Tier 1 Lab Safety Review

Training

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Health, Safety and Environment

Objectives

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This trainings aims at helping the LSR's understand:

- The importance of laboratory safety review.
- The laboratory safety review process.
- How to check the lab spaces for hazards and potential risks.
- What to look for findings and how to correct them.

Why LSR's?

- LSR's are familiar with their lab spaces, the experimental design, lab users and the lab safety culture.
- LSR's are in the lab spaces most of the time.
- LSR's are the primary point of contact for HSE and the Principal Investigators.

How to perform Tier 1 Lab Safety Review

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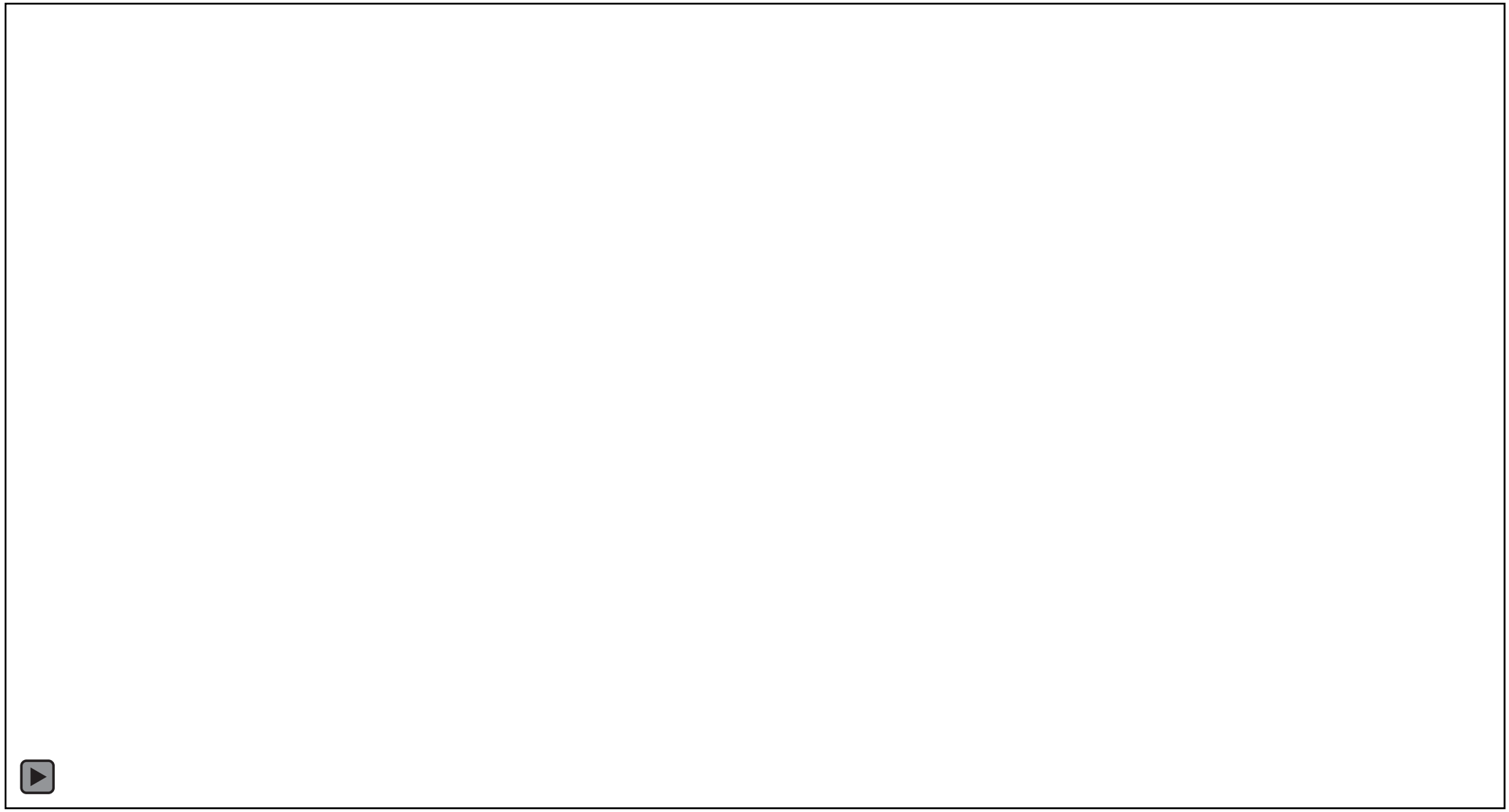

Output types

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- **Yes/ No/ N/A or C/S questions, where:**

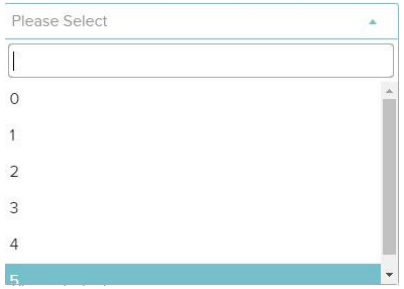
N/A stands for “Not applicable”

C/S stands for “Corrected on site”

- **Number of issues found, where:**

0 is for no issue found under that category

1 is for one issue found and so on



- **The last section about Safety Culture has options:**

“Never, Rarely, Sometimes, Often and Almost always”

How often to perform Tier 1 Lab Safety Review?

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- Once every three months is the minimal requirement.
- The required frequency can be increased based on HSE's review and risk categorization.
- The LSR's are encouraged to increase the assessment frequency as required / as preferred.
- LSR's can contact their building point of contact or send an email to hse.kaust.edu.sa for any advice or consultation.

What to do if there are findings?

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- Take corrective action yourself to address the issue immediately.
- Notifying the respective lab users.
- Using signs or labels as reminders.
- Contact HSE for guidance if required.
- Use as topics of discussion in the next lab / group meeting.
- Inform the faculty / supervisor of the continued issues with the respective individual(s) not complying with the lab safety requirements

What to look for in Tier 1 Lab Safety Review?

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1. **Engineering Controls**
   Biosafety cabinets, fume hoods, glove boxes, laminar flow hoods.

2. **Administrative Controls**
   Standard operating procedure, hazards signage, and training.

3. **Personal Protective Equipment**
   Availability and usage.

4. **Housekeeping**
   Corridor, storage, and tripping or slipping hazards.

5. **General Safety**
   (Biological, chemical, radiation) labeling, storage, and segregation, gas cylinders, electrical, and hazardous waste.

6. **Emergency Readiness**
   Spill kits, eyewash, first aid, AED, fire extinguisher, and sharps container.

7. **Safety Culture**

Engineering Controls

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What to look for

- Obvious maintenance issues
- Annual certification for biosafety cabinets and laminar flow hoods.
- Annual check for fume hoods.
- Flow sensor of the fume hood
- Damage of the sash of the fume hoods
- Holes in the gloves of the gloves boxes.
- The glove box alarms(leaks, Oxygen level, etc.)

Biosafety Cabinet

Laminar Flow

Fume Hood

Glove Box

Administrative Controls
What to look for

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Administrative Controls	What to look for
Standard Operating Procedures (SOP's)	• All SOP's for all hazardous biological, chemical, radiological and operations are available and updated. • Find more information in the Lab Safety Manual and in the SOP Webpage.
Lab Door Signage	• All primary hazards of the lab have been identified on the door signage, and all contact details valid and updated.
Training Requirements	• All researchers have completed the following mandatory HSE training: 1- HSE Emergency Incident Preparedness Training 2- Laboratory Safety Training 3- Hazardous Waste Training • All researcher have completed assigned specialized training

Personal Protective Equipment (PPE)

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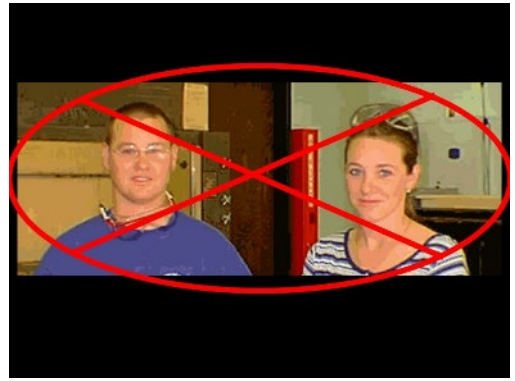
What to look for

- **Standard lab PPE are available (lab coats, safety glasses and appropriate gloves)**
  - **Additional specialized PPE based on activities**

Standard Lab PPE

- **PPE effectiveness – only effective if use correctly**
  - **Worn incorrectly: wearing safety glasses on the forehead/ around the neck, unbuttoned/ contaminated lab coats, gloves with holes**
  - **No PPE worn outside the lab**



Face shield / Safety goggles

Cryogenic gloves

Chemical apron/ boots

Respirators

Hearing protection

N95 respirators not protected against chemical gases/vapors & highly toxics

Housekeeping
What to look for

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Housekeeping	What to look for
General Housekeeping	• The lab benches, fume hoods, laminar flow hoods, biosafety cabinets etc. de-cluttered, wiped and free of waste or spills. • The waste bins being emptied regularly
Corridor(service, circulation, and Exit)	• The floor is cleaned and free of clutter or spills. • Nothing blocking emergency exit signs, lights, fire alarm devices, or warning devices. • 1.5 meters egress is maintained consistently throughout the corridor.
Storage	• 0.5 meters (18 inches) clearance from the ceiling. • No excessive amount of combustible items such as cardboard. • Storing items on pallets or on the floor is only allowed temporarily for 30 days. • No hazardous material usage or storage in the circulation corridor. • No chemical storage in the circulation corridor. • No storage of any kind is permitted in the exit corridor.
Chemical and Heavy items storage	• No heavy items stored overhead • No corrosive chemicals stored above eye level • Chemicals storage on cabinets or on lower shelves
Tripping or slipping hazard	• The floor is free of electrical strips • The floor is free of any obstacles might cause tripping or falling. • The floor is free of any spill or liquid that cause slipping.

Housekeeping

What to look for

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Housekeeping

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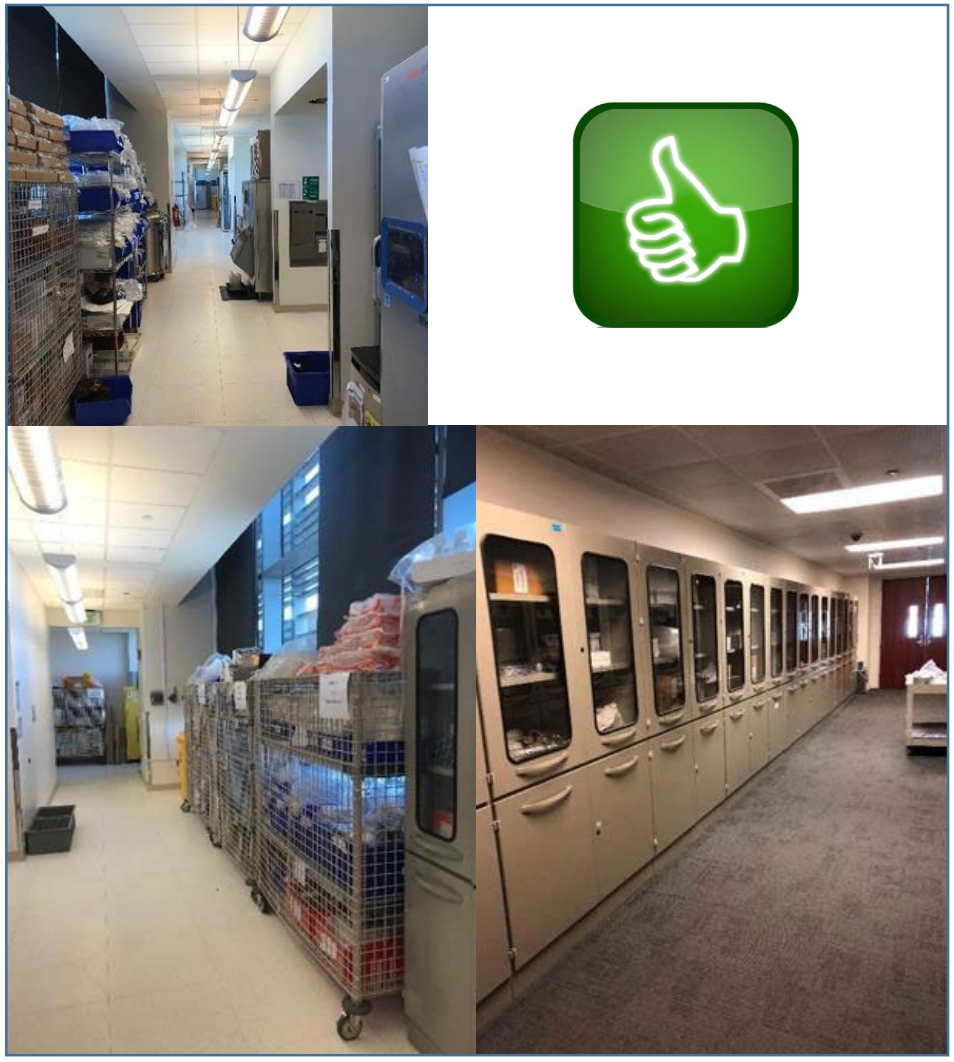

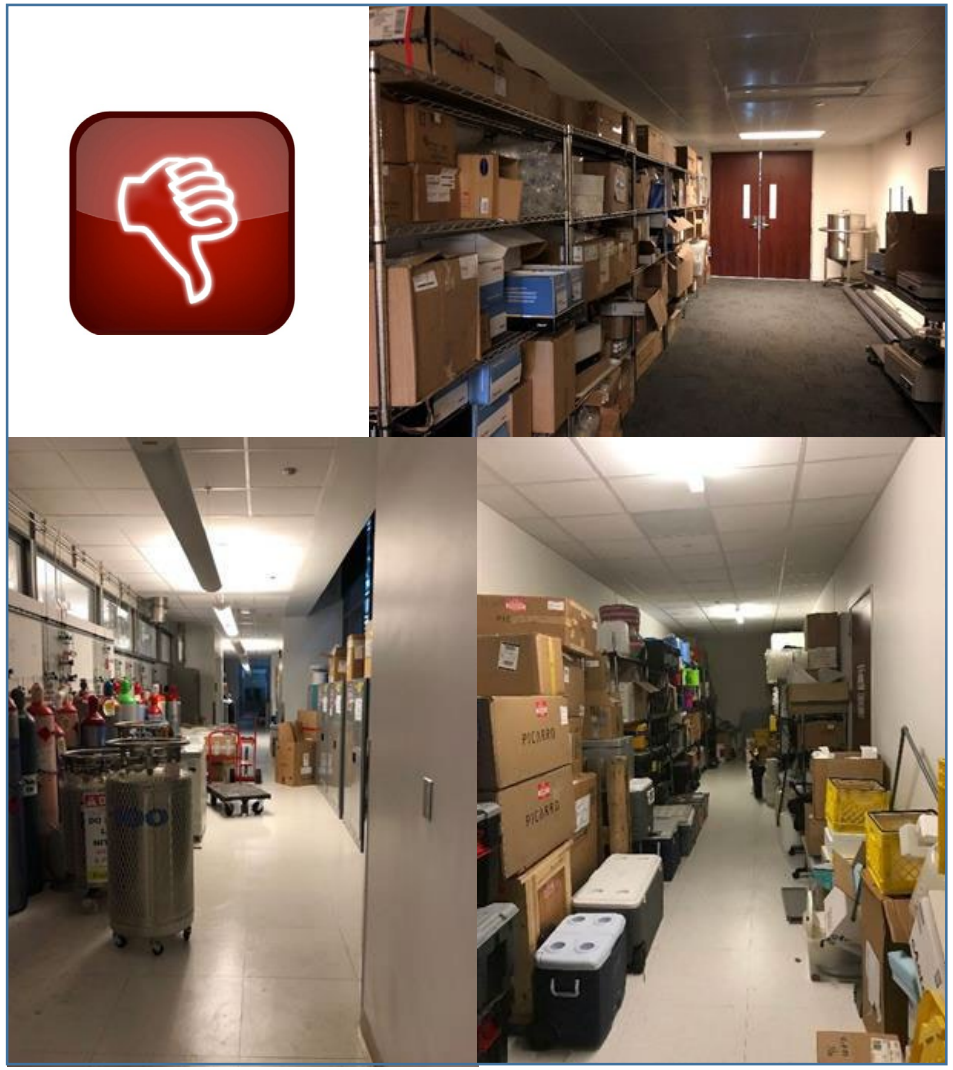

General Safety
What to look for

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General Safety	What to look for
Materials (bio, chemical, rad) are labelled, stored, and segregated properly	• Materials segregated based on type and hazard class. • Materials labeled clearly in English. • Visible abbreviation key available if abbreviations or formulas used. • Secondary containers in use to store materials.
Bench top samples are labelled and stored properly	• Samples placed on bench top are labeled clearly in English. • Samples are capped and stored away of bench edge.
Gas cylinders are secured and labeled	• Cylinders secured to a sturdy object. • chain or strap is tighten. • Chain or strap placed in the upper 1/2 of the cylinder and not around the cap or valve. • Cylinders are labeled with content.
Power strips off floor and no exposed wiring or damaged electrical cords	• No power strips plugged to each other. • No exposed wiring or cords. • Cords in a good condition. • Power strips placed off the floor.
Hazardous waste containers are closed, labeled and stored correctly.	• Hazardous waste container is closed. • Hazardous waste container is labeled as “hazardous waste” and with the contents. Correct bags are used in correct bin

General Safety

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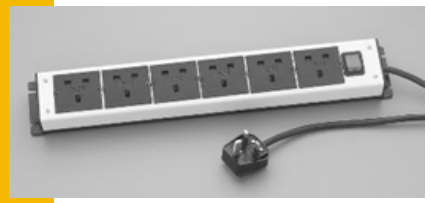
This lab is well organized, chemicals are labeled, benches are not cluttered, the overall condition would be considered very good.

This lab is starting to show some clutter on the benches and in the fume hood, but would still be considered acceptable.

These chemicals are not segregated properly – there are strong acids being stored next to strong bases, and oxidizing acids (nitric acid) being stored with flammable liquids.

Worn Cable and two strips plugged together can cause a serious incident

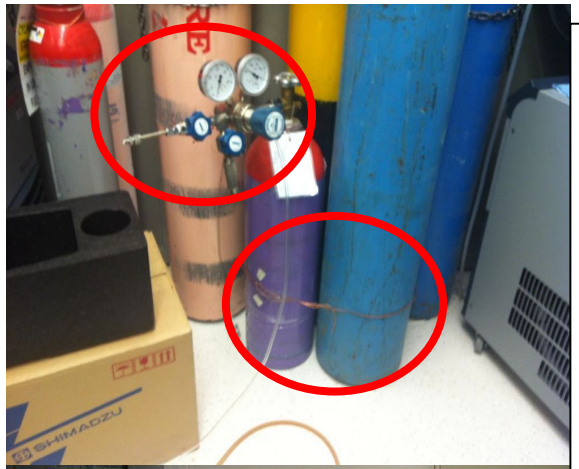
General Safety



Correct type of power strip and adapter, all are available in the chemical warehouse

Ensure proper fit and no gas leakage before use, empty cans stay in fume hood before dispose.

This flammable chemical is stored above eye level, and sitting on the edge of the shelf. It should be stored under a fume hood or in a flammable cabinet.



The copper wire is not strong enough to secure the cylinders.

Restraints should be half way or higher on the cylinder.

Regulators need to be removed and replaced with a cap when the cylinder is not in use.

Emergency Readiness
What to look for

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Emergency Readiness	What to look for
Spill kits	• The right spill kits are available, and free of obstructions.
Eye wash	• Eyewash is functioning, free of obstructions, and checked weekly.
First Aid	• First aid is accessible and available with no expired items.
Sharps and broken glass containers	• Sharp container is available and labeled. • Sharp container is not excessively full.
Fire extinguisher	• The right type of fire extinguisher is available, charged and checked.

Safety Culture
How to assess

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Safety is everyone's responsibility, it is a combination of essential beliefs, value, and pattern of behaviors that we all share. In order to mitigate the risks in the laboratory and to reduce the harms and damages resulted from accidents and incidents. Laboratory incidents often result from a lack of attention to safety issues, here is some tools and behaviors that helps us to develop a safety culture.

Safety Culture	How to assess
Safe work practices	• Users take safety measures while conducting experiments. • Users ask about the best way to operate safely. • Users care about safety regulation while working.
Safety requirements communication	• PI or LSR discuss safety requirements with users. • Safety requirements discussion among users.
incidents or near misses communication	• Are incidents events communicated with users. • Are events that could cause an incident communicated with users.
Safety review	• Do users review potential hazards before starting a new experiment. • Do users discuss safety measures prior to new experiment.

Thank you