



STANFORD UNIVERSITY
LABORATORY CHEMICAL SAFETY PLAN
ENVIRONMENTAL HEALTH & SAFETY

This Safety Plan is specific to the Laboratory indicated below and is supplemental to the institutional requirements outlined in Stanford University's Chemical Hygiene Plan <http://ChemHygienePlan.stanford.edu>.

Principal Investigator:
Phone:
Email:
Department:
Building:
Room(s):

Contents:

Key Elements of Chemical Hygiene Plan

1. Responsibilities
 - Principal Investigator
 - Laboratory Personnel
2. Laboratory Self Inspections
3. Training Requirements
4. Prior Approval and Special Precautions
5. Creating Standard Operating Procedures (SOPs)

Additional guidance can be found in the Laboratory Chemical Safety Toolkit <http://chemtoolkit.stanford.edu>

Records *(Either insert records in binder or indicate location in lab where located.)*

1. Training Records: _____
2. Standard Operating Procedures: _____
3. Lab Self Inspection Records: _____

References and Resources

1. Emergency Actions for Hazardous Material Incidents
2. Laboratory Chemical Waste Guidelines
3. Biohazardous and Medical Waste Disposal Guidelines
4. Lab Compliance Cheat Sheet
5. Stanford Storage Group Classification System
6. Stickers available from Stanford EH&S
7. Other Lab-specific information

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PIs/Laboratory Supervisors – Understanding Your Responsibilities

Summary: Per Stanford University's [Chemical Hygiene Plan](#), the PI/Laboratory Supervisor has responsibility for the health and safety of laboratory personnel doing work in his/her laboratory. For each of the responsibilities described below, there is a corresponding page in the toolkit to guide you in fulfilling the responsibility. The PI/Laboratory Supervisor may delegate the safety duties for which he/she is responsible, but must make sure that any delegated safety duties are carried out.

Responsibility	Refer to Toolkit
1. Identify hazardous conditions or operations in the lab, determine safe procedures and controls, and implement and enforce standard safety procedures.	Chem Hazards Info Creating SOPs
2. Establish standard safety operating procedures (general and protocol-specific) and perform literature searches relevant to safety & health that are appropriate.	Creating SOPs
3. Provide prior-approval for the use of Restricted Chemicals in the PI/Laboratory Supervisor's laboratory.	Prior Approval and Special Precautions
4. Consult on higher risk chemical usage and operations so that special safety precautions may be taken.	Prior Approval and Special Precautions
5. Maintain the on-line laboratory chemical inventory for the laboratory.	Chemical Storage, Labeling, and Inventory
6. Provide laboratory personnel access to the Chemical Hygiene Plan , any individual Laboratory Safety Plan, and chemical hazard information.	Chem Hazards Info
7. Train laboratory personnel under your supervision to work safely with hazardous chemicals and operations and maintain records of training provided locally.	Safety Training and Hazard Info
8. Maintain in functional working order appropriate work place engineering controls (e.g., fume hoods) and safety equipment (e.g., emergency showers/eyewashes, fire extinguishers), with emphasis on controls for particularly hazardous substances.	Laboratory Inspections
9. Maintain in functional working order appropriate personal protective equipment (e.g., gloves, goggles).	Personal Protective Equipment
10. Conduct periodic laboratory inspections and maintain records of inspections.	Laboratory Inspections
11. Promptly report laboratory accidents and injuries to Risk Management and Environmental Health & Safety (EH&S).	Incident Reporting
12. Make available required medical surveillance or medical consultation/ examination for laboratory personnel.	Medical Surveillance
13. Inform facilities personnel, other non-laboratory personnel and any outside contractors of potential lab-related hazards when they are required to work in the laboratory environment. Identified potential hazards should be minimized to provide a safe environment for repairs and renovations.	Disclosing Potential Hazards to Non-Laboratory Personnel and Contractors
14. If minors in the laboratory are participating in the University-sponsored function of research, comply with EH&S requirements and restrictions on their laboratory activities.	Health & Safety Requirements for Minors in Laboratories

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Laboratory Personnel - Understanding Your Responsibilities

Summary: Per Stanford University's Chemical Hygiene Plan, laboratory personnel who work with hazardous chemicals in research laboratories have the responsibilities listed below. Consult with your PI/Laboratory Supervisor as you implement your responsibilities. For each responsibility, there is a corresponding page in the toolkit to provide guidance.

Responsibility	Refer to Toolkit
1. Follow the CHP and any individual Laboratory Safety Plan.	Safety Training and Hazard Info
2. Follow oral and written laboratory safety rules, regulations, and standard operating procedures required for the tasks assigned.	Safe Laboratory Practices Creating Standard Operating Procedures
3. Keep work areas safe and uncluttered.	Safe Laboratory Practices
4. Review and understand chemical hazards and hazards of laboratory procedures prior to conducting work.	Chem Hazards Info Creating Standard Operating Procedures
5. Utilize appropriate measures to control identified hazards, including consistent and proper use of engineering controls, personal protective equipment, and administrative controls.	Safe Laboratory Practices Safe Fume Hood Practices Personal Protective Equipment
6. Understand the capabilities and limitations of personal protective equipment issued.	Personal Protective Equipment
7. Gain prior approval from the PI/Lab Supervisor for the use of Restricted Chemicals.	Prior Approval and Special Precautions
8. Consult with PI/Laboratory Supervisor prior to higher risk chemical usage and operations so that special safety precautions may be taken.	Prior Approval and Special Precautions
9. Promptly report accidents and unsafe conditions to PI/Laboratory Supervisor.	Emergencies - Spills or Procedures
10. Complete all required health and safety training.	Safety Training and Hazard Info
11. Participate in the medical surveillance program, when required.	Medical Surveillance
12. Inform PI/Laboratory Supervisor of any work modification ordered by physician as a result of medical surveillance or occupational injury or exposure.	Medical Surveillance
<p><i>In addition to the above responsibilities, laboratory personnel working autonomously or performing independent research are also responsible for:</i></p> <ul style="list-style-type: none"> • Providing the PI/Laboratory Supervisor with a written scope of work for their proposed research. • Notifying and consulting with the PI/Laboratory Supervisor, in advance, if they intend to deviate from their written scope or scale of work. • Preparing SOPs and performing literature searches relevant to safety and health that are appropriate for their work. • Providing appropriate oversight, training and safety information to laboratory personnel they supervise or direct. 	

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Inspection Records

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Laboratory Inspections

Summary: To identify and address potential safety and health deficiencies and for regulatory compliance purposes, laboratories must be inspected as follows:

What to do?	Where?	When?
General Laboratory Self-Inspection [Printable form]	For all laboratories	At least quarterly (more frequently where determined appropriate by PI/Laboratory Supervisor). <ul style="list-style-type: none"> • Retain records of inspection and any follow-up for at least 3 years.
Hazardous Materials Storage Area Self-Inspection [Printable form]	For rooms designated as hazardous materials storage areas (including shared/ common work areas and designated storage rooms)	At least monthly. <ul style="list-style-type: none"> • Retain records of inspection and any follow-up for at least 3 years.
Waste Accumulation Area Self-Inspection	For specially designated waste accumulation areas. Contact EH&S Chemical Waste Program at x5-7520 for more information.	At least weekly. <ul style="list-style-type: none"> • Retain records of inspection and any follow-up for at least 3 years.
Controlled Substance Laboratory Self-Inspection [Printable form]	For laboratories where controlled substances are used and/or stored (applicable to those labs enrolled under the institutional program).	At least quarterly. <ul style="list-style-type: none"> • Retain records of inspection and any follow-up for at least 1 year.
Quarterly NSAR Select Toxin Checklist [Printable form]	For laboratories where NSAR Select Toxins will used/ stored	At least quarterly. <ul style="list-style-type: none"> • Retain records of inspection and any follow-up for at least 1 year beyond the last use or possession.
Testing frequencies of safety-related equipment (eyewashes, fume hoods, etc.)		

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HAZARDOUS MATERIALS STORAGE AREA: MONTHLY INSPECTION

Building Number _____ **Building Name** _____ **Room Number** _____
Inspector's Name _____ **Phone Number** _____ **Year** _____

Instructions:

1. Use this form to inspect rooms that are designated as Hazardous Materials Storage Areas (not laboratories or work areas).
2. Evaluate the storage area during the inspection for breakage, odors, etc. and for items listed below to ensure safe storage conditions.
3. Record all corrective actions in the last space for items with a "No" answer; attach an additional sheet if necessary.
4. If the spill is more than 30 ml or if it escapes the secondary container, call EH&S at **725-9999** (24 hours).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Enter Inspection Date _____ →												
Is the area free from leaks and/or spills? (Yes/No)												
Is appropriate emergency equipment (spill kit, etc.) available? (Y/N)												
Are incompatible chemicals segregated? (Y/N)												
Are all containers labeled with full chemical name? (Y/N)												
Are all containers closed? (Y/N)												
Are leak-proof secondary containers provided? (Y/N)												
Are gas cylinders and lecture bottles in storage properly restrained and valve caps in place? (Y/N/NA)												
After each inspection initial here _____ →												
Corrective Action:												

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LABORATORY INSPECTION CHECKLIST

Building & Room:	Inspected By:
PI/Area Supervisor:	Date:

All laboratory spaces containing hazardous materials must be inspected at least quarterly. For each item check Yes, No, or N/A. Be sure to retain all documentation regarding inspections, including findings **and** corrective actions taken for any “No” responses, for a minimum of 3 years. Contact EH&S at 723-0448 for questions or additional information.

Y	N	N/A	GENERAL SAFETY
			1. Area around fire extinguishers, pull alarms, emergency showers, and electrical panels kept clear?
			2. Eighteen-inch vertical clearance maintained below fire sprinkler heads (e.g., over shelves)?
			3. Cabinets, furniture, and equipment taller than 4 feet braced or anchored?
			4. Food and drink stored and consumed away from toxic and infectious materials?
			5. Refrigerators/freezers labeled either “Food & Drink Only” or “No Food & Drink”?
			6. Extension cords and power strips not daisy chained and no permanent extension cords in use?
			7. No exposed wiring or damaged electrical cords?
			8. Floors are clear and aisles and adjacent hallways unobstructed?
			9. Floors dry and free of slip hazards; bench tops (including hoods) reasonably organized and clean?
HAZARDOUS MATERIALS & WASTES			
			10. All containers, including non-hazardous chemicals and wastes, legibly labeled with the full chemical or trade name (note: abbreviations/formulas are not adequate)?
			11. All hazardous materials and oil pumps stored in secondary containment free of spilled material?
			12. Incompatible materials properly segregated (see Stanford’s Storage Group Classification System)?
			13. Chemical and waste containers in good condition and kept closed except during use (no funnels)?
			14. Flammable liquids (including flammable waste and glacial acetic acid) stored in flammable liquid storage cabinets? Note: Up to 10 gallons per control area (NOT per individual lab) may be stored outside of cabinets. Control areas with cabinet credit are required to store 100% of their flammable liquid inventory inside cabinets. [CFC section 3404.3.4.1, 3404.3.4.4]
			15. Flammables that are refrigerated are placed in explosion-proof or flammables refrigerators only?
			16. No hazardous materials near sinks or drains unless secondary containment is provided?
			17. Lab practices minimize volatilization (i.e. traps used, open-container procedures minimized)?
			18. “Chemical Waste Compliance” poster posted in lab where hazardous waste is accumulated?
			19. Storage in fume hoods minimized and sashes kept closed when not in use?
			20. Emergency contacts, chemical storage maps, and chemical inventory in life safety box are current?
			21. Hazardous material spill cleanup kits and first aid kits available (recommended)?
			22. All hazardous wastes collected in compatible containers with completed waste tags and kept for no longer than 9 months from “accumulation date” on waste tag?
			23. Biohazardous waste in red bags with proper signage in hard sided, closed secondary containment with biohazard symbols on four sides and top?
COMPRESSED GASES			
			24. Cylinders listed on chemical inventory, positioned so that contents label is visible, and stored in a dry, well-ventilated location protected from heat sources?
			25. Cylinders > 26” tall secured to a rigid structure at 1/3 and 2/3 height with metal chains and a maximum of 2 cylinders per pair of chains (one restraint for cylinders <26” and dewars)?
			26. Cylinder valves closed and valve caps in place when cylinders not in use?

Comments & Additional Findings (on following page)

Comments & Additional Findings

Training Records

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Safety Training and Hazard Information

Summary: To apprise laboratory personnel of the hazards of chemicals present in their work area, information and training must be made available.

A. For Work Directed by PI/Laboratory Supervisor: Laboratory personnel must receive general and laboratory-specific information and training at the time of initial assignment to the laboratory, and prior to assignments involving new exposure situations, Particularly Hazardous Substances, and hazardous operations.

1. Safety Training:

What to do?	How to do this?
Obtain General Laboratory Safety Training, which includes orientation to and training on the Chemical Hygiene Plan	Take the following training. <ul style="list-style-type: none"> • General Safety & Emergency Preparedness (EHS-4200)* • Chemical Safety for Laboratories (EHS-1900)* AND, where applicable: <ul style="list-style-type: none"> • Compressed Gas (EHS-2200)* • Computer Workstation Ergonomics (EHS-3400)* • Laboratory Ergonomics (call EH&S at 723-0448) * For on-line classes, register in STARS at https://axess.stanford.edu/ .
Obtain Laboratory-specific training	<ol style="list-style-type: none"> 1. See your PI/Laboratory Supervisor to review the lab-specific training procedures for your lab. 2. Review any individual Laboratory Safety Plan. 3. Complete lab-specific training* or equivalent, which includes: <ul style="list-style-type: none"> ◦ Local/building safety information. ◦ Standard Operation Procedure(s) involving hazardous materials. You may use the form Documenting SOP & PI Approval to document your review. ◦ Any other laboratory-specific safety procedures or hazards that may be encountered in the laboratory environment. Lab-owned equipment may require specialized training to ensure safety and prevent equipment damage.* Additional guidance for PIs on how to develop lab-specific training can be found in How to Develop Lab-Specific Training
Maintain Training Records	<ol style="list-style-type: none"> 1. PI/Laboratory Supervisor or designate must retain training documents for laboratory personnel at least one year. 2. Use How to Develop Lab-Specific Training or equivalent to document training.

2. Hazard Information: The following hazard information is available for PIs/Laboratory Supervisors and Laboratory Personnel to consult during the experiment planning process to assess the hazards and potential risks associated with the chemicals and laboratory operations:

For Information on:	See:
Reference materials on the hazards, signs & symptoms of exposure, safe handling, storage & disposal of hazardous chemicals at the various website links:	<ul style="list-style-type: none"> • Material Safety Data Sheets • Stanford University's Chemical Safety Database • Chemical Safety, National Institute of Health • SOP Template, section #4
Cal/OSHA's Permissible Exposure Limits	<p>"Permissible Exposure Limits (PEL) for Chemical Contaminants", California Code of Regulations, Title 8, Section 5155.</p> <p>Cal/OSHA establishes regulatory exposure limits for many airborne contaminants; the actual values are in Table AC-1. If a PEL is not established for a specific contaminant, contact EH&S for guidance.</p>
Cal/OSHA's Laboratory Standard	<p>"Occupational Exposure to Hazardous Chemicals in Laboratories." California Code of Regulations Title 8, Section 5191.</p> <p>Cal/OSHA is a governmental agency that protects worker health and safety in the State of California. This regulation was promulgated to protect laboratory personnel engaged in the laboratory use of hazardous chemicals. [NOTE: Custodial and maintenance staff who service the laboratory fall under Cal/OSHA's Hazard Communication Standard, Code of Regulations Title 8, Section 5194.]</p>
Stanford University's Chemical Hygiene Plan	<p>Stanford University's Chemical Hygiene Plan.</p> <p>The above-referenced Cal/OSHA regulation requires employers to have a written Chemical Hygiene Plan. This Plan fulfills this regulatory requirement and is a resource for information used for planning experiments and laboratory operations.</p>

B. For Work Conducted Autonomously or Independently:

What to do?	How to do this?
Consult with PI/Laboratory Supervisor	<ol style="list-style-type: none">1. PI/Laboratory Supervisor or designate must retain training documents for laboratory personnel at least one year. Note: Training records for EHS-provided trainings are maintained electronically.2. Obtain any other training that is appropriate to the work you conduct in Stanford University laboratories.<ul style="list-style-type: none">◦ Provide appropriate oversight, training and safety information to any laboratory personnel you supervise or direct.



HOW TO DEVELOP LAB-SPECIFIC TRAINING

SUMMARY

Stanford's Chemical Hygiene Plan requires that all lab members be trained on the specific hazards that exist in their lab and the procedures, equipment, and resources available in their lab for working safely with these hazards.

Lab-specific training must be: (1) documented and (2) provided to all lab personnel at the time of initial assignment to the lab and prior to work involving new exposure situations and hazardous operations.

HOW TO USE THIS TEMPLATE

Guidance text provided in **gray** should be modified and adapted to reflect your lab's practices. The template below may be used to develop a lab-specific training handout and for documenting the training. After reviewing the training goals in the left-hand column, describe in the right-hand column how your lab fulfills these goals. Guidance text provided in **gray** should be modified and adapted to reflect your lab's practices. The guidance text may be deleted.

	TRAINING GOAL	HOW LAB FULFILLS TRAINING GOAL
TRAINING	Ensure completion of all safety training before beginning lab work.	Identify required training for each new lab member. At minimum should include completion of: <ul style="list-style-type: none">General Safety and Emergency Preparedness (EHS-4200) – available online via AxessChemical Safety for Laboratories (EHS-1900) – available online via AxessLab-Specific Training To determine if additional safety training is required: http://web.stanford.edu/dept/EHS/prod/training/index.html
SAFETY ROLES	Know the health and safety responsibilities of the principal investigator, lab safety coordinator, and all group members.	Describe the process for discussing and addressing health and safety concerns in the lab. Include information on expectations for all lab members. Identify additional key personnel for the building and/or department such as the facilities manager, Safety Chair, EH&S, Human Resources, etc.
SAFETY INFO	Know where to find material safety data sheets (MSDS), standard operating procedures (SOP), user manuals for equipment, journals, textbooks, etc.	Identify and list how to locate relevant safety resources. Focus on resources specific to the lab such as a lab-specific MSDS binder (if any), SOPs, etc.
LAB-SPECIFIC HAZARDS	Know the specific hazards that exist in the lab and which hazards are covered by existing SOPs.	In this section provide a basic overview of hazards present in the lab and any controls or alarms that all lab members should be aware of. For example, presence of lasers, biohazards, reproductive hazards, reactives, toxic gas, etc.

LAB OPERATIONS	Know the Chemical Hygiene Plan SOP requirements and the lab's process for developing and reviewing new SOPs.	Per SU Chemical Hygiene Plan the following materials should receive priority for SOP development: highly toxic chemicals, carcinogens, reproductive toxins, and highly reactive materials. In addition, this section should review the PI's expectations for when written SOP development is triggered.
	Know the lab's chemical ordering, usage, and disposal procedures.	Include: Where lab chemicals are stored, including flammable cabinet locations, how ChemTracker is used for inventorying chemicals, and where hazardous waste is collected and what are the waste labeling procedures specific to the lab
	Know what is required personal protective equipment (PPE) for working in the lab, including where lab-provided PPE is stored such as safety glasses/goggles, cryogenic gloves, etc.	See the Personal Protective Equipment section of the Chemical Safety Toolkit (chemtoolkit.stanford.edu) for minimum requirements. If PPE is not required at all times in the lab then identify the areas, times, and/or situations when eye protection, proper lab attire, etc. are not necessary.
	Know the rules for being trained on and authorized to use the lab's specialized equipment, e.g., centrifuge, rotary evaporator, glove box, etc.	In most cases this equipment should have a separate SOP which can be used in conjunction with any owner manuals as a training tool for that piece of equipment.
	Know the lab's "Do's and Don'ts"	For example, what are the lab rules regarding propping open lab doors, food storage, break areas, working after hours, cleaning up after yourself, etc. Refer to SU's Laboratory Toolkit: http://chemtoolkit.stanford.edu/LabSafetyBasics
EMERGENCY EQUIPMENT & PROCEDURES	Know where to find safety equipment.	Includes spill kits, fire extinguishers, emergency alarm boxes, safety eyewash and showers, and first aid kits. List safety equipment relevant to your lab in this box and either describe location or as part of training show new lab personnel the location during lab walkthrough
	Know the procedures for chemical, fire, and earthquake emergencies.	Include: <ul style="list-style-type: none"> ○ What equipment do I need to quickly turn off before evacuating (heat sources, gases, vacuums, etc.)? ○ Where is the Emergency Assembly Point (EAP)? ○ What are at least two evacuation routes out of the building?
	Know the incident and injury reporting procedures.	Include: <ul style="list-style-type: none"> ○ How to obtain and complete an incident investigation report (SU-17 form) ○ How to call 911 from a campus phone and cell phone ○ How to contact the Occupational Health Center
Lab member: _____ Lab member's signature: _____ Trainer's name: _____ Training date: _____ Signature of PI: _____		

Prior Approvals & Special Precautions

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Prior Approval and Special Precautions

Summary: Prior approval is the process whereby laboratory personnel seek permission and the PI/Lab Supervisor grants approval for the use of Restricted Chemicals.

Laboratory personnel should consult with PI/Laboratory Supervisors on certain higher risk chemical usage and operations in their laboratories so that special safety precautions can be taken, where appropriate.

What to do?	How
For use of Restricted Chemicals, obtain prior approval before you execute the operation	<ol style="list-style-type: none">1. Complete <i>Documenting SOP Review and PI Approval</i> ; <u>OR</u>2. PI/Laboratory Supervisor signs and dates laboratory personnel's laboratory notebook and indicates approval for the process, procedure or activity; <u>OR</u>3. PI/Laboratory Supervisor provides other written approval (e.g., via e-mail or memo). Retain record of prior approval for at least one year.
Consult with PI/Lab Supervisor on higher risk chemical usage and operations	Consultation includes, but is not limited to, discussion regarding special hazards, safety precautions, and review of applicable standard operating procedures.

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SOPs

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Creating Standard Operating Procedures

Summary: Standard Operating Procedure

A standard operating procedure (SOP) is a set of written instructions that describes in detail how to perform a laboratory process or experiment safely and effectively. SOPs are a requirement of Stanford University's Chemical Hygiene Plan <http://chemhygieneplan.stanford.edu>, as described in section 4.0. **The scope of an SOP can cover:**

- The **specific** use of a chemical or class of chemicals (such as a specific laboratory procedure).
- The **generic** use specific chemical or class of chemicals with similar hazards (for example, mineral acids).
- A **generic procedure** (such as distillation) that covers several chemicals.

Responsibility

The PI/Lab Supervisor is responsible for providing written Standard Operating Procedures (SOPs) relevant to health and safety for laboratory activities he/she directs involving hazardous chemicals. Laboratory personnel working autonomously or performing independent research are responsible for developing SOPs appropriate for their own work using the guidance below.

Prioritizing SOP Development

Priority for SOP development should be given to any operation involving Restricted Chemicals, certain higher risk chemicals, such as Particularly Hazardous Substances and highly reactive chemicals, and specified higher risk research procedures described in the CHP.

What to do?	How to do this?
1. Prioritize SOPs to generate	Consult with PI/Laboratory Supervisor on above guidance.
2. Create SOPs	<p>Use <i>SU's SOP Template, SU's Toxic Gas SOP Template</i>, or equivalent. <u>If using SU SOP Template:</u></p> <ol style="list-style-type: none"> 1. Complete Sections 1 -10. <ol style="list-style-type: none"> 1. The grey text provides guidance on how to complete the section. Guidance text may be deleted. 2. Some sections indicate blanks to complete. 3. Section #7, Emergency Procedures, provides the established Stanford University procedures to follow, with specific contact information to be added. 2. After completion, review the SOP with your Principal Investigator/Lab Supervisor. [NOTE: At any time, you are welcome to consult with EH&S (723-0448) during the development of your SOP.] <p>General Use SOPs General use SOPs for the major classes of hazardous chemicals are available for you to incorporate into your own SOPs, as appropriate.</p> <ul style="list-style-type: none"> • Carcinogens • Compressed Gases • Corrosive Materials • Cryogenic Liquids • Flammable & Combustible Liquids • Highly Acutely Toxic Materials • Highly Reactive/Unstable Materials • Irritants • Reproductive Toxins • Sensitizers • Restricted Chemicals • Nanomaterials
3. Maintain SOPs	Maintain copy that is physically or electronically accessible to all lab members.
4. Revise SOPs	Consult with PI/Laboratory Supervisor on SOP on timeframe for re-evaluating and revising SOP to ensure it reflects current best practices.

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STANDARD OPERATING PROCEDURE TEMPLATE

#1 CONTACT INFORMATION

Procedure Title	[Specify – Note: All guidance text in brackets may be deleted]
Procedure Author	[Specify]
Creation/Revision Date	[Specify]
Responsible Person	[Name of PI, Lab Supervisor, or Autonomous Researcher, as appropriate]
Location of Procedure	[Building and room number]
Approval Signature	[Obtain prior approval, as appropriate. See section #10 of this template.]

#2 THIS STANDARD OPERATING PROCEDURE (SOP) IS FOR A:

Specific laboratory procedure or experiment
[Examples: synthesis of chemiluminescent esters, folate functionalization of polymeric micelles, etc.]

Generic laboratory procedure that covers several chemicals
[Examples: distillation, chromatography, etc.]

Generic use of specific chemical or class of chemicals with similar hazards
[Examples: organic azides, mineral acids, etc.]

#3 PROCESS OR EXPERIMENT DESCRIPTION

[Provide a brief description of your process or experiment, including its purpose. Do not provide a detailed sequential description as this will be covered by section #6 of this template. Indicate the frequency and duration below.]

Frequency:	<input type="checkbox"/> one time <input type="checkbox"/> daily <input type="checkbox"/> weekly <input type="checkbox"/> monthly <input type="checkbox"/> other: _____
Duration per Expt:	_____ minutes; or _____ hours

#4 SAFETY LITERATURE REVIEW & HAZARD SUMMARY

1. Hazardous Substances

[List hazardous substances and their associated health and safety hazards. Examples of potential hazards include toxicity, reactivity, flammability, corrosivity, pressure, etc. Refer to Safety Data Sheets (SDSs) and other resources, as needed.]

2. Other Hazards

[List nonchemical hazards, e.g., biological hazards, electrical hazards, mechanical hazards, nonionizing radiation, or ionizing radiation.]

3. References

[List all references you are using for the safe and effective design of your process or experiment, including safety literature and peer-reviewed journal articles. Safety resources are available at [http://web.stanford.edu/dept/EHS/cgi-bin/lcst/creating-standard-operating-procedures/.](http://web.stanford.edu/dept/EHS/cgi-bin/lcst/creating-standard-operating-procedures/)]

#5	STORAGE REQUIREMENTS
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[Describe special handling and storage requirements for hazardous chemicals in your laboratory, especially for highly reactive/unstable materials, highly flammable materials, and corrosives.]

#6	STEP-BY-STEP OPERATING PROCEDURE
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[For each step's description, include any step-specific hazard, personal protective equipment, engineering controls, and designated work areas in the left hand column.

- a. **Guidance on Engineering and Ventilation Controls** – Review safety literature and peer-reviewed journal articles to determine appropriate engineering and ventilation controls for your process or experiment. Guidance is available from health and safety specialists at Stanford EH&S and online in the General Use SOPs and Laboratory Safety Sheets in the Laboratory Chemical Safety Toolkit (<http://chemtoolkit.stanford.edu/>)
- b. **Guidance on Personal Protective Equipment** - To assist with your PPE selection, refer to <http://chemtoolkit.stanford.edu/LabPPE>. Respiratory protection is generally not required for lab research, provided the appropriate engineering controls are employed. For additional guidance on respiratory protection, consult with EH&S, 723-0448.
- c. **Designated work area(s)** - Required whenever carcinogens, highly acutely toxic materials, or reproductive toxins are used. The intent of a designated work area is to limit and minimize possible sources of exposure to these materials. The entire laboratory, a portion of the laboratory, or a laboratory fume hood or bench may be considered a designated area. See the Chemical Safety Toolkit for more information.

Describe the possible risks involved with failure to follow a step in the SOP in the right hand column.]

Step-by-Step Description of Your Process or Experiment	Potential Risks if Step is Not Done or Done Incorrectly (if any)
1. Don personal protective equipment. <input type="checkbox"/> appropriate street clothing (long pants, closed-toed shoes)	

<input type="checkbox"/> gloves; indicate type: _____ <input type="checkbox"/> safety goggles <input type="checkbox"/> safety glasses <input type="checkbox"/> face shield <input type="checkbox"/> lab coat <input type="checkbox"/> flame-resistant lab coat <input type="checkbox"/> other: _____																	
2. Check the location/accessibility/certification of the safety equipment that serves your lab:																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 60%;">ITEM</th> <th style="text-align: left;">STATUS</th> </tr> </thead> <tbody> <tr> <td data-bbox="212 527 553 653">Laboratory Fume Hood/Glove Box or other Ventilation Control</td> <td data-bbox="553 527 1421 653">Location: _____ <i>Check sticker to ensure that hood was certified within last 12 months.</i></td> </tr> <tr> <td data-bbox="212 653 553 821">Eyewash/Safety Shower</td> <td data-bbox="553 653 1421 821">Location: _____ <i>Ensure that it is accessible, not blocked. Check tag that it has been tested within last month.</i></td> </tr> <tr> <td data-bbox="212 821 553 873">First Aid Kit</td> <td data-bbox="553 821 1421 873">Location: _____</td> </tr> <tr> <td data-bbox="212 873 553 926">Chemical Spill Kit</td> <td data-bbox="553 873 1421 926">Location: _____</td> </tr> <tr> <td data-bbox="212 926 553 978">Fire Extinguisher</td> <td data-bbox="553 926 1421 978">Location: _____</td> </tr> <tr> <td data-bbox="212 978 553 1031">Telephone</td> <td data-bbox="553 978 1421 1031">Location: _____</td> </tr> <tr> <td data-bbox="212 1031 553 1157">Fire Alarm Manual Pull Station</td> <td data-bbox="553 1031 1421 1157">Location: _____</td> </tr> </tbody> </table>		ITEM	STATUS	Laboratory Fume Hood/Glove Box or other Ventilation Control	Location: _____ <i>Check sticker to ensure that hood was certified within last 12 months.</i>	Eyewash/Safety Shower	Location: _____ <i>Ensure that it is accessible, not blocked. Check tag that it has been tested within last month.</i>	First Aid Kit	Location: _____	Chemical Spill Kit	Location: _____	Fire Extinguisher	Location: _____	Telephone	Location: _____	Fire Alarm Manual Pull Station	Location: _____
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Telephone	Location: _____																
Fire Alarm Manual Pull Station	Location: _____																
3. [Describe the next step in the procedure.]																	
4. [Describe the next step in the procedure. Insert additional rows in table, as needed.]																	
5. Dispose of hazardous solvents, solutions, mixtures, and reaction residues as hazardous waste.																	
6. Clean up work area and lab equipment. [Describe specific cleanup procedures for work areas and lab equipment that must be performed after completion of your process or experiment. For carcinogens and reproductive toxins, designated areas must be immediately wiped down following each use.]																	
7. Remove PPE and wash hands.																	

#7	EMERGENCY PROCEDURES
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<p>1. Health-Threatening Emergencies</p> <p style="margin-left: 40px;">A. Fire, explosion, health-threatening hazardous material spill or release, compressed gas leak, or valve failure, etc.</p>
--

- 1) Call 9-911 (or 286 in the School of Medicine).
- 2) Alert people in the vicinity and activate the local alarm systems.
- 3) Evacuate the area and go to your Emergency Assembly Point (EAP): [Indicate EAP location]
- 4) Remain nearby to advise emergency responders.
- 5) Once personal safety is established, call EH&S at 725-9999 (or 286 in the School of Medicine).
- 6) Provide local notifications (local notifications are listed at the end of this section).

Note: For compressed gas leaks, shut off gas supply only if this can be done safely, without risk to personnel.

B. Injuries and Exposures:

- 1) Remove the injured/exposed individual from the area, unless it is unsafe to do so because of the medical condition of the victim or the potential hazard to rescuers.
- 2) Call 9-911 (or 286 in the School of Medicine) if immediate medical attention is required.
- 3) Call 725-9999 (or 286 in the School of Medicine) to report the exposure to EH&S.
- 4) Administer first aid as appropriate.
- 5) Flush contamination from eyes/skin using the nearest emergency eyewash/shower for a minimum of 15 minutes. Remove any contaminated clothing.
- 6) Bring to the hospital copies of SDSs for all chemicals the victim was exposed to.

2. Non-Health-Threatening Emergencies

A. Injuries and Exposures

For injuries and exposures that are not considered [serious or a medical emergency](#), call the Occupational Health Center (OHC) at 725-5308 between 8:00 am-5:00 pm M-F at (650) 725-5308 for immediate phone triage and to schedule an appointment. For [urgent conditions](#) when SUOHC is closed, go to the Stanford University Medical Center Emergency Department.

B. Spills

For hazardous material spills or releases which have impacted the environment (via the storm drain, soil, or air outside the building) or for a spill or release that cannot be cleaned up by local personnel:

- 1) Notify Stanford University responders by calling 725-9999 (or 286 in the School of Medicine). These services are available 24 hours a day, 7 days a week.
- 2) Provide local notifications (local notifications are listed at the end of this section).

3. Local Cleanup of Small Spills

In the event of a minor spill or release that can be safely cleaned up by local personnel using readily available equipment (absorbent available from EH&S in Small Spill Kit) and laboratory PPE:

- 1) Notify personnel in the area and restrict access. Eliminate all sources of ignition.
- 2) Review the SDS for the spilled material, or use your knowledge of the hazards of the material to determine the appropriate level of protection (do not clean up spills requiring respiratory protection locally).
- 3) Wearing appropriate personal protective equipment, clean up spill. Collect spill cleanup materials in a tightly closed container. Manage spill cleanup debris as hazardous waste.
- 4) Submit online waste pickup request to EH&S.
- 5) Reporting Requirements: All spills cleaned up locally must be reported if they occur outside of secondary containment. A spill that occurs within secondary containment (a laboratory hood is

considered secondary containment) must be reported if it is greater than 30 ml or if it takes longer than 15 minutes to clean up. To report a spill, call EH&S at 725-9999 (or in the School of Medicine, x286) as soon as possible.

4. Lab-Specific Procedures

[This section is for any emergency procedures different from standard responses, or for additional emergency information due to the nature of materials or task. Include information on gas leaks, chemical spills, and personal exposure/medical emergency as appropriate.]

5. Building Maintenance Emergencies

Call Facilities Operations at 723-2281 (or 721-2146 in the School of Medicine) for building maintenance emergencies (e.g., power outages, plumbing leaks).

6. Local Notifications

[Identify the area management staff that must be contacted and include their work and after-hours numbers. This must include the principal investigator and may include the lab safety coordinator, facilities manager, and/or business manager.]

#8

WASTE DISPOSAL

[Describe the quantities of waste you anticipate generating and appropriate waste disposal procedures. Include any special handling or storage requirements for your waste. Contact EH&S at 723-0448 for questions and additional guidance.]

#9

TRAINING REQUIREMENTS

General Training *(check all that apply):*

- General Safety & Emergency Preparedness (EHS-4200)
- Chemical Safety for Laboratories (EHS-1900)
- Compressed Gas Safety (EHS-2200)
- Biosafety (EHS-1500)
- Life Sciences Research Laboratory Safety Training (EHS-4875)
[In the School of Medicine, EHS-4875 is required for laboratory personnel in lieu of EHS-1900, 2200, and 1500.]
- Other: _____

[Depending on the hazardous materials and processes you will be working with in this SOP, additional safety training may be required by the University. To evaluate if additional safety training is required, go to

<http://web.stanford.edu/dept/EHS/prod/training/index.html>.]

Location Where Records Maintained:

Laboratory-specific training *(check all that apply):*

- Review of SDS for chemicals involved in process/experiment

- Review of this SOP
- Other: _____

Location Where Records Maintained:

#10

PRIOR APPROVALS

[You **must** seek prior approval from your principal investigator (PI) or lab supervisor if you plan to use **restricted chemicals** (dimethylmercury and toxic gases regulated by Santa Clara County).

You should also consult your PI or lab supervisor if your experiments involve **high-risk chemicals and operations**, as special safety precautions may need to be taken. High-risk chemicals and operations may involve chemicals with a high level of acute toxicity, carcinogens, reproductive toxins, and highly reactive materials. For additional guidance, see section 5.3 of the Chemical Hygiene Plan.

Your PI or lab supervisor's prior approval may be documented by his/her signature in the Approval Signature section of this document. For granting prior approval to individuals other than the procedure author, use one of the methods described at <http://web.stanford.edu/dept/EHS/cgi-bin/lcst/restricted-chemicals-high-risk-procedures/>.]

Prior Approval (*check if applicable*):

- Prior approval from the PI or lab supervisor is required for this procedure

References & Resources

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For Room:	Room Phone:	
Building:	Department:	Date:

EMERGENCY ACTIONS FOR HAZARDOUS MATERIALS INCIDENTS

FIRES & HEALTH-THREATENING HAZARDOUS MATERIAL RELEASES CALL 9-911

INCLUDES ALL COMPRESSED GAS CYLINDER LEAKS OR VALVE FAILURES

Activate fire alarm. Close door to laboratory or room.

Evacuate the area or building. For building evacuations, go to the Emergency Assembly Point (EAP) at

Administer first aid. For chemical spills, remove clothing from victim and deluge contaminated area with water for at least 15 minutes or until emergency personnel arrives.

Notify area management and staff identified below. Brief arriving personnel.

RELEASES OR INCIDENTS NOT IMMEDIATELY HEALTH THREATENING CALL 5-9999

**USE THIS EH&S 24-HOUR NUMBER TO REPORT
CHEMICAL, RADIATION, and OTHER HEALTH AND SAFETY INCIDENTS**

Leave the area. Close door. Contain or clean up the spill ONLY if you are trained to do so.

Notify area management and staff identified below. Brief arriving personnel.

Area Management and Staff	Room	Work Phone	Emergency Phone (No pagers)
Lab Contact, or person most familiar with location			
Principal Investigator, or person responsible for location			
If above unavailable, Business Manager or Supervisor			

Emergency Building Maintenance: Call Facilities Operations (3-2281)

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STANFORD UNIVERSITY Laboratory Chemical Waste Guidelines



Hazard Awareness

How well do you know waste & chemical properties?



Corrosive (Acids and Bases): Materials that corrode skin or metal. **Examples: Hydrochloric Acid, Sodium Hydroxide**



Flammable (and Combustible): Materials that readily ignite and burn vigorously. **Examples : Alcohols, Acetone, Ethers, Acetic Acid**



Oxidizer (and Organic Peroxides): Materials that release oxygen readily to stimulate the combustion of organic matter. **Examples: Concentrated Hydrogen Peroxide, Potassium Permanganate, Bleach**



Air or Water Reactive (and Pyrophorics): Materials that react violently with air or water. **Examples: Zinc Dust, Magnesium Metal**



Toxic (Poisons, Carcinogens, Mutagens): Materials that contain a known carcinogen or known mutagen; exhibit oral toxicity; contain toxic metals or pesticides, or are toxic to aquatic species. **Examples: Mercury, Ethyl Acetate, Formaldehyde, Ethidium Bromide**

For regulatory reasons, chemical wastes that are not clearly in one of the above categories, and are not listed on the Stanford nonhazardous waste list should be considered toxic.

nonhazardouswaste.stanford.edu

Hazardous Materials are Never to be disposed of in the sink nor intentionally evaporated!



Note: This poster contains important regulatory information about hazardous materials and hazardous wastes that every laboratory worker is required to know. You may be asked to demonstrate your knowledge of these subjects by City, County or State inspectors.

Handling Laboratory Wastes

A laboratory chemical becomes a waste when you no longer intend to use or reuse the chemical.

Laboratory wastes may be accumulated in laboratories for up to 9 months.

An on line waste tag can be created and printed for your use wastelabel.stanford.edu

Submit a pickup request on line at wastepickup.stanford.edu

as soon as the container is full or 8 months after the initial accumulation, whichever comes first.



All laboratory waste containers must be:



- in good condition with no leaks or cracks,
- kept closed except when adding waste,
- segregated from other incompatible wastes,
- stored in clean and compatible secondary containment, and
- affixed with a fully completed hazardous waste label.

All laboratory chemical waste must be managed as hazardous waste unless it is listed on the Stanford University Non-Hazardous Waste List.



- See: nonhazardouswaste.stanford.edu
- Follow instructions from the list for other disposal options such as drain disposal for non-hazardous wastes.

Spill Response

Call 725-9999 for cleanup assistance of spills if:



- the spill is not contained in a hood or on a lab bench, **and**
- in your judgement, the spill may result in an environmental impact by entering a sink or floor drain, or by contaminating soil, or by producing personnel inhalation hazard, **or**
- you cannot complete cleanup within 15 minutes.

You do not need to call EH&S for assistance if:



- the chemical spill is less than 1 ounce, **and**
- you are knowledgeable of the hazards of the material, **and**
- you can clean it up using available spill response and personal protective equipment.

- Report to EH&S if you clean up a spill of less than 1 ounce yourself and it takes longer than 15 minutes.
- For cleanup of small spills that do not involve immersion in liquids or risk of overexposure, use laboratory protective equipment available for routine handling of the material (including appropriate gloves and eye protection).
- All contaminated spill cleanup materials must be managed as hazardous waste.

Accident Response

Emergency Response for Accidents Involving Hazardous Materials

If the accident is a fire, explosion, or health-threatening:

- call **9-911** for emergency assistance, **and**
- alert people in the vicinity, **and**
- evacuate the area, **and**
- remain nearby to provide information to emergency personnel.

In case of eye or skin contact with hazardous chemicals,



- immediately flush the affected area with water for 15 minutes
- use a safety shower/eyewash for any eye exposure and in cases of serious skin exposure.
- contact EH&S for all injuries at 650-723-0448

Contact Environmental Health & Safety (650) 723-0448
ehs.stanford.edu

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Biohazardous and Medical Waste Disposal Guidelines



ITEMS REQUIRING DISPOSAL

PROPER DISPOSAL METHOD

SHARPS



All:
Blades (scalpels, razors)
Pasteur pipets
Hypodermic needles with attached:
•Syringes (barrels and plungers)
•Tubing

Never remove needles from syringes!

Sharps Container



Biohazard waste

CULTURES AND DISPOSABLES



Contaminated:
Petri dishes
Disposable culture & tissue flasks
Materials (paper towels, kim wipes, etc.)

See below for disposing of blood and body fluids.

If culture is **NOT Biohazardous (BSL-1)**

Red bag in hard-sided leak proof container with biohazard symbols on all sides and top



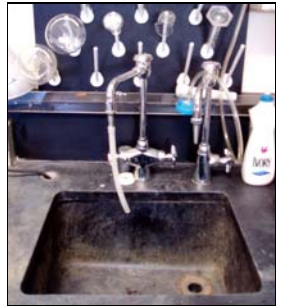
Biohazard waste

Contaminated liquid waste in container

Container with liquid removed

Decontaminate liquid

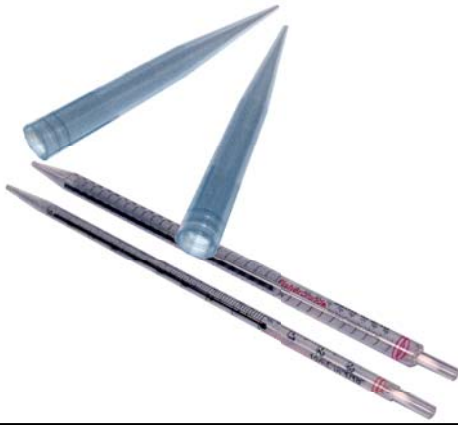
Dispose liquid into sewer using running water



Regular trash



PIPETETS



Contaminated Pipette Tips
Disposable Pipets

Red bag in hard-sided leak proof container with biohazard symbols on all sides and top



Biohazard waste

Non-contaminated Pipette Tips
Disposable Pipets

Regular trash



GLASS



Contaminated Broken and unbroken glass

Sharps container



Biohazard waste

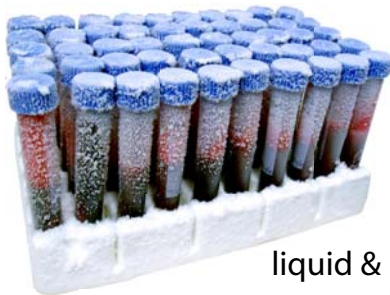
Non-contaminated Broken and unbroken glass

Broken glass container



Recycling

BLOOD & BODY FLUIDS



All:
human blood
animal blood
blood elements
body fluids
liquid & semi-liquid materials

Dilute with bleach 1:10 (final concentration = 0.5% sodium hypochlorite)

or
Autoclave (do not add bleach if autoclaving)



Dispose into sewer using running water



ANIMAL BODIES



Version 2.2009

All: Contaminated Animal carcasses & body parts

Red bag in hard-sided leak proof container with biohaz symbol



Research Animal Facility (RAF) refrigerators

Uncontaminated Animal carcasses & body parts

Black bag



(RAF) refrigerators

Radioactive Animal carcasses & body parts

Label bag exterior with approved radiation sticker

(RAF) radioactive freezer

CHEM AND RAD



All: Biohazardous material with chemical contamination

Call EH&S Chem Waste 5.7520

Biohazardous material with radioactive contamination

Call EH&S Radiation Waste 3.3765

Do not use needle clippers or cardboard pipet envelopes for sharps disposal.

For biohazardous waste, do **not** use **orange** or clear autoclave bags.

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STANFORD UNIVERSITY

ENVIRONMENTAL HEALTH & SAFETY

Lab Compliance Cheat Sheet

While not inclusive, the following items are lab violations commonly cited by the County of Santa Clara during hazardous materials inspections

Questions? Contact Safety & Compliance Assistance at 723-0448



HAZARDOUS CHEMICAL WASTE DISPOSAL: Waste tags must be attached to hazardous chemical waste containers when the first drop of waste is collected. Waste tags are created using the Online Chemical Waste Manager at <http://wastetag.stanford.edu>. Check your waste tags periodically. When **full or no more than eight months** past the accumulation date, submit a pickup request through the Online Chemical Waste Manager. If you are still using pre-printed paper waste tags for your waste containers, submit an online pickup request for these items through <http://wastepickup.stanford.edu>. All waste containers must be kept closed except when adding waste. Funnels must be removed after use and the waste container immediately recapped. If you are unsure whether a material is sewerable or can be thrown into regular trash, contact EH&S. If the material is poured down the drain or thrown into regular trash and is later determined to be hazardous, that is illegal disposal. Don't do it!



LABELING: All containers must be labeled with their full chemical name in English (example: label "methanol" and not "MeOH"). There are limited exceptions: (1) If the container holds a nonhazardous buffer with pH 5.5-11 you may use the buffer abbreviation (example: PBS, TRIS, HEPES). (2) If the contents are a manufactured product with a trade name you may use the trade name (example: Zaclon ZR flux). If you plan to reuse a chemical, do not label the container with words such as "used" or "dirty" as this invites the inspector to ask whether it is waste. Instead label the bottle with "for reuse" next to the full chemical name (example: acetone - for reuse).



CHEMICAL STORAGE: All hazardous chemicals must be stored in secondary containment and segregated according to chemical compatibility. Example: Containers of bleach (storage group E), ammonia (storage group C), and ethanol (storage group L) must be in secondary containment and segregated from each other. For more information, refer to the Stanford Storage Group System on the EH&S website <http://ehs.stanford.edu>. Containers must be structurally sound or the contents must be transferred to another container and labeled with the full chemical name in English.



FLAMMABLE LIQUID STORAGE: Store flammable liquids in flammable cabinets. In some areas, the California Fire Code permits storage of small quantities of flammable liquids outside flammable cabinets. Contact the Stanford University Fire Marshal's Office for additional guidance.



LEAKS INTO SECONDARY CONTAINMENT: Must be cleaned up immediately (example: standing oil from a leaking vacuum pump).



RAGS & TOWELS USED TO CLEAN UP CHEMICAL SPILLS: Rags and towels used to clean up hazardous material spills, including vacuum pump oil, become hazardous waste and must be disposed of as such. Do not throw into the regular trash.



GASES ON YOUR INVENTORY: All compressed gas cylinders and liquefied gas dewars must be listed on the online chemical inventory system (ChemTracker) for the room in which they are stored. The

reported amount must be equal to or greater than the amount stored in the lab. For ChemTracker access, submit a help ticket to <http://chemtrackerhelp.stanford.edu>.



RESTRAINTS FOR GAS CYLINDERS & DEWARS: Gas cylinders >26" tall must be restrained by metal chains at 1/3 and 2/3 the cylinder height. A maximum of two cylinders can be restrained together. Dewars must be restrained at one point. This applies to in-use, stored, and empty cylinders and dewars.



REFRIGERATORS & FREEZERS: Incompatible hazardous materials stored in refrigerators and freezers, including their doors, must be secondarily contained. Flammable and combustible materials may only be stored in refrigerators and freezers rated for flammable storage. Domestic refrigerators and freezers are not designed nor approved for this type of storage.



ETHIDIUM BROMIDE: If the ethidium bromide you use is over 0.4 weight percent, it must be handled as hazardous waste. Know the concentration of the ethidium bromide you work with; you may be asked this by an inspector.



FLUORESCENT & UV LAMPS: These items are universal waste and cannot be thrown into regular trash or broken glass boxes. Place in a hard-sided container, label as "universal waste," identify what the contents are, and indicate the date that you are designating it as waste. Contact your building's facilities coordinator for disposal. The lamps must be removed from labs no more than nine months past the date you first designated them as universal waste.



USED BATTERIES: Used batteries cannot be collected in labs, even on a temporary basis. Please bring your used batteries to one of the many battery recycling drop-off locations. To find the one nearest you, visit <http://batterybuckets.stanford.edu>.



EMERGENCY EYEWASHES & SAFETY SHOWERS: Do not store boxes or equipment adjacent to or under eyewashes and safety showers. This presents a danger to you and other lab personnel should you or they need to access the eyewash or safety shower during an emergency. The Stanford Plumbing Shop tests all campus eyewashes and safety showers monthly. If Plumbing Shop personnel cannot access an eyewash and safety shower and must return for additional attempts, your laboratory may be charged for these repeat visits.

Should be used in conjunction with specific storage conditions taken from the manufacturer's label and MSDS.

STORAGE GROUPS

Store chemicals in separate secondary containment and cabinets

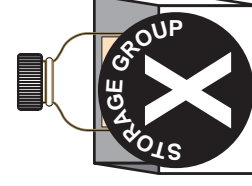
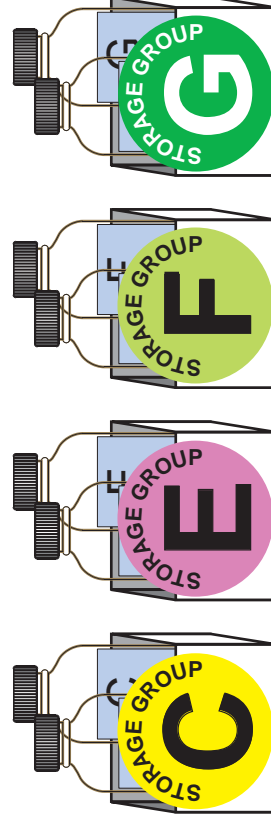
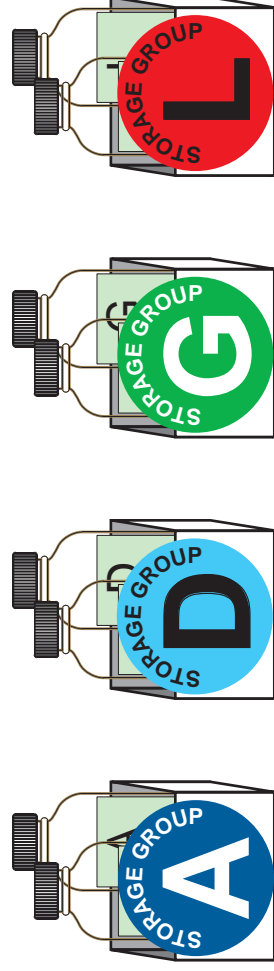
Find Storage Group information in Chemtracker:

<https://chemtracker.stanford.edu/chemsafety>

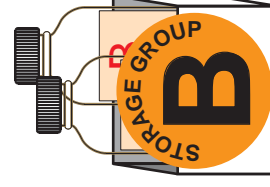
- A** Compatible Organic Bases
- B** Compatible Pyrophoric & Water Reactive Materials
- C** Compatible Inorganic Bases
- D** Compatible Organic Acids
- E** Compatible Oxidizers including Peroxides
- F** Compatible Inorganic Acids not including Oxidizers or Combustible
- G** Not Intrinsicly Reactive or Flammable or Combustible
- J*** Poison Compressed Gases
- K*** Compatible Explosive or other highly Unstable Material
- L** Non-Reactive Flammable and Combustible, including solvents
- X*** Incompatible with ALL other storage groups

***Storage Groups J, K and X: Contact EH&S @ 3-0448
For specific storage - consult manufacturer's MSDS**

If space does not allow Storage Groups to be kept in separate cabinets the following scheme can be used with extra care taken to provide stable, uncrowded, and carefully monitored conditions.



Storage Group X must be segregated from all other chemicals.

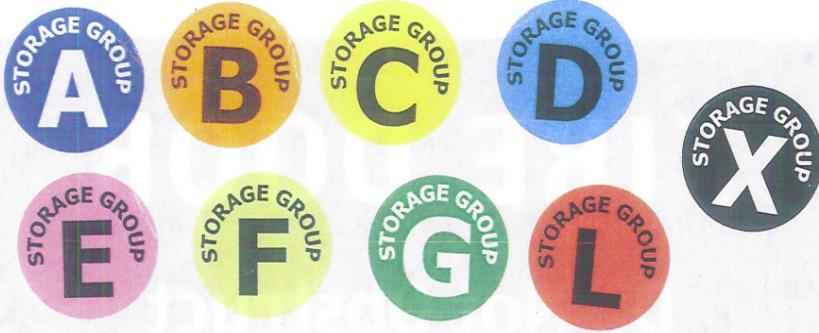


Storage Group B is not compatible with any other storage group.

Recommended Storage Groups for Common Chemicals

CHEMICAL	Group	Ethylene Glycol	L	Propylene Oxide	L
1-Butanol or 2-	L	Ficoll	G	Pump Oil	L
1-Propanol	L	Formaldehyde	L	Pyridine	A
2-Mercaptoethanol	L	Formamide	L	SDS (Sodium Lauryl Sulfate) (in solution G)	L
Acetic Acid, Glacial (flammable)	D	Formic Acid (88%)	D	Sigmacote	L
Acetic Anhydride	L	Geopen	G	Sodium Acetate	G
Acetone	L	Glutaraldehyde	G	Sodium Azide	X
Acetonitrile	L	Glycerol	L	Sodium Bicarbonate	G
Acetaldehyde	L	Glycine	G	Sodium Bisulfate	G
Acrolein	L	Guanidine Hydrochloride	G	Sodium Bisulfite	G
Acrylamide	G	Guanidine Thiocyanate	C	Sodium Borate	G
Agarose	G	Halothane, Isoflurane	G	Sodium Borohydride	B
Ammonium Acetate	G	HEPES	G	Sodium Carbonate, Anhydrous	G
Ammonium Chloride	G	Hexanes	L	Sodium Chlorate	E
Ammonium Formate	G	Hydrochloric Acid	F	Sodium Chloride (NaCl)	G
Ammonium Hydroxide	C	Hydrogen Peroxide, 90%	E	Sodium Citrate, Dihydrate	G
Ammonium Nitrate	E	Hydrogen Peroxide, <5%	G	Sodium Dichromate, Dihydrate	E
Ammonium Persulfate	E	Imidazole	A	Sodium Hydroxide (NaOH)	C
Ammonium Sulfate	G	Isobutyl Alcohol	L	Sodium Hypochlorite	E
Ammonium Sulfide	L	Isopentane	L	Sodium Hypochlorite solution (i.e. Bleach)	G
Benzene	L	Isopropanol	L	Sodium Phosphate	G
BIS & BIS-Acrylamide	G	Magnesium Chloride	G	Sodium Sulfide, Anhydrous	B
BIS TRIS	A	Magnesium Sulfate	G	Succinic Acid	D
Borax	G	Maleic Acid	D	Sucrose	G
Boric Acid	G	Methanol	L	Sulfuric Acid	F
Calcium Chloride	G	N-Methyl-2-Pyrrolidone	L	Tannic Acid	D
Chloroform	G	N,N Dimethylformamide	L	TEMED	A
Chromerge	E	Nitric Acid	E	TES free acid	G
Citric Acid	D	P-Dioxane	L	Tetracycline	G
Coomassie Blue	G	Paraformaldehyde	L	Tetrahydrofuran	L
Dextrose	G	Perchloric Acid	E	Trichloroacetic Acid	D
Dichloromethane	G	Periodic Acid	E	Toluene	L
Diethylamine (flammable)	A	Permout	L	Triethanolamine	A
Diethyl Pyrocarbonate	L	Phenol	L	TRIS	A
Dimethyl Popop	G	Phosphoric Acid	F	Triton X-100	G
Dimethyl Sulfoxide (DMSO)	L	Picric Acid dry (<10% H ₂ O)	K	Trizol	L
Drierite	G	Picric Acid moist (10-40% H ₂ O)	X	TWEEN 20	G
EcoLume, UniverSOL, BetaMax, CytoScint, Scintisafe, Econo-Safe, Ecoscint, Opti-fluor	L	Picric Acid soln (1-4%)	X	Urea	G
EDTA (in solution G)	D	Piperidine	A	WD-40	L
Ethanol	L	Pipes, Free Acid	G	Xylenes	L
Ethanolamine	A	Potassium Acetate	G	Zinc Chloride	G
Ethers	L	Potassium Chloride	G		
Ethidium Bromide	G	Potassium Cyanide	C		
Ethyl Acetate	L	Potassium Hydroxide (KOH)	C		
		Potassium Phosphate	G		
		PPO	G		
		Propionic Acid	D		

Environmental Health & Safety Stickers



Surplus
Date _____

**NO FOOD
OR DRINKS**

**FOOD AND
DRINKS ONLY**

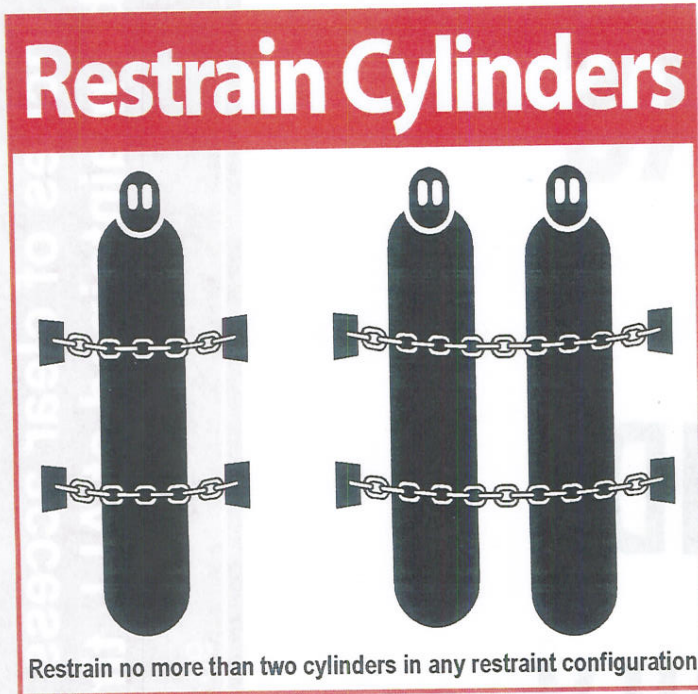
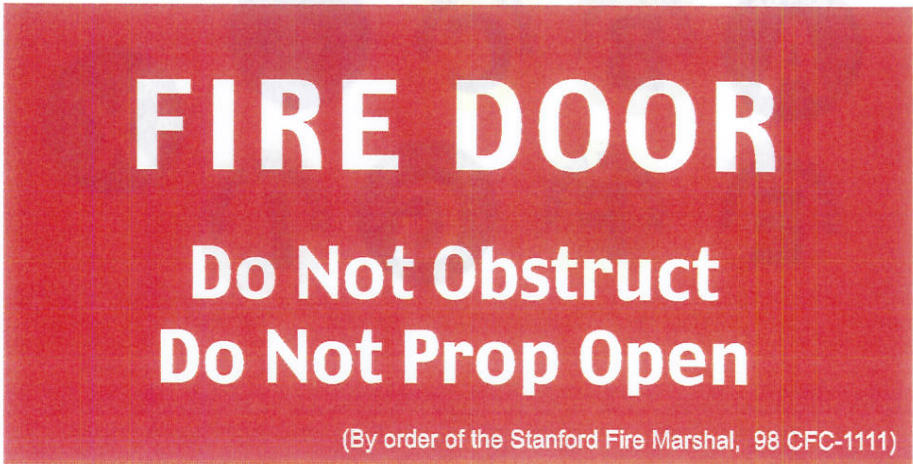
DO NOT BLOCK ELECTRICAL PANEL

30 inches of clear access
must be maintained at ALL times

98 CFC 8509.2

Stickers are available from Stanford EH&S
Call (650) 723-0448 for more information

Environmental Health & Safety Stickers



Secure up to two cylinders with TWO chains at 1/3 and 2/3 height



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