

1. LABORATORY SAFETY SURVEY CRITERIA

The following are minimum laboratory essential criteria:

a. Emergency Phone Numbers

Must be clearly and visibly posted. Emergency phone numbers and emergency procedures are also printed on the back cover of the Laboratory Chemical Storage Guidelines Book that all labs have.

b. Appropriate Warning Signs Posted

- i. NFPA 704 fire diamond should be posted outside of laboratories for use by firefighters in emergency conditions. The green placard that the diamond is mounted on will also have indications of chemical reactivity factors, and the names and telephone numbers of responsible laboratory personnel.
- ii. Laboratories that utilize radioactive materials must also be posted with radiation warnings.
- iii. Researchers working with or storing biosafety level 2 or higher organisms should also label the laboratory with the universal biohazard warnings.

c. Food or Drink Rules

- i. No food or drink is allowed in any laboratory
- ii. Application of cosmetics in a laboratory is prohibited.
- iii. Smoking is prohibited in laboratories and in all buildings that house laboratories.
- iv. Ice in the ice machines in science/research facilities is not safe for human consumption and is placarded as such.

d. Material Safety Data Sheets (MSDS)

MSDS must be on hand or on order for all chemicals within the lab. They should be maintained in a single binder or location, and be available to all employees within the lab, and for individuals reviewing lab safety procedures.

e. Ventilation of Laboratories

- i. Laboratories must be areas of controlled occupational exposure regarding indoor air quality (IAQ).
- ii. Fume hoods or bio safety cabinets are to be utilized as controlled areas for applicable experimentation.
- iii. Laboratories must be maintained under negative air conditions.

f. Fire Extinguishers

- i. Fire extinguishers must be charged and inspected.
- ii. Live fire extinguisher training is available through TJU.

g. Paths Of Egress

- i. It is imperative that all laboratories have unobstructed means of egress.

h. Electrical/Gas Safety Issues

i. Electrical

- 1. Electrical cords must be of good condition. Repair with electricians' tape is not acceptable.
- 2. Cheater plugs are not authorized.
- 3. Access to electrical sources must be kept clear of obstructions.
- 4. There must be no visible overloading of electrical circuits. (Multi outlet adapters are discouraged)
- 5. All electrical equipment must be appropriately grounded.

ii. Gas

- 1. Bunsen burners and burner tubing must be routinely inspected and free of defects.
- 2. Access to gas shut offs must be kept free of obstructions.

i. Compressed Gas Cylinders

Compressed Gas Cylinders must be appropriately secured. All compressed gas cylinders inclusive of lecture bottles, EMPTY CYLINDERS, and cylinders in transit, must be secured. Cylinders are appropriately secured by a number of means including clamps and straps, chains, straps, stands, racks, and any acceptable means that eliminates the possibility of tipping over of a tank.

j. Personal Protective Equipment (PPE)

- i. The individual responsible for the laboratory is also responsible for insuring that adequate PPE is on hand and in good condition for use by lab workers. This applies to all students in teaching laboratories. Accordingly, it will be the responsibility of the laboratory supervisor, P.I., or the TA in charge to insure that PPE safety standards are enforced.
- ii. PPE will include at minimum, but not be limited to:
 - 1. Gloves appropriate for type of research conducted are required
 - 2. Lab coats/aprons are required

3. Safety glasses/goggles and face shields are required
4. Long sleeved clothing and long trousers/slacks to cover as much skin as possible is encouraged.
5. Short pants, skirts, and dresses are prohibited.
6. Open toed shoes/sandals are prohibited. Solid rubber soled shoes are encouraged.
7. All PPE should be removed upon leaving the lab to minimize contamination both outside as well as in the lab.

l. Machine Guarding

Machines and equipment with rotating gears, belts, and or functions that may allow entrapment of fingers, hair, clothing, etc. must be guarded. (i.e. vacuum pumps).

m. Proper Labeling of Chemicals

All chemicals in laboratories must be labeled with hazard information inclusive of chemical nomenclature, physical and health hazard information and manufacturer. (NOTE: Chemical symbols by themselves do not satisfy OSHA standards, and the common nomenclature must appear on the container regardless of chemical symbol).

n. Segregation of Chemicals

Stored chemicals must be separated and stored based upon compatibility and reactivity. (i.e. separate acids from bases, flammables from oxidizers, and reactives from air or water). Please see Chemical Storage Guidelines distributed to all labs.

o. Refrigerator Storage

- i. Do NOT store food or other personal items in the refrigerators.
- ii. Do not store flammables in refrigerators.
- iii. Explosion proof and flammable refrigerators and/or freezers are to be utilized only for the intended purpose stated by the manufacturer.

p. Physical Storage of Chemicals

- i. Do not store chemicals on shelves above eye level.
- ii. Do not store chemicals in fume hoods as bulk storage in hoods impedes airflow.
- iii. Store flammables in flammable storage cabinets.
- iv. Do not store chemicals or chemical waste on floors unless they are in secondary containment.

v. Avoid storing chemicals in direct exposure to sunlight, excessive heat, or excessive cold.

vi. Review MSDS for storage specifics.

q. *Chemical Waste*

i. Ensure that all chemical waste containers are kept closed, appropriately marked and labeled to include start date of collection.

ii. Outdated, expired, and/or unknown chemicals must be disposed of as waste through coordination with the HSP waste disposal protocols.

iii. Chemicals that may no longer be used, or of questionable purity, or that are past expiration date should be removed from the labs.

r. *Biological Waste*

Common methods for appropriate disposal include disinfecting, autoclaving, and for liquid disposal in the sanitary sewer. Be sure that the container is properly labeled, and decontaminated before disposal. Note the method of disposal for each liquid and solid waste. Observe that biohazard waste is stored in secondary containment.

s. *Sharps Disposal*

Contaminated sharps include needles, syringes, scalpels, exposed dental wires, broken glass if contaminated with human blood, and other potentially infectious material(s). These items must be collected in a sharps container or other puncture resistant container that is color coded or labeled with the universal biohazard symbol.

2. *INVENTORY AND INVENTORY CONTROL*

An inventory of chemicals stored and used in laboratories or storage areas must be completed annually. Quantities of chemicals received should be limited to what you reasonably need and not stored in large quantities. (It is important to minimize quantities ordered for amounts necessary only for given projected time frames in order to avoid over-ordering, excess chemical inventory, and problems with orphaned chemicals.)

3. *LABORATORY SELF AUDITS*

Safety self-audits of laboratories should be completed by primary investigators or their designated laboratory personnel annually.

4. *OTHER SIGNIFICANT SAFETY FACTORS*

It must be understood that this program, like any and all safety programs, must be a continual work in progress. Accordingly constructive criticism, recommended changes, and the requirement for periodic update are welcomed and encouraged. To make recommendations for change and or review, contact any one of the Safety Committee Team, or kimb@tju.edu.cn. It must also be realized that changes or updates in law, rules, regulations and standards that apply

to laboratory management and safety will be updated in this program, as these changes become known.

5. CONCLUSION

The safety of students, faculty, and staff personnel who work in, or take classes in laboratories must be a priority of all individuals in laboratories that utilize hazardous materials. Lab safety must be a constant and ongoing awareness issue. It is the responsibility of individuals who work in laboratories to be safety conscience and to insure that those that they work with are safety conscience as well. Mistakes in laboratories can result in loss of facilities, loss of research, and most importantly injury to employees and/or students and the possibility of loss of life.