Michigan State University
Department of Chemical Engineering and Materials Science (CHEMS)

Safety Documents

Contents

Definitions

This document uses the following terms.

- Laboratory – Space where physical experiments are conducted. Labs where only computations are performed are excluded.
- Laboratory worker – Personnel who have a working role in a laboratory, as defined above, whether or not they are executing experiments.
- Project Director (P.D.) – A supervisor or principal investigator with > 50% appointment in CHEMS or teaching a laboratory course.

Michigan State University
Department of Chemical Engineering and Materials Science

SAFETY TRAINING REQUIREMENTS

A. **Affiliates Working in Locations away from the East Lansing Facilities** require safety training and seminars provided by a safety officer at that location.

B. **Laboratory visitors who are not performing experiments** must always be accompanied by personnel who have completed the appropriate training, as specified below. These visitors do not require safety training, but must be provided appropriate personal protective equipment (PPE) for the visit.

C. **Staff and Plan B (nonthesis) MS students Not Working in the Lab** require
Hazard Communication – through https://ora.msu.edu/train - Once.

D. **Independent Study Students, Undergraduate Employees, Senior Thesis Students working in East Lansing Labs** require completion of all safety training below *PRIOR TO PERFORMING ANY LABORATORY WORK:*

Online Research Laboratory Security Training – through https://ora.msu.edu/train - Once,
Site-Specific Training – through https://ora.msu.edu/train - Annually,
Chemical Hygiene and Laboratory Safety – through https://ora.msu.edu/train - Once,
Hazardous Waste Refresher - Annually.

Examples of Site-Specific Training, if applicable:

Autoclave – Initial/Refresher	Compressed Gas Cylinder Safety – Once
Biosafety Principles – Initial/Refresher	Hearing Conservation – Initial/Refresher
Bloodborne Pathogens – Initial/Refresher	Respirators – Initial/Fit Test Varies
X-ray Safety Training – Once	Hand and Power Tools – Once
Radioisotopes – Initial/Refresher	Lock Out/Tag Out – Once

E. **Personnel in the following categories**

1. **Laboratory workers in East Lansing's Chemical Engineering and Materials Science labs who are Post Docs, Staff, Visiting Researchers, Plan B (nonthesis) MS students;**
2. **All CHEMS PhD and CHEMS Plan A (thesis) MS students;**

must complete <u>all</u> safety training for category D *PRIOR TO PERFORMING ANY LABORATORY WORK* **and within 2 weeks of joining a research group,** plus the *annual CHEMS Department Safety Refresher*.

F. **Personnel based in East Lansing advising individuals in categories E.1, E.2 or teaching a CHEMS laboratory course** must complete training for category D plus the *annual CHEMS Department Safety Refresher*.

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SAFETY COMPLIANCE GUIDELINES

Each faculty, staff member, and student is responsible for his/her own safety in the conduct of experiments.

1. Each supervisor or principal investigator with > 50% appointment in CHEMS or teaching a laboratory course, is designated as a Project Director (P.D.). Each Project Director (P.D.) is responsible for safety in the laboratories under their direction. This shall include:

    a. Becoming knowledgeable about the hazards in the laboratories.

    b. Establishing written laboratory specific standard operating procedures (SOPs) and keeping copies in the laboratory safety notebook or on a computer in the laboratory.

    c. Research Labs: Providing computer access to all safety data sheets (SDSs) via a computer (on-line or off-line) or maintaining a file of SDSs within each laboratory or group of laboratories where chemicals are used. However, SDSs for all extremely hazardous chemicals (e.g., peroxides, class A carcinogens, and HF) should be kept in a file or posted at appropriate places in each laboratory where the chemicals are used.

    Laboratory Courses: Printing SDSs in a notebook and keeping them within the laboratory.

    d. Ensuring that an annual chemical inventory is updated in the EHS ChemInventory database. The P.D. will review the inventory and coordinate disposal of unneeded chemicals as hazardous waste.

    e. Ensuring that all personnel are aware of the risks involved in their work, including **posting** of the following:

        i. Poster telling where SDSs can be found, as required by Michigan law,
        ii. Placard on doorway exterior with emergency phone numbers and hazard labels.

    f. Providing background for Independent Study/Project students on the following topics prior to student enrollment:

        i. SDS Forms
        ii. MSU Chemical Hygiene Plan*
        iii. MSU Right-to-Know Hazardous Communication Document*

*Available at https://ehs.msu.edu/.

g. Activating Training Tracking for subordinates: Assigning University-level safety training for new laboratory workers in the MSU Ability safety training system.

h. Assuring Lab-Specific Training is completed for each worker.

i. Assuring that bi-weekly online safety compliance checks are completed. Online reporting is available to faculty and safety representatives after logging into the departmental intranet.

2. Each individual must complete the assigned training and annually upload documentation for lab-specific training in the MSU Ability portal. The lab-specific documentation form is provided on the EHS site and accessible from the Ability portal.

   The individual must meet with the P.D. or designated trainer to check off the appropriate lab-specific training categories.

   a. The form provides examples of generic training categories, but the P.D. should supplement for unique hazards in each laboratory. Examples of laboratory specific training are:

      i. Specific chemical hazards and disposal procedures for your laboratory
      iv. Specific physical hazards, i.e. hot surfaces, pinch points, rotating equipment, lock out/tag out, UV, laser light sources, electrical hazards.
      v. Special requirements for dress, eye protection
      vi. Laboratory safety equipment, its location and use
      vii. Evacuation procedures
      viii. The 'Training Notes' field on the form should be used for specialized training.

3. The Department will:

   a. Ensure the training compliance for CHEMS Affiliates according to the Safety Training section of this document.

   b. Conduct an annual refresher giving an overview of chemical safety, outlining the necessary precautions, and clearly noting how to access these safety regulations.

c. Nominate a CHEMS representative for membership on the College Safety Committee.

d. The department safety committee shall:

i. Coordinate safety inspections with EHS and the College of Engineering.
ii. Coordinate correction of safety hazards identified.

e. Prepare annual safety report in cooperation with the College Safety Committee.

4. Laboratory Courses. The instructor(s) for the course is (are) responsible for:

a. Designing experiments to minimize hazards.

b. Establishing safety rules and regulations for all instructors and student personnel.

c. Maintaining a file of printed SDSs in the laboratory.

d. Ensuring that all personnel are aware of the risks involved in their work, including **posting** of the following:

i. Hazardous Substance Inventory
ii. Safety Rules and Regulations (one page)
iii. Poster indicating where SDSs can be found.

e. Assuring compliance with safety rules.

f. Training students and teaching assistants in safety.

g. Obtaining a "Classroom Laboratory Safety Agreement" signed by all students and teaching assistants. The completed form will be filed in the Department of Chemical Engineering and Materials Science Office.

5. Research Group Safety Representatives. Each project director will appoint a safety representative regardless of use of chemicals in their work. Understanding of chemical safety is important for all CHEMS affiliates. In the event that a project director has laboratory facilities in two or more locations, more than one safety representative may be appointed. The safety representative(s) will assist the project director by:

a. checking that all workers have completed the required safety training;

b. coordinating annual inventories of laboratory chemicals;

c. serving as research group contact for safety communications from the department;

d. performing bi-weekly safety compliance checks using the departmental "Bi-weekly Compliance Report" and recording the inspection results on-line. The bi-weekly checklist states the following:

This is a reminder that the bi-weekly compliance report is overdue for your research group. Please document compliance by logging into the CHEMS database, at https://www.egr.msu.edu/chems/index_login.html . One of the following applies:

A) The listed room is a shared office space. All personnel have received required training for the laboratory work they perform in other spaces.

Or

B) The listed room is a laboratory or storage location. If the room to be inspected serves only for storage, compliance with Items 1,6-10 and 12 is sufficient.

1. The lab door(s) list(s) the current emergency contacts and the correct phone numbers.
2. All personnel have received required training.
3. Eyewash is unobstructed and has been tested/flushed on a weekly basis.
4. Food/Beverage is not used or stored in the lab.
5. Spill kits are available and complete.
6. All personnel working in the room know the location of the nearest fire extinguisher.
7. Gas cylinders are properly secured.
8. Peroxide forming agents were dated when opened and are not expired.
9. Hazardous waste containers are labeled and dated upon first use.
10. Waste tags are complete.
11. Biohazard waste containers are available for sharps and none have accumulated beyond 90 days.
12. No waste has accumulated over 90 days.

LABORATORY SAFETY RULES AND REGULATIONS

The safe conduct of all experiments is the responsibility of each student. You will be expected to follow the guidelines set forth below:

1. Know the location of safety equipment in and near the laboratory. Know how to use each item. These items include:

   a. Safety shower
   b. Fire extinguishers
   c. First aid kits
   d. Eye wash station
   e. Fire blanket
   f. Telephone
   g. Safety Data Sheets (SDS)
   h. Chemical spill kit

2. Key principles for use of fire extinguishers are:

   a. They are placed near doorways intentionally, so that you are not cornered by a fire.
   b. Your back should be to the door when using an extinguisher so that you always have an escape route.
   c. Follow the '**PASS**' procedure: (1) **P**ull the pin; (2) **A**im at the base of the flame; (3) **S**queeze the trigger; (4) **S**weep side-to-side.

3. Report all hazardous situations to your professor.

4. Report all injuries to your professor.

5. Wear protective glasses, in compliance with MSU guidelines and lab specific SOPs. Soft contact lenses should not be worn in a laboratory where hazardous chemicals are in use.

6. Refrain from drinking or eating in the lab.

7. Learn and avoid the hazards associated with the equipment you will use in your experiments.

8. Avoid horseplay.

9. Know the hazardous characteristics of the materials you will be using in your experiment. Know where SDSs are located. Incorporate suitable precautions into your lab work.

10. Become conscious of safety—make suggestions, assist others in maintaining a safe working environment.

11. Do not wear open-toe shoes or ties; tie back long hair and scarves; secure loose clothing; have legs covered down to the ankles. Pants with holes do not meet coverage requirements.

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CLASSROOM LABORATORY SAFETY AGREEMENT

_____	_____	_____
Lab Course	Room #	Instructor

Work in a laboratory exposes a person to risk of injury and illness from hazardous materials and equipment. The risks associated with working in this lab have been explained to my satisfaction, and I have had the opportunity to ask questions about them.

Regulations and guidelines, however well-conceived, are not sufficient to achieve safe laboratory practice. It is the skill, knowledge and basic common sense of the individual laboratory worker that is crucial to a safety program. To this end, each person working in a laboratory assumes the following responsibilities:

1. To attend safety seminars when asked and to read all safety materials issued (such as manuals, hazard alerts, etc.). If new hazards are observed, these should be communicated to the instructor and the unit safety committee.

2. To comply fully with all established safety regulations and practices and to consult the instructor for advice in circumstances where safe practice is in doubt.

3. To limit laboratory work to projects authorized by the instructor.

4. To warn visitors to the laboratory of existing hazards and, when necessary, to inform them of the Department and University safety regulations. Warning signs shall be properly displayed and maintained. Unoccupied laboratories must be locked.

Note: to be completed for laboratory courses including
ChE 316, ChE 472, ChE 481, laboratory sections of ChE 491
MSE 250, MSE 331, MSE 381, MSE 451, MSE 466

I have read and understand the responsibilities on the Classroom Laboratory Safety Agreement and agree to observe them in my laboratory work. I have also read the Safety Rules and Regulations for this laboratory. I know where to locate the SDSs in the laboratory. Prior to an experiment, I will familiarize myself with known hazards of the materials involved in my experiment. I agree to observe the regulations in this course.

Signing of this Classroom Laboratory Worker Safety Agreement is not a waiver of individual rights of redress in case of injury.

1. _____ 16. _____

2. _____ 17. _____

3. _____ 18. _____

4. _____ 19. _____

5. _____ 20. _____

6. _____ 21. _____

7. _____ 22. _____

8. _____ 23. _____

9. _____ 24. _____

10. _____ 25. _____

11. _____ 26. _____

12. _____ 27. _____

13. _____ 28. _____

14. _____ 29. _____

15. _____ 30. _____

Instructor(s) _____ Date _____

TA(s) _____ Date _____