Sam Houston State University

Environmental Health & Safety

Chemical Hygiene Plan

TABLE OF CONTENTS

Contact	Phone	Email
Environmental Health and Safety	936-294-2342	safety@shsu.edu
Environmental Health and Safety Director	936-294-2679	lag042@shsu.edu
Biosafety and Chemical Manager	936-294-2342	lag042@shsu.edu
University Safety Manager	936-294-1847	mshiflet@shsu.edu

I. PURPOSE

Sam Houston State University (SHSU) is committed to providing a safe work environment for employees and students in laboratories. The Occupational Safety and Health Administration (OSHA) establishes requirements regarding the occupational exposure to hazardous chemicals in laboratories (29 Code of Federal Regulations (CFR) §1910.1450). SHSU has developed a Chemical Hygiene Plan (CHP) to ensure compliance with this standard by protecting employees from potential health and physical hazards associated with chemicals in laboratories.

This plan establishes a formal written program for protecting faculty, staff, and students against hazards associated with exposures to potentially hazardous chemicals that may be found in laboratories. The procedures and policies detailed in this plan should be followed by all individuals working in a laboratory.

II. SCOPE

This plan applies to all laboratories that use, store, and/or handle potentially hazardous chemicals. This includes, teaching and research laboratories, stockrooms, and areas that store and manage hazardous chemicals for laboratory use. Non-laboratory areas that use hazardous chemicals should refer to the SHSU Hazard Communication Program. For information concerning biological or radiological materials, please refer to the Biosafety Manual and the Radiation Safety Manual, respectively.

III. RESPONSIBILITIES

A. <u>Environmental Health and Safety (EH&S) & Chemical Hygiene Officer (CHO):</u>

- Developing and administering the CHP.
- Assisting Principal Investigators (PIs) and laboratory managers on the implementation of the CHP in their laboratories.
- Reviewing and updating the CHP at least annually.
- Conducting laboratory safety inspections to ensure the relevant sections of the CHP have been implemented.
- Providing guidance on how to address deficiencies identified during laboratory safety inspections.
- Investigating and maintaining documentation of hazardous chemical exposure incidents.
- Monitoring the procurement, use, and storage of hazardous chemicals.

- Assisting with the storage, transport, and disposal of hazardous waste.

B. Departments (Deans and Chairs):

- Provide a safe work environment for laboratory personnel.
- Ensure laboratory personnel are provided the resources necessary to adhere to safe laboratory practices.
- Ensure laboratory personnel are informed of the hazards associated with the chemicals in their area and the work being performed.
- Assist and support the CHO in the implementation of the CHP.
- Ensure deficiencies identified and reported by the CHO are appropriately addressed and corrected within the timeframe provided.
- Report laboratory incidents and near-misses to EH&S as soon as possible, but no later than 24 hours after the incident occurs.
- Initiate the laboratory close-out process by notifying EH&S when laboratory facilities will be vacated.

C. Principal Investigators or Laboratory Managers:

- Ensure laboratory personnel comply with the departmental CHP and understand their roles and responsibilities.
- Ensure laboratory personnel receive adequate training and instruction prior to working with or handling hazardous chemicals or operating equipment.
- Ensure that hazardous chemicals are stored in accordance with the manufacturer's instructions and the CHP.
- Wear personnel protective equipment (PPE) appropriate for the hazards of the chemicals being used and the tasks being performed.
- Establish written laboratory procedures to be performed by laboratory personnel.
- Conduct a risk assessment of written laboratory procedures to identify potential safety concerns.
- Enforce laboratory safety rules established by laboratory protocols and the CHP.
- Train laboratory personnel on the hazards associated with chemicals present in the laboratory, as well as procedures for incidental exposures or spills.
- Obtain and maintain safety data sheets (SDSs) for all hazardous chemicals present in the laboratory.
- Ensure SDSs are readily available and accessible to laboratory personnel.
- Ensure that PPE is readily available to laboratory personnel.
- Report and address any safety issues that arise in the laboratory.
- Maintain a chemical inventory of all chemicals used and/or stored in the laboratory.

- Ensure laboratory personnel are familiar with emergency procedures, including the location and use of emergency equipment, such as emergency eyewashes and showers, as well as how to obtain additional help in an emergency.
- Submit chemical purchase requests to EH&S for review.
- Conduct routine self-inspections of the laboratory to identify any issues and ensure safe laboratory practices are followed.
- Monitor engineering controls (i.e., fume hood, flammable storage cabinets) to ensure they are maintained and functioning properly.
- Report issues with the laboratory facilities or engineering controls.
- Correct deficiencies identified and reported by the CHO.

D. Laboratory Personnel:

- Review, understand, and follow laboratory safety rules, regulations, and laboratory protocols.
- Know the location of SDSs and how to access them.
- Wear all required PPE in the laboratory.
- Know the contents and location of the CHP.
- Participate in safety trainings provided by faculty/staff or the University.
- Notify Principal Investigators or laboratory managers of any hazardous conditions or unsafe practices in the laboratory.

IV. WRITTEN PROCEDURES

As required by the OSHA Laboratory Standard, written standard operating procedures (SOPs) must be developed by laboratory managers or PIs that detail the chemical hazards associated with operations in their laboratories. Additional provisions must be provided for operations involving the use of a particularly hazardous substance (PHS). PHSs include select carcinogens, reproductive toxins, and/or substances that possess a high degree of acute toxicity. OSHA maintains a list of highly hazardous chemicals, toxics and reactives which can present a potential for a catastrophic event at or above the threshold quantity.

The following topics should be included at a minimum:

- Description of the procedures and chemicals to be used.
- Identification of health and physical hazards associated with the procedure and the chemicals involved.

- Required PPE to be worn throughout the procedure.
- Information regarding laboratory personnel that may be at a higher risk to be affected by the hazards of the chemicals.
- Procedures in case of spills or unexpected reactions.
- Selection of the appropriate control methods to be used for the chemical hazards present.
- Selection of specific areas in the laboratory for the storage of chemical products and chemical wastes.

All laboratory managers and PIs must ensure all laboratory personnel review the laboratory/procedure specific SOP, along with the CHP before commencing any work.

V. INFORMATION AND TRAINING

Laboratory personnel shall be provided training and information on the chemical hazards present in their area prior to working in the laboratory. Laboratory managers or PIs shall maintain documentation to demonstrate the appropriate training and information has been provided to all laboratory personnel.

Laboratory personnel should be informed on the following topics, at a minimum:

- 29 CFR 1910.1450 – "Occupational Exposure to Hazardous Chemicals in Laboratories".
- How to access the CHP and SDS.
- Responsibilities of laboratory personnel as assigned by the CHP.
- Knowledge of the hazards, safe handling, storage, and disposal of hazardous chemicals, as described in the SDS.
- Methods and observations that may be used to detect the presence or release of a hazardous chemical, such as continuous monitoring devices, visual appearance, or odor of hazardous chemicals when being released.
- Location and operation of emergency equipment such as emergency eyewashes, safety showers, chemical spill kits, and fire extinguishers.
- Specific procedures that have been implemented for worker protection, including work practices, emergency procedures, and personal protective equipment to be used.
- Emergency contact information for the laboratory should be posted within the laboratory. Contact information includes the name and phone number (office and after-hours) of the emergency contact. This information should include a secondary contact, as well as the SHSU emergency contact list (**Appendix A**).

All laboratories storing and managing hazardous chemicals, should have a copy of the *Hazard Communication Act Notice to Employees* posted within the laboratory (**Appendix B**). This Notice provides information regarding the hazards of the chemicals to which employees may be exposed to in the workplace.

Safety Data Sheets (SDS)

All departments are responsible for ensuring that all SHSU purchases of hazardous chemicals are accompanied by the corresponding SDS.

Everyone working in the laboratory must review the SDS associated with the chemicals they will be working with. SDS must be readily available for review by employees. If SDS are provided electronically, then access must be readily available.

All departments must request or obtain an otherwise unavailable SDS within 30 business days of receipt of any hazardous chemical and must not permit the use of any hazardous chemical until a current SDS is available and the site-specific training is completed.

SDS should be maintained in an organized manner within the work area and/or workplace and should be utilized in site-specific training of employees.

SHSU departments must be able to provide SDS for review on request to emergency responders or a governmental agency conducting an inspection of SHSU.

VI. GENERAL LABORATORY SAFETY PROCEDURES

A. General Procedures

- Always review the SDS and the label on the container prior to using a chemical in the laboratory.
- Laboratory personnel should always behave in a professional manner in the laboratory. Practical jokes and other behavior that may confuse, startle, or distract other workers is not tolerated.
- Avoid working alone in the laboratory. Arrangements should be made prior to conducting hazardous experiments to avoid working alone in the laboratory. Do not deviate from the assigned work schedule without prior authorization from the laboratory supervisor or PI.
- Do not perform unauthorized experiments.

- Never pipette by mouth.
- Laboratory personnel are encouraged to notify their supervisor of any medical conditions that may increase the likelihood of experiencing negative health effects. This includes individuals that are pregnant, planning to become pregnant, immunocompromised, or suffer from chronic skin conditions.
- Employees are responsible for being alert to any unsafe conditions, practices or operations taking place in the laboratory. All unsafe conditions, practices, or operations should be reported immediately to the laboratory manager or PI.
- The use of illicit substances or medications that may impair motor skills or sensory perception is strictly prohibited.
- Laboratory visitors should be escorted by an SHSU employee.
- Avoid leaving laboratory experiments unattended. If a procedure is left unattended, it should be adequately communicated and appropriate measures must be taken to ensure the safety of others that may enter the lab (e.g., placing signage on the door).
- Laboratory personnel should maintain awareness of the hazards posed by the work of others and any additional hazards that may result from contact between materials and chemicals from different work areas. Additionally, laboratory personnel should make others aware of any special hazards associated with the work being performed.
- Pets are strictly prohibited from the laboratory. Service animals may be permitted on a case-by-case basis. Laboratory personnel that rely on the use of a service animal should consult with their laboratory manager prior to working in the lab.
- Eating, drinking, gum-chewing and cosmetic application are not permitted in the laboratory.
- Laboratory personnel should wear long sleeves, long pants, and closed-toe shoes when working in the laboratory.
- Wearing of open toe shoes, sandals, mid-drift tops or loose clothing is not allowed. Hair must be held in place behind the head.
- Always use the wafting technique to smell chemicals. Never inhale chemicals directly.
- Food and beverages for human consumption are not permitted in the laboratory.
- Refrigerators, microwaves, and other kitchen appliances used in the laboratory, should be labeled “for laboratory use only”.
- Remove gloves and wash hands with soap and water prior to leaving the laboratory. Do not wear gloves outside of the laboratory.

B. <u>General Housekeeping</u>

- All work areas should be free of clutter. Aisles and doorways should be free of clutter. Do not store backpacks or other items that present a tripping hazard on the floor.
- Spills should be cleaned up immediately from work areas and floors.
- Access to emergency equipment (i.e., emergency eyewashes, emergency showers, and fire extinguishers) should never be blocked.
- All empty chemical containers must be tripled rinsed (if feasible) before disposal. For further information regarding empty chemical containers, please refer to SHSU Hazardous Waste Management Program or contact EH&S.

VII. CHEMICAL PROCUREMENT, HANDLING, STORAGE, AND DISPOSAL

Prior to procuring new chemicals, laboratory managers and PIs should review their existing chemical inventories to determine if a new purchase is necessary.

Laboratory managers and supervisors will be required to maintain an updated inventory of hazardous chemicals present in the workplace. The chemical inventory for that space should be always readily available for review.

Laboratory managers and supervisors should maintain the chemical inventory updated as chemicals are purchased or disposed. Additionally, laboratory managers and supervisors should inspect their chemical containers and their expiration or opened date. Chemicals that are past expiration, have exceeded shelf-life, containers in poor condition, or are unknown, are considered hazardous waste and should be disposed of immediately. Laboratory managers and supervisors should contact EH&S if unknown chemicals are found in the laboratory.

The chemical inventory should include the following information:

- Chemical Name
- Manufacturer Name
- CAS Number
- Amount (as listed on container)
- Unit of Measurement
- Quantity
- Total Amount
- Building and Room Number

- Date of Opening
- Flashpoint (°C) and (°F)
- NFPA Classification

A. Chemical Container Labeling

All containers of hazardous chemicals used or stored in any SHSU workplace must be appropriately labeled.

Supervisors in SHSU departments will ensure chemical manufacturers or distributors provide labels which meet labeling requirements for primary containers of all hazardous chemical purchases. Additionally, for secondary containers, supervisors and laboratory managers will ensure chemical containers are properly labeled to identify contents and hazards.

All **primary containers** of hazardous chemicals should be labeled as follows:

- Product identifier – name of the chemical product
- Signal word – word indicating the severity of the hazards present, example “Danger”
- Hazard statement(s) – a statement describing the nature of the hazard
- Pictogram(s) – allow for visualization of the hazards
- Precautionary statement(s) – protective measures to prevent exposure
- Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

Secondary containers are containers that are managing chemicals transferred from an original container. Secondary containers should be labeled as follows:

- Product identifier
- Signal word
- Hazard statement(s)
- Pictogram(s)
- Precautionary statement(s)

For those chemicals generated during research, laboratory managers and PIs are encouraged to label the containers managing research generated chemicals with the following information:

- Product identifier
- Name of researcher/professor
- Date of synthesis
- Hazards (if known)

B. Chemical Management

Minimizing chemical volumes, avoiding storage of incompatible chemicals, and maintaining chemical containers in good condition, can reduce the risk of exposure to laboratory personnel.

Faculty and staff are encouraged to limit chemical purchases to the quantities needed. Due to the cost of disposal and hazards associated with storage, bulk purchases are not recommended.

It is the responsibility of all faculty and staff to ensure their laboratory is secured. All external doors to the laboratory should be kept locked when unoccupied. Only authorized personnel should have access to the laboratory.

Laboratory managers and supervisors are encouraged to follow the following guidelines/recommendations regarding the procurement, handling, and storage of chemicals:

Procurement

- Information on proper handling, storage, and disposal should be known before a substance is received.
- Containers should have adequate identifying labels upon arrival.
- Shipments with breakage or leakage should be refused or opened in a fume hood.
- Original labels on containers should be readable. For those containers where the original label is no longer readable, it is recommended to create another label for the container that provides the chemical name, hazard warnings, and name of manufacturer. For those containers holding chemical product that was transferred due to the original container being damaged, the label should include the chemical name, hazard warnings, name of manufacturer, date of transfer of the chemical and name of the researcher in charge.

Handling

- All SDS and label information should be reviewed prior to working with any hazardous chemical for the first time.

- Secondary containment should be used when transporting chemicals outside of the laboratory. The transport container should be break-resistant.
- Avoid high traffic areas and elevators when transporting hazardous chemicals outside of the laboratory.

Storage

- Labels on primary containers must include the chemical identity and hazard pictograms.
- The contents of all other chemical containers and transfer vessels, including, but not limited to, beakers, flasks, reaction vessels, and process equipment, should be properly identified.
- Containers should be labeled with the date of receipt and the date of opening.
- Chemicals should be stored based on hazard category and compatibility, as listed on the SDS and container label. Consult the SDS for incompatible chemicals.
- Chemicals should not be stored in the fume hood, on the floor, in areas of egress, on the benchtop, or in areas near heat or in direct sunlight.
- Do not store hazardous chemicals above eye-level or in places that are difficult to reach.
- Chemicals should not be stored on shelves that are not sturdy or secured to the wall. Shelves should have a built-in lip to ensure containment in the event of a spill.
- Chemicals should only be stored in laboratory grade, chemical resistant, and explosion proof refrigerators. Use of household refrigerators for the storage of chemicals is not approved. Do not store food or beverages for human consumption in the laboratory refrigerator.
- Flammable chemicals should be stored in spark-free environment and in an approved flammable storage cabinet. Refer to the manufacturer's instructions for the cabinet's maximum storage volume.
- Corrosive chemicals should be stored in appropriate acid storage cabinets. For small quantities, secondary containment may be used in lieu of acid storage cabinets.
- Separate oxidizers, reducing agents, and organics to prevent accidental contact in the event of a spill or leak.
- Secondary containment should be provided for those chemicals that are highly toxic, flammable, or reactive.
- Access to laboratories and chemical stock rooms should be controlled.

C. Waste Management

All chemical waste generated should be separated from chemical products. SHSU maintains a Hazardous Waste Management Program that provides information regarding waste generation, classification, management, and storage.

Faculty and staff generating waste should use the following guidelines:

- Waste containers are to be kept always closed, except when adding waste.
- Empty bottles that previously contained a hazardous chemical or waste should either be triple rinsed before disposal in the regular trash or labeled with a hazardous waste tag that states, “empty container”.
- All hazardous waste containers must be properly labeled with the hazardous waste tag. All applicable fields must be completed on the waste tag.
- Waste containers should not be completely full. Leave at least two inches of headspace to prevent over-pressuring of the waste container.
- Waste containers should be separated based on their category and hazard classification. Waste solvents should not be stored together with waste acids or other reactive wastes.
- No hazardous waste should be disposed of via the sanitary sewer (i.e., do not pour wastes down the drain).
- Waste containers should be compatible with the waste being stored.
- Distinctive waste streams must be kept separate (i.e., do not mix waste generated from different processes or procedures).
- Waste containers must be labeled with the hazardous waste tag. SHSU has created a hazardous waste tag for laboratory managers and supervisors to use.
- Waste should be managed in one designated location.
- Wastes accumulated in a laboratory cannot exceed an aggregate volume of 55-gallons.

Please contact EH&S for assistance with disposing of unwanted or expired chemicals.

D. Peroxide Formers

Certain chemicals commonly found in the laboratory may form peroxides after exposure to oxygen. Peroxides are dangerous compounds that are sensitive to light, impact, friction, heat, and oxidizing/reducing agents. Adhering to the following precautions will ensure the safe management of peroxide-forming chemicals:

- Due to the hazards associated with prolonged storage, avoid purchasing peroxide-forming chemicals in bulk quantities. Purchase only the amount needed for the work being performed.
- Store in the original manufacturer’s container, if possible. Container should be air-tight and light-resistant.
- Store containers away from open flames, sources of heat, and light. Adhere to the storage requirements provided by the manufacturer.

- Peroxide forming chemicals should be dated upon receipt and dated upon opening. Peroxide forming chemicals should be routinely conducted for the formation of peroxides. Class A peroxide formers should be tested every 3 months. Class B & C peroxide formers should be tested every 6 months. The date and result of these tests should be documented on the container.
- When possible, use or dispose of peroxide-forming chemicals prior to their expiration date.
- Visually inspect containers for potential peroxide formation. Any peroxide-forming chemical with visible discoloration, crystallization, or liquid stratification should be treated as potentially explosive. Do not attempt to move or open the container. Notify EH&S immediately for assistance.

A table listing the peroxide forming chemicals by class in included in **Appendix C.**

VIII. COMPRESSED GASES

Compressed gases in the laboratory pose a chemical and physical risk to all working in a laboratory. Compressed gases can be dropped or knocked over, creating a hazardous situation in a laboratory. These hazardous situations can include property and structural damage, bodily injury, or even death.

Faculty and staff planning on utilizing compressed gases should use the following guidelines:

- Label all cylinders as either full, empty, or in-use while in the laboratory.
- Secure all cylinders with straps, chains, or a suitable stand to prevent them from falling.
- Transport cylinders using hand trucks or carts specifically designed for this purpose. Cylinders should be always strapped to the hand truck when being moved.
- Secure safety cap to the cylinder when not in use.
- Place cylinders away from heat, sparks, flames, or electrical circuits.
- Accept only cylinders that are clearly marked with their contents. Verify that the information listed on the label is correct. Do not rely on the color of the cylinder to verify its contents.
- Maintain cylinder valves intact. Faculty, staff, and students should not tamper with the cylinder valves.
- Ensure all cylinder valves are tightly closed when not in use.
- Never bleed cylinders until they are empty.
- Wear personal protective equipment such as safety glasses or goggles when handling compressed cylinders.
- Do not attempt to refill empty cylinders.

IX. ENGINEERING CONTROLS AND LABORATORY SAFETY EQUIPMENT

Local exhaust ventilation is the primary means of protecting against the inhalation of hazardous chemicals.

A. Fume hoods

Fume hoods are and should be used when handling all hazardous chemicals. Laboratory personnel should verify fume hood is functioning properly before use.

Fume hoods are annually certified by a third-party contractor. Upon completion of the certification, the contractor will place a certification sticker on the outside of the fume hood, providing the certification date. Laboratory managers are encouraged to maintain their fume hoods clean and if any issues arise with the fume hoods, to contact EH&S immediately and cease operations in the fume hood.

i. General Guidelines for Using a Fume Hood

- Fume hoods are certified annually. Fume hoods past certification date should not be used. Verify that the fume hood is within its certification period prior to use.
- The exhaust fan should be always on.
- When working with chemicals, the chemicals should be kept at least 6 inches behind the sash. All activities or procedures conducted in the fume hood should be viewed through the sash.
- Avoid opening and closing the sash with rapid movements. Avoid moving arms side-to-side when working in the fume hood. Avoid rapid movements in the fume hood as this creates turbulence and significantly reduces the efficiency of the fume hood.
- Keep the fume hood free of clutter. Only materials that are in active use should be kept in the hood. The fume hood will function more effectively and efficiently if the rear baffles are unobstructed.
- Keep the sash in the lowest possible position when the fume hood is not in use or is unattended.
- Do not use fume hoods to dispose of chemicals via evaporation.
- Promptly report any suspected issues with the fume hood to Customer Service (4-3663).

B. Flammables Storage

All flammable/combustible and corrosive chemicals should be stored in their appropriate cabinets. Chemicals that are flammable and/or corrosive should not be stored and managed in fume hoods, work benches, shelves, or any

other location that is not designed to contain spills or prevent a rise in temperature in case of a fire outside the cabinets.

All laboratories should implement precautions for the safe handling of flammable and corrosive materials. The following precautions should be taken:

- Flammable chemicals should be used in laboratory fume hoods and away from sources of ignition.
- Flammable chemicals storage should follow quantity limits specified by the National Fire Protection Association (NFPA).
- Flammable substances should never be heated using an open flame.
- Flammable liquids should be transferred from 5-gallon containers to smaller containers in a fume hood.
- Flammable liquids should be transferred from a bulk container (>5-gallons) to a smaller container in a well-ventilated area outside of the laboratory. The bulk container must be electrically bonded and grounded.
- Flammable chemicals should only be stored in refrigerators designated for flammable liquids. Flammable chemicals should not be stored in a household refrigerator.

The NFPA 30 – Flammable and Combustible Liquids Code has established maximum allowable quantities of liquids to be stored in each flammable cabinet. The NFPA 30 Table is included in **Appendix D**.

C. Safety Showers and Eyewash Stations

Per 29 CFR 1910.151(c), safety showers and eyewashes must be available in work areas that use or store corrosive chemicals. Laboratory personnel should be knowledgeable of the location and operation of the nearest safety shower and eyewash. Access to safety showers and eyewash stations must be always readily available. Safety showers and eyewashes should be flushed regularly to identify any issues with water pressure, temperature, or sediment accumulation.

D. Fire Extinguishers

Fire extinguishers should be present in locations where a potential fire hazard exists. Laboratory personnel should be knowledgeable on the location, classification, and operation of the nearest fire extinguisher. Personnel that have not been trained on the use of a fire extinguisher must not attempt to use one to put out a fire. Please contact EH&S to coordinate training on the proper use of a fire extinguisher. Additionally, please notify EH&S if a fire extinguisher has been discharged or if there are any other fire extinguisher related issues.

E. PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is an essential component of laboratory safety and must be used appropriately to provide the necessary protection. Since PPE does not modify the hazardous condition itself, it is important to conduct a brief visual inspection of all PPE before commencing work in the laboratory.

A. Eye Protection

Eye protection is required for all laboratory personnel. Eye protection such as googles, and safety glasses should be provided by the laboratory supervisor or the corresponding department. Regular prescription glasses do not offer an equivalent level of protection provided by googles or safety glasses. Laboratory personnel that wear contact lenses must never handle the lens while in the laboratory. Contact lenses should only be inserted or removed after personnel have washed their hands and stepped outside of the laboratory.

When selecting eye protection, personnel should consider each hazardous condition that is presented by the work being performed. Please contact EH&S for assistance in determining appropriate eye protection.

- Danger of splash – chemical splash-googles with splash-poof sides and face shield
- Handling explosive or highly hazardous chemicals – full face shield with throat protection and safety glasses
- Danger of flying particles – impact protection googles, full face shields with safety glasses and side shields
- Working with infrared, ultraviolet or intense visible light – specialized eye protection

B. Hand Protection

Laboratory personnel are required to use hand protection when handling hazardous chemicals, regardless of the procedure. Gloves should be selected based on the potential contact hazard and the permeability of the glove's material. Disposable nitrile gloves are usually adequate for incidental contact with small amounts of chemicals that are not readily absorbed through the skin. A glove suitability chart listing the most common chemicals used in laboratories can be found in **Appendix E.** For a complete list of chemicals and selection of protective gloves,

laboratory personnel are encouraged to review OSHA's Personal Protective Equipment publication OSHA3151-12R to determine if a specific glove material is appropriate for protection against a certain chemical.

C. Body Protection

Laboratory managers and PIs should conduct a risk assessment to determine the type of lab coat required for a specific procedure. Flame resistant lab coats are required for work with pyrophoric chemicals outside of a glove box.

A buttoned laboratory coat should be always worn in the laboratory. If there is a risk of splash or spill, a full-body-length rubber, plastic, or neoprene apron appropriate for the chemical being handled should be worn.

Laboratory coats utilized in the laboratory should not be taken home to be laundered. All laboratory coats utilized in the laboratory, should remain in the laboratory. Laboratory managers in need of professional laundering services for soiled laboratory coats should contact EH&S for assistance.

F. INSPECTION PROGRAM

Inspection Process

EH&S conducts annual laboratory safety inspections of all teaching and research laboratories. The goal of these inspections is to identify and correct any unsafe conditions present in the laboratory. This evaluation includes, but is not limited to, laboratory safety, fire safety, electrical safety, and housekeeping. All inspection findings will be communicated with the respective faculty and staff for that laboratory. Please contact EH&S or refer to the EH&S website for the current version of the laboratory evaluation form.

It is the responsibility of the laboratory supervisor or PI to correct any identified deficiencies within the timeframe provided. The time frame for correcting issues will vary depending on the associated risk. Conditions that present immediate danger to laboratory personnel or laboratory facilities will be reported to the laboratory manager or PI immediately for correction. EH&S may conduct unannounced follow-up inspections to ensure deficiencies identified during the initial laboratory inspection have been addressed. Please contact EH&S for assistance with correcting reported deficiencies.

Laboratory managers or PIs are encouraged to be present during inspections. Information may be needed from laboratory personnel regarding laboratory-specific procedures.

Laboratory managers and PIs are encouraged to conduct self-audits of their laboratories. Self-audits provide a great opportunity to establish a culture of safety within the lab, as well as improve working conditions for laboratory personnel.

G. SPILLS, ACCIDENTS, AND EMERGENCIES

Faculty and staff are required to inform and train all personnel and students working in the laboratory on the procedures to follow during a spill, chemical exposure, or fire.

The SHSU Emergency Procedures Quick Reference should be posted in every laboratory. This reference provides emergency contact information for fire, hazardous materials, medical emergencies, disruptive behavior, severe weather, and bomb threats/suspicious items. The laboratory manager or PI must provide laboratory personnel with a means of contacting them after hours.

a. Spills – Major vs Minor

   All laboratories working with hazardous chemicals should have spill response policies and procedures in place.

   Laboratory personnel should be trained on the use of a chemical spill kit, so that minor spills can be cleaned immediately. Minor spills include spills of materials that are not highly toxic, of relatively small quantity, does not present a significant fire hazard, and can be recovered before it is released to the environment.

   Laboratory personnel should never attempt to clean up a major spill and should contact UPD Emergency Dispatch at (4-1000) or dial 9-1-1. Major spills include spills of toxic or acutely toxic materials, materials that present a fire hazard due to volatility or the quantity spilled, cannot be recovered before it is released to the environment.

b. Fire

   Laboratory personnel should immediately evacuate the lab upon activation of a fire alarm. Refer to the Building Emergency Plan to identify the emergency exit nearest to the laboratory.

c. Chemical Exposures

If an exposure incident occurs that results in chemical contamination of personnel or their clothing, the contaminated clothing should be immediately removed, and the affected person should be directed to a safety shower. The contaminated body parts should be flooded with large quantities of water for at least 15 minutes. Obtain the SDS of the chemicals involved in the exposure and seek immediate medical assistance by contacting UPD Emergency Dispatch or by dialing 9-1-1.

H. MEDICAL CONSULTATION AND EXAMINATION

SHSU employees that work with hazardous chemicals shall be provided the opportunity to receive medical consultation and/or examination by a licensed physician, under the following circumstances:

- The employee develops signs or symptoms indicative of an exposure to a hazardous chemical.
- When exposure monitoring reveals that an employee is routinely exposed to a hazardous chemical for which medical surveillance is required by a particular regulatory standard.
- An undesired incident occurs in which an employee is indirectly or directly exposed to a hazardous chemical.

In the event an employee seeks medical evaluation for a potential exposure to a hazardous chemical, the Principal Investigator, supervisor, or laboratory manager must provide the following information to the physician:

- The identity of the hazardous chemical(s) to which the employee may have been exposed.
- A detailed description of the conditions under which the exposure occurred, including any available quantitative exposure data.
- A description of any signs and symptoms of exposure that the employee is experiencing.
- The SDS of all hazardous chemicals involved in the exposure incident.

Faculty and staff should review the laboratory protocols and experiments with anyone planning to work in the laboratory. This review will provide information regarding the chemicals that will be used and their hazards.

If medical attention is required, students can attend SHSU's Student Health Center, an emergency room off-campus, or their personal primary care physician.

For emergency situations, employees should dial 9-1-1 as soon as possible. If possible, a copy of the SDS should be available for emergency medical personnel.

I. REFERENCES

- National Fire Protection Association (NFPA) 30
- OSHA FACT SHEET – LABORATORY SAFETY CHEMICAL HYGIENE PLAN
- 29 CFR 1910.106 – Flammable Liquids
- Prudent Practices pg. 133 – 6.G.3 Organic Peroxides
- Prudent Practices pg. 176 – Eye and Face Protection
- Prudent Practices pg. 176 – Hand Protection and 29 CFR 1910.138
- OSHA Personal Protective Equipment OSHA3151-12R 2004 "Hand and Arm Protection" Table 4 Chemical Resistance Selection Chart for Protective Gloves
- 29 CFR 1910.151 – Medical Services and first aid
- Biosafety in Microbiological and Biomedical Laboratories – 6th Edition (fume hood).
- Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version 92011) – Chapter 2, Section D – Chemical Management Program and Chemical Waste
- OSHA 1910.1450 App A - National Research Council Recommendations Concerning Chemical Hygiene in Laboratories (Non-Mandatory)
- Prudent Practices in the Laboratory 9.C.2. – Laboratory Chemical Hoods
- Prudent Practices in the Laboratory 9.C.3.8. – Flammable-Liquid Storage Cabinets
- Prudent Practices in the Laboratory 8.B.3.1. – Definition of Characteristic Waste
- Prudent Practices in the Laboratory Chapter 10 – Laboratory Security
- Prudent Practices in the Laboratory – 6.H – Working with Compressed Gases
- Prudent Practices in the Laboratory Chapter 7.D. – Working with Compressed Gases
- 29 CFR 1910.119 Appendix A – List of Highly Hazardous Chemicals, Toxic and Reactives https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.119AppA

J. APPENDICES

A. SHSU Emergency Contact Information
B. Hazard Communication Notice to Employees
C. Peroxide Forming Chemicals
D. NFPA 30 Flammable and Combustible Liquids Table
E. OSHA Chemical Resistance Selection Chart for Protective Gloves

K. REVISION CONTROL

Revision Date	Material Changed	Changed by:
2022	Document Created	Reyna Loosmore
2024	Revision	Luis Grado

SHSU EMERGENCY PROCEDURES QUICK REFERENCE

BOMB THREATS/SUSPICIOUS ITEMS:

- Pay close attention to the exact words the caller is using; document the call
- **Contact University Police at 936-294-1000 (4-1000 on campus)**
- **Do not** touch or handle suspicious items or packages
- Keep others away from area
- Notify your supervisor

DISRUPTIVE BEHAVIOR:

- **Contact University Police at 936-294-1000 (4-1000 on campus)**
- Give your name, location, what is happening and number of people involved (shooters/victims) if known
- If possible, exit the building or area immediately
- If exit is impossible, get to a room, lock or barricade the door, keep quiet, remain in place until all clear is given by law enforcement officials

FIRE – In case of fire or when the fire alarm sounds:

- Evacuate the building immediately using building emergency plan procedures
- **Do not** use the elevators
- Assist those with mobility problems
- **Contact University Police at 936-294-1000 (4-1000 on campus)**
- Report to supervisor at the designated site
- **Do not** re-enter the building until instructed by authorized personnel

HAZARDOUS MATERIALS:

- **Contact University Police at 936-294-1000 (4-1000 on campus)**
- Provide information on type and size of spill (if known)
- Evacuate the immediate area and building as directed
- Get decontamination instructions from authorities
- **Do not** re-enter area until all clear is given by authorized personnel

MEDICAL EMERGENCIES:

- **Contact University Police at 936-294-1000 (4-1000 on campus)**
- Provide your name, location, number injured and description of injuries
- Stay on the phone for instructions on what to do

SEVERE WEATHER:

- Stay away from windows
- Take immediate shelter
- Monitor local radio and television stations
- *Today @ Sam* for University closings
- **Contact University Police at 936-294-1000 (4-1000 on campus)**

***Refer to the SHSU Emergency Response Plan at http://www.shsu.edu/safety for more information.**

A Member Of The Texas State University System

NOTICE TO EMPLOYEES

The Texas Hazard Communication Act, codified as Chapter 502 of the Texas Health and Safety Code, requires public employers to provide employees with specific information on the hazards of chemicals to which employees may be exposed in the workplace. As required by law, your employer must provide you with certain information and training. A brief summary of the law follows.

HAZARDOUS CHEMICALS

Hazardous chemicals are any products or materials that present any physical or health hazards when used, unless they are exempted under the law. Some examples of more commonly used hazardous chemicals are fuels, cleaning products, solvents, many types of oils, compressed gases, many types of paints, pesticides, herbicides, refrigerants, laboratory chemicals, cement, welding rods, etc.

WORKPLACE CHEMICAL LIST

Employers must develop a list of hazardous chemicals used or stored in the workplace in excess of 55 gallons or 500 pounds. This list shall be updated by the employer as necessary, but at least annually, and be made readily available for employees and their representatives on request.

EMPLOYEE EDUCATION PROGRAM

Employers shall provide training to newly assigned employees before the employees work in a work area containing a hazardous chemical. Covered employees shall receive training from the employer on the hazards of the chemicals and on the measures they can take to protect themselves from those hazards. This training shall be repeated as needed, but at least whenever new hazards are introduced into the workplace or new information is received on the chemicals which are already present.

SAFETY DATA SHEETS

Employees who may be exposed to hazardous chemicals shall be informed of the exposure by the employer and shall have ready access to the most current Safety Data Sheets (SDSs) or Material Safety Data Sheets (MSDSs) if an SDS is not available yet, which detail physical and health hazards and other pertinent information on those chemicals.

LABELS

Employees shall not be required to work with hazardous chemicals from unlabeled containers except portable containers for immediate use, the contents of which are known to the user.

EMPLOYEE RIGHTS

Employees have rights to:

- access copies of SDSs (or an MSDS if an SDS is not available yet)
- information on their chemical exposures
- receive training on chemical hazards
- receive appropriate protective equipment
- file complaints, assist inspectors, or testify against their employer

Employees may not be discharged or discriminated against in any manner for the exercise of any rights provided by this Act. A waiver of employee rights is void; an employer's request for such a waiver is a violation of the Act. Employees may file complaints with the Texas Department of State Health Services at the telephone numbers provided below.

EMPLOYERS MAY BE SUBJECT TO ADMINISTRATIVE PENALTIES AND CIVIL OR CRIMINAL FINES RANGING FROM $50 TO $100,000 FOR EACH VIOLATION OF THIS ACT

Further information may be obtained from:

Texas Department of State Health Services
Consumer Protection Division
Policy, Standards, & Quality Assurance Section
Environmental Hazards Unit
PO Box 149347, MC 1987
Austin, TX 78714-9347

(512) 834-6787
(800) 293-0753 (toll-free)
Fax: (512) 834-6726
E-mail: TXHazComHelp@dshs.texas.gov
Website: www.dshs.texas.gov/hazcom

TEXAS Health and Human Services | Texas Department of State Health Services

Worker Right-To-Know Program
Publication # 23-14173
Revised 05/2018

Appendix C

Class A – High Hazard without Concentration		
Butadiene	Chlorobutadiene (chloroprene)	Divinyl acetylene
Isopropyl ether	Potassium amide	Sodium amide (sodamide)
Tetrafluoroethylene	Vinylidene chloride	
Class B – Hazard upon Concentration		
Acetal	Cumene (isopropylbenzene)	Cyclopentene
Cyclooctene	Cyclohexene	Diethylene glycol dimethyl ether (diglyme)
Diethyl ether	1,4-Dioxane	Ethylene glycol dimethyl ether (glyme)
Furan	Isopropanol	Methyl-isobutyl ketone
Tetrahydrofuran	Tetrahydronaphthalene	Vinyl ethers
Class C – Polymerization Hazard		
Acrylic acid	Chlorotrifluoroethylene (gas)	Vinylacetylene (gas)
Acrylonitirle	Methyl methacrylate	Vinyladiene chloride
Butadiene (gas)	Styrene	Vinyl chloride (gas)
Chlorobutadiene	Tetrafluoroethylene (gas)	Vinyl pyridine
Chloroprene	Vinyl acetate	

NFPA 30 Flammable and Combustible Liquids Code				
Maximum Allowable Quantities of Flammable and Combustible Liquids per Control Area				
	Liquid Class(es)	**Quantity**		**Notes**
		Gal	L	
Flammable Liquids	IA	30	115	1,2
	IB and IC	120	460	1,2
	IA, IB, IC combined	120	460	1,2
Combustible Liquids	II	120	460	1,2
	IIIA	330	1,265	1,2
	IIIB	13,200	50,600	1,2

Notes:
(1) Quantities are permitted to be increased 100 percent where stored in approved flammable liquids storage cabinets or in safety cans in accordance with the fire code. Where Note 2 also applies, the increase for both notes is permitted to be applied accumulatively.
(2) Quantities are permitted to be increased 100 percent in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13. Where Note 1 also applies, the increase for both notes is permitted to be applied accumulatively.

Appendix E

OSHA Chemical Resistance Selection Chart for Protective Gloves				
Chemical	Neoprene	Latex/Rubber	Butyl	Nitrile
Acetaldehyde	VG	G	VG	G
Acetic acid	VG	VG	VG	VG
Acetone	G	VG	VG	P
Benzaldehyde	F	F	G	G
Benzene	P	P	P	F
Butyl alcohol	VG	VG	VG	VG
Chlorobenzene	F	P	F	P
Chloroform	G	P	P	F
Diisobutyl ketone	P	F	G	P
Ethyl acetate	G	F	G	F
Ethyl ether	VG	G	VG	G
Formaldehyde	VG	VG	VG	VG
Hydrochloric acid	VG	G	G	G
Methyl alcohol	VG	VG	VG	VG
Methyl chloride	P	P	P	P
Methyl ethyl ketone	G	G	VG	P
Nitric acid	G	F	F	F
Perchloric acid (60%)	VG	F	G	G
Phosphoric acid	VG	G	VG	VG
Sulfuric acid	G	G	G	G
Toluene	F	P	P	F
Xylene	P	P	P	F
VG: Very Good; G: Good; F: Fair; P: Poor (not recommended)				