineering Controls
19. Safety Data Sheets
20. Compressed Gas Cylinders
21. Standard Operating Procedures for Common Chemical Classes
 - a. Acutely Toxic Gases
 - b. Acutely Toxic Chemicals
 - c. Carcinogens
 - d. Compressed Gases
 - e. Corrosive Chemicals
 - f. Flammable Liquids

University of Louisiana Monroe

Chemical Hygiene Plan

ULM continually strives to provide a learning, teaching, and research environment free from recognized hazards. Pursuant to Occupational Safety and Health Administration Regulations (29 CFR 1910.1450) the University establishes this Chemical Hygiene Plan (CHP) to protect employees and students from the potential health hazards associated with the handling, use, and storage of hazardous chemicals.

The Chemical Hygiene Plan applies to all facilities at ULM. The safe storage, use, and disposal of chemicals require policies for the protection of students, employees, and the environment. Chemicals, which include reagent grade materials through trade name products and wastes, are the focus of increased regulatory actions by federal, state, and local governments. The purpose of this Chemical Hygiene Plan is to provide the chemical user with basic safety information regarding the use of chemicals. This Chemical Hygiene Plans forms the foundation of the safe use of. The Chemical Hygiene Plan is an adjunct to ULM Monroe Hazard Communication Program.

This manual is not intended as an encyclopedia of chemicals and their hazards; it will not contain listings of hundreds of chemicals that employees/ students may encounter while working in research and development. Although numerous chemicals may be mentioned for the most part they will serve as illustrations for broad categories of hazards, except in the case of chemical incompatibility charts or listings.

Radiation Safety

The safe use and development of radioactive materials require control measures similar to those found in chemical safety. However, the use of radioactive materials has additional requirements. See ULM Radiation Safety Program.

- precautions shall be taken. One shall assume that any mixture will be more toxic than its most toxic component and that all substances of unknown toxicity are toxic.
- c. Ensure adequate ventilation. The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by use of fume hoods and other ventilation devices. All facility fume hoods certifications will be maintained by the Environmental Health & Safety Office. This will include but is not limited to mechanical components such as motors, belts, sashes, and cables. It will also include air flow calibration.
 - d. Institute the chemical hygiene program. A mandatory chemical hygiene program designed to minimize exposures is needed; it shall be a regular, continuing effort, not merely a standby or short-term activity. Its recommendations shall be followed in academic teaching facilities as well as by full-time facility workers.
 - e. Observe the PELs, TLVs. The Permissible Exposure Limits of OSHA and the Threshold Limit Values of the American Conference of Governmental Industrial Hygienists shall not be exceeded.
-
-

The responsibility for implementing the procedures outlined in this CHP is shared among ULM management, Department Heads, Chemical Hygiene Officers (CHOs), staff and students.

- a. The Environmental, Health, and Safety Office is responsible for providing guidance for these and other procedures as they pertain to chemical hygiene.
- b. Deans and/or department chairpersons are responsible for maintaining safe operations in their s on a daily basis. Specific responsibilities include:
 - i. Ensure that the requirements of the Chemical Hygiene Plan are followed in their areas.
 - ii. Assure that adequate safety resources are available to personnel.

- ii. Avoidance of "routine" exposure. Each employee with the training, education and resources provided by supervision, shall develop and implement work habits consistent with this Chemical Hygiene Plan to minimize personal and co-worker exposure to the chemicals in the facility. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to all chemicals shall be minimized. General precautions which shall be followed for the handling and use of all chemicals include:
 - (1) Develop and encourage safe habits.
 - (2) Avoid unnecessary exposure to chemicals by any route.
 - (3) All employees shall wash all areas of exposed skin prior to leaving the facility.
 - (4) Vent apparatus (vacuum pumps, distillation columns, etc.) which may discharge toxic chemicals into local exhaust devices.
 - (5) Inspect gloves and test glove boxes before use.
 - (6) Do not allow release of toxic substances in cold rooms and warm rooms, since these have contained, re-circulated atmospheres.
 - (7) Mouth suction for pipetting or starting a siphon is prohibited.
 - (8) Use only those chemicals for which the quality of the available ventilation system is appropriate.
 - (9) Do not smell or taste chemicals.
 - (10) Avoid eating, drinking, smoking, gum chewing or application of cosmetics in areas where facility chemicals are present; wash hands before conducting these activities. Avoid storage, handling or consumption of food or beverages in storage areas, and refrigerators.
 - (11) Glassware or utensils used for facility operations shall not be used for food or drink consumption or preparation.

- iii. Laboratory Equipment and Glassware. Each employee shall keep the work area clean and uncluttered. At the end of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.
 - (1) All laboratory equipment shall be used only for its intended purpose.
 - (2) Handle and store laboratory glassware with care to avoid damage; do not use damaged glassware. All broken glassware shall be disposed of in a designated container.

- (4) Sandals, open toe shoes, and bare feet are strictly prohibited in the facility where HM are being used. Close toe shoes are required at all times.
 - (5) Coats/Aprons provide adequate body protection for most operations in the facility where HM are being used. Coats/Aprons will be laundered on a periodic basis (at least monthly). Coats/Aprons shall be removed immediately upon discovery of significant contamination.
 - (6) Use appropriate gloves when the potential for contact with toxic materials exists. The degradation and permeation characteristics of the glove material selected must be appropriate for protection from the hazardous chemical being handled. Gloves shall be inspected and washed prior to reuse. If a chemical permeates the glove, it shall be immediately replaced, as prolonged contact with the hand may cause more serious damage than in the absence of a proper glove. Gloves shall be washed before removal from the hands.
 - (7) Thermal-resistant gloves shall be worn for operations involving the handling of heated materials and cryogenic fluids. Thermal-resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.
 - (8) Appropriate respiratory equipment shall be used when air contaminant concentrations are not sufficiently restricted by engineering controls. Respirators shall be inspected before each use. If it is of the kind that uses cartridges, these will also need inspection prior to use and cartridge replacement in a timely manner.
 - (9) Use any other protective and emergency apparel as appropriate.
- v. Personal Protection – Eqn1h2 0 612 792 reW*0 g0 G[s]-4(i)5 792 r8.05 671.74 Tm0 g0 G[w]

(3) Acute Toxicity Chemicals – Any substances for which the LD50 data

evacuate the area; assure the cleanup personnel wear suitable protective apparel and equipment. The facility supervisor must assess the situation and take action accordingly.

- vii. Waste: Thoroughly decontaminate or incinerate contaminated clothing or shoes. If possible, chemically decontaminate by chemical conversion. Store contaminated waste in closed, suitably labeled, impervious container (for liquids, in glass or plastic bottles half-filled with vermiculite).
- f. Work with Chemicals of High Chronic Toxicity
- i. Access: Conduct all transfers and work with these substances in a "controlled area": a restricted access hood, glove box, or portion of a lab, designated for use of highly toxic substances, for which all people with access are aware of the substances being used and necessary precautions.
 - ii. Approvals: Plans for use and disposal of these materials must be approved by the facility supervisor.
 - iii. Non-contamination Decontamination: Protect vacuum pumps against contamination by scrubbers or HEPA filters and vent them into the hood. Decontaminate vacuum pumps or other contaminated equipment, including glassware, in the hood before removing them from the controlled area. Decontaminate the controlled area before normal work is resumed there.
 - iv. Exiting: On leaving a controlled area, remove any protective apparel (placing it in an appropriate, labeled container) and thoroughly wash hands, forearms, face and neck.
 - v.

- (4) Precautions shall be made for the interruption of utility services during the unattended operation (loss of water pressure, electricity, etc.).
- (5) Containment will be provided in the event of unexpected hazardous material releases.
- (6) Tubing for running water must be in good condition and secured at connections by clamps or wire.

7.

a. Procurement.

- i. Before a substance is received, information on proper handling, storage, and disposal shall be known to those who will be involved.
- ii. No container shall be accepted without an adequate identifying label.
- iii. Preferably, all substances shall be received in a central location.

b. Stockrooms/storerooms.

- i. Toxic substances shall be segregated in a well-identified area with local exhaust ventilation.
- ii. Chemicals which are highly toxic or other chemical containers that have been opened shall be in unbreakable secondary containers.
- iii. Stored chemicals shall be examined periodically (at least annually) for replacement, deterioration and container integrity.
- iv. Stockrooms/storerooms shall not be used as preparation or repackaging areas, shall be open during normal working hours, and shall be controlled by one person.
- v. Storage

- (1) Storage areas for chemicals shall be well illuminated to provide easier
3()-4(ea)30 0 1 171.86 343.25 Tm00 g0 G[]T#TQq0.00000912 0 6190 g0 G# 633.8

- iii. Carts used for chemical transport must have sides, on each shelf, that are high enough to retain the containers. Cart wheels must be large enough to prevent the carts from being caught in floor cracks and door and lab elevator thresholds.
 - iv. Person transporting chemicals must wear the appropriate personal protective equipment.
- d. Facility storage.

- ii. Safety showers shall be tested weekly. The inspection shall be documented on the Emergency Eyewash/Shower Weekly Testing Schedule.
 - iii. Respirators for routine use shall be inspected monthly by the facility supervisor.
 - iv. Other safety equipment shall be inspected regularly.
 - v. Procedures to prevent restarting of out-of-service equipment shall be established.
- d. Passageways.
- i. Stairways and hallways shall not be used as storage areas.
 - ii. The work benches shall be kept clear of equipment and chemicals except those necessary for the work currently being performed.
 - iii. All floors, aisles, exits, fire extinguishing equipment, eye washes, electrical disconnects, and other emergency equipment shall remain unobstructed.
-
- a. In accordance with federal OSHA and state standards, all facilities required to have emergency eyewash/showers must perform weekly tests to eliminate the backup of particles or impurities which could contaminate wounds or the eyes such flushing becomes necessary.

- iii. If necessary, University Police will arrange emergency transportation for the injured.
 - iv. If the person is ambulatory and the injury considered non-serious, the person will be taken to the Student Health Center for first aid.
-
-

- a. Accident records shall be completed and retained.
 - b. Chemical Hygiene Plan records shall document that the facilities and precautions were compatible with current knowledge and regulation.
 - c. Inventory and usage records for high-risk substances shall be kept
 - d. Medical records shall be retained by ULM in accordance with the requirements of state and federal regulations.
-
-

Prominent signs and labels of the following types shall be posted:

- a. Emergency telephone numbers of emergency personnel facilities, supervisors and facility workers.
 - b. Identity labels, showing contents of containers (including waste receptacles) and associated hazards. See Hazardous Waste label.
 - c. Location signs for safety showers, eyewash stations, other safety and first aid equipment, exits and areas where food and beverage consumption and storage are permitted or are not permitted.
 - d. Warnings at area or equipment where special or unusual hazards exist.
-
-

- a. A written emergency spill and accident plan shall be established and communicated to all personnel. It shall include procedures for ventilation failure, evacuation, medical care, reporting and drills.
- b. There shall be an alarm system to alert people in all parts of the facility including isolation areas such as cold rooms.
- c. A spill control policy shall be developed and shall include means of prevention, containment, cleanup and reporting.
- d. All accidents or near accidents shall be carefully analyzed with the results distributed to all who might benefit.

b. Section II

Describes the various ingredient(s) contained in the product, the percentages of ingredient(s), and exposure limits when appropriate. This will include all hazardous chemicals that comprise 1% or greater of the mixture will be identified. Carcinogens must be listed if the concentrations are 0.1% or greater.

c. Section III

- i. Boiling point
- ii. Specific gravity
- iii. Vapor pressure
- iv. Percent volatile
- v. Vapor density
- vi. Evaporation rate
- vii. Solubility in water
- viii. Appearance and odor

d. Section IV

Describes the fire and explosion hazard data for the material. The appropriate extinguishing agent for fires involving the material will be listed. Special firefighting procedures may also be listed.

e. Section V

Describes the known health hazard data for the material and exposure limits. Symptoms or health effects of an overexposure are listed. This information will help the user and medical personnel recognize if an overexposure has occurred.

- i. Threshold limit value (TLV)
- ii. Existing medical conditions that may be aggravated by exposure
- iii. Effects of overexposure (e.g., headache, nausea, narcosis, eye irritation, weakness, skin rashes, etc.)
- iv. Primary routes of exposure (i.e., inhalation, skin, ingestion)
- v. Cancer or other special health hazards
- vi. Emergency and first aid procedures

f. Section VI

Describes reactivity data; that is, the material's ability to react and release energy or heat under special conditions or when it comes in contact with certain substances.

g. Section VII

Gives instructions for the steps to be taken in case of an accidental release or spill. The steps normally include information on containment, evacuation procedures, and waste disposal. The statements on the SDS are general.

h. Section VIII

Describes the protective equipment for the individual who might have to work with the substance. This section normally describes worst case conditions; therefore, the extent to which personal protective equipment is required is task dependent. Always review the appropriate departmental procedure. Equipment may include:

- i. Respiratory equipment
- ii. Ventilation
- iii. Protective gloves
- iv. Eye protection
- v. Other protective equipment (i.e., special clothing)

i. Section IX

Describes handling and storage procedures to be taken with the material. Information may include statements such as: keep container closed; store in a cool, dry, well ventilated area; keep refrigerated; avoid exposure to sunlight.

j. Section X

Describes any special precautions or miscellaneous information regarding the material. In some cases, manufacturers may choose to withhold certain information on a SDS provided the information is trade secret. Regardless of the existence of trade secrets, the SDS must still contain all relevant hazard, protection, and health information.

k. Assumptions:

- i. Some SDSs may not contain all ten sections or the information may be in a slightly different order. However, the basic information described above must be provided.
- ii. Some SDSs are more complete than others. Do not assume everything you need to know is contained on the SDS. Do not assume if a section is left blank that there is no risk.

a. Handling

- i. The valve must be covered with its metal cover, if so designed, before moving or transporting it.
- ii. A hand truck that has a chain or a belt to secure the cylinder shall be used for transportation.
- iii. When the cylinder is in place it shall be clamped securely to the wall or counter top before the metal valve cover is removed.
- iv. Every effort shall be made not to drop cylinders or allow them to strike other cylinders or walls violently.
- v. When a cylinder becomes empty, use chalk and write on the cylinder EMPTY of MT and return it to the storage area and order another tank to replace it.
- vi. Always consider a cylinder as being full, and handle them with care.

- i. Securing of gas cylinders
Cylinders of compressed gases must be handled as high energy sources. When storing or moving a cylinder, have the cap securely in place to protect the stem. Use suitable racks, straps, chains or stands to support cylinders.
Decontamination procedures
Personnel: Wash hands and arms with soap and water immediately after handling acutely toxic gases.
Designated area
All locations within the facility where acutely toxic gases are handled shall be posted with designated area caution signs. This includes all fume hoods and bench tops where the acutely toxic gases are handled.
Emergency procedure
Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure must be developed. The procedures shall address as a minimum the following:
 - (1) Who to contact: (University police, and Office of Environmental Health and Safety Officer, Chemical Hygiene Officer of the facility)
 - (2) The location of all safety equipment (showers, eye wash, fire extinguishers, etc.)
 - (3) The method used to alert personnel in nearby areas of potential hazards.
 - (4) Special first aid treatment required by the type of acutely toxic material(s) handled in the facility

- v. Eye protection

- i. Securing of gas cylinders
Not applicable
- ii. Decontamination procedures
 - (1) Personnel: Wash hands and arms with soap and water immediately after handling acutely

- (3) If your research does not permit the handling of acutely toxic chemicals in a fume hood, biological safety cabinet, or glove box, you must contact the Office of Environmental Health and Safety.
 - (4) All areas where acutely toxic chemicals are stored or manipulated must be labeled as a designated area.
- xvii. Spill response
- (1) Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the safety data sheet. This shall occur prior to the use of any acutely toxic chemical.
 - (2) In the event of a spill alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of acutely toxic chemicals. Vacate the facility immediately and call for assistance.
Office of Environmental Health & Safety, 5177 or
University Police 1-911 or 5350. This is a 24-hour service.
 - (3) Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.
- xviii. Vacuum protection
- (1) Evacuated glassware can implode and eject flying glass, and splattered chemicals. Vacuum work involving acutely toxic chemicals must be conducted in a fume hood, glove box or isolated in an acceptable manner.
 - (2) Mechanical vacuum pumps must be protected using cold traps and, where appropriate, filtered to prevent particulate release. The exhaust for the pumps must be vented into an exhaust hood.
- xix. Waste disposal
- All materials contaminated with acutely toxic chemicals shall be disposed of as a hazardous waste. Wherever possible, attempt to design research in a manner that reduces the quantity of waste generated.
- i. Securing of gas cylinders
Not applicable
- ii. Decontamination procedures
- (1) Personnel: Wash hands and arms with soap and water immediately after handling carcinogens.
 - (2) Area: Decontamination procedures vary depending on the material being handled. The toxicity of some materials can be neutralized with other reagents. All surfaces shall be wiped with the appropriate cleaning agent following dispensing or handling. Waste materials generated shall be treated as a hazardous waste.
 - (3) Equipment: Decontaminate vacuum pumps or other contaminated equipment (glassware) before removing them from the designated area.
- iii. Designated area
- All locations within the facility where carcinogens are handled shall

xiv. Signs and labels
(1)

- i. Securing of gas cylinders
 - (1) Cylinders of compressed gases must be handled as high energy sources. They pose a serious hazard if the cylinder valve is dislodged. When storing or moving a cylinder, have the cap securely in place to protect the stem. Use suitable racks, straps, chains or stands to support cylinders.
 - (2) Do not store cylinders or lecture bottles with the regulator in place. If the regulator fails, the entire contents of the gas cylinder may be discharged.
- ii. Decontamination procedures
Not Applicable
- iii.

- xii. **Safety shielding**
Safety shielding is required any time there is a risk o

- i. Securing of gas cylinders
Not applicable
- ii. Decontamination procedures
 - (1) Personnel: Wash hands and arms with soap and water immediately after handling oxidizing chemicals.
 - (2) Area: Carefully clean work area after use. Paper towels or similar materials contaminated with strong oxidizing chemicals may pose a fire risk.
- iii. Designated area
Not applicable
- iv. Emergency procedure
Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure must be developed. The procedures shall address as a minimum the following:
 - (1) Who to contact: (University police, and Office of Environmental Health and Safety, Chemical Hygiene Officer of the facility)
 - (2) The location of all safety equipment (showers, eye wash, fire extinguishers, etc.)
 - (3) The method used to alert personnel in nearby areas of potential hazards.
 - (4) Special first aid treatment required by the type of oxidizing chemicals material(s) handled in the facility
- v. Eye protection
Eye protection in the form of safety glasses must be worn at all times when handling oxidizing che

- xii. **Safety shielding**
Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of oxidizing chemicals which pose this risk shall occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all facility occupants, are acceptable.
- xiii. **Safety shower**
A safety or drench shower shall be available in a nearby location where the oxidizing chemicals are used.
- xiv. **Signs and labels**
Containers: All oxidizing chemicals must be clearly labeled with the correct chemical

xvii. Spill response

- (1) Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the safety data sheet. This shall occur prior to the use of any pyrophoric chemicals. Spill control materials for pyrophoric chemicals are designed to be inert and will not react with the reagent.
- (2) In the event of a spill alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of pyrophoric chemicals. Turn off all ignition sources and vacate the facility immediately. Call for assistance. Office of Environmental Health & Safety, 5177, or University Police 1-911 or 5350. This is a 24-hour service.
- (3) Remain on the scene, but at a safe distance, to receive and direct email on the is a

v. Eye protection

Eye protection in the form of safety glasses must be worn at all times when handling reactive solids. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn.

vi. Eyewash

Where the eyes or body of any person may be exposed to reactive solids, suitable facilities for quick drenching or flushing of the eyes and body shall be G[f]-4(or)9(e1)-4(o)13

- (2) Date all containers upon receipt. Potassium will form peroxides and superoxides when stored under oil at room temperature. Examine storage containers frequently. Dispose of any container that exhibits salt build up on its exterior. Dispose of all reactive solids whenever they are no longer required for current research.
- (3) Never return excess chemicals to the original container. Small amounts of impurities may be introduced into the container which may cause a fire or explosion.
- xvi. Special ventilation
Special ventilation is required if these materials are used outside of a fume hood or glove box. If your research does not permit the handling of reactive solids in a fume hood or glove box, you must contact the Office of Environmental Health and Safety to review the adequacy of all special ventilation.
- xvii. Spill response
 - (1) Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the safety data sheet. This shall occur prior to the use of any reactive solids chemical. Spill control materials for reactive solids are designed to be inert and will not react with the reagent.
 - (2) In the event of a spill alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of reactive solids. Turn off all ignition sources and vacate the facility immediately. Call for assistance. Office of Environmental Health & Safety, 5177, or University Police 1-911 or 5350. This is a 24-hour service.
 - (3) Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.
- xviii. Vacuum protection
Not applicable
- xix. Waste disposal
All materials contaminated with reactive solids shall be disposed of as hazardous waste. Alert the Office of Environmental Health and Safety if you generate wastes contaminated by reactive solids. These wastes may pose a flammability risk and shall not remain in the facility overnight.
- i. Securing of gas cylinders
Not applicable
- ii. Decontamination procedures
 - (1) Personnel: Wash hands and arms with soap and water immediately after handling reactive liquids.
 - (2) Area: Carefully clean work area after use.
 - (3) Equipment: Decontaminate vacuum pumps or other contaminated equipment (glassware) before removing them from the designated area.
- iii. Designated area
Not applicable
- iv. Emergency procedure
Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of signs and symptoms of overexposure must be developed. The procedures shall address as a minimum the following:

- (1) Who to contact: (University police, and Office of Environmental Health and Safety, Chemical Hygiene Officer of the facility)
- (2) The location of all safety equipment (showers, eye wash, fire extinguishers, etc.)
- (3) The method used to alert personnel in nearby areas of potential hazards.
- (4) The location and quantity of all reactive liquids in the facility
- (5) Special first aid treatment required by the type of reactive liquids handled in the I reactive liquids in the

- (2) Area: Decontamination procedures vary depending on the material being handled. The toxicity of some materials can be neutralized with other reagents. All surfaces shall be wiped the material being

- x. Hazard assessment
Hazard assessment shall focus on proper handling techniques, education of facility workers concerning the health risks posed by reproductive hazards, and the demarcation of designated areas.
- xi. Protective apparel
coats, closed toed shoes, and long sleeved clothing shall be worn when handling reproductive hazards. Additional protective clothing shall be worn if the possibility of skin contact is likely.
- xii. Safety shielding
Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of reproductive hazards which pose this risk shall be performed in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all facility occupants, are acceptable.
- xiii. Safety shower
A safety or drench shower shall be available in a nearby location where the reproductive hazards are used.
- xiv. Signs and labels
 - (1) Doorways: The room sign must contain a Designated Area Within Caution where carcinogens, reproductive hazards, and/or acutely toxic chemicals are stored or used.
 - (2) Containers: All containers of reproductive hazards must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.
- xv. Special storage
Reproductive hazards must be stored in a designated area.
- xvi. Special ventilation
 - (1) Manipulation of reproductive hazards outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to reproductive hazards in the facility and are the preferred ventilation control device. When possible, handle reproductive hazards in a fume hood. If the use of a fume hood proves impractical attempt to work in a glove box or on an isolated area of the bench top.
 - (2) If available, consider using a Biological Safety Cabinet. The biological safety cabinet is designed to remove particulates (the reproductive hazard) before the air is discharged into the environment. Reproductive hazards that are volatile must not be used in a biological safety cabinet unless the cabinet is vented to the outdoors.
 - (3) If your research does not permit the handling of reproductive hazards in a

- (2) In the event of a spill alert personnel in the area that a spill has occurred. Do not attempt to handle a spill of reproductive hazards. Vacate the facility immediately and call for assistance. Office of Environmental Health & Safety, 5177, or University Police 1-911 or 5350. This is a 24-hour service.
 - (3) ~~Remain on the scene~~, but at a safe distance, to receive and direct safety personnel when they arrive.
- xviii. Vacuum protection

- vi. Eyewash
Where the eyes or body of any person may be exposed to water sensitive chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.
- vii. Fume hood
Many water sensitive chemicals will liberate hydrogen when they react with water. The use of a fume hood is recommended to prevent the buildup of combustible gases.
- viii. Glove (dry) box
A glove box may be used to handle water sensitive chemicals when a dry atmosphere is required.
- ix. Gloves
Gloves shall be worn when handling water sensitive chemicals.
- x. Hazard assessment
Hazard assessment of work involving water sensitive chemicals shall address proper use and handling techniques, fire safety (including the need for Class D fire extinguishers), storage, water reactivity, and waste disposal issues.
- xi. Protective apparel
coats, closed toed shoes, and long sleeved clothing shall be worn when handling water sensitive chemicals. Additional protective clothing shall

xvi. Special ventilation

Special ventilation is required if these materials are used outside of a fume hood. If your research does not permit the handling of water sensitive chemicals in a fume hood you must contact the Office of Environmental Health and Safety to review the adequacy of all special ventilation. 10.00000912 0 612 792 6W*nBT 0 m

