

Minimum Requirements in Dartmouth College Laboratories:

Administrative Controls:

- Each PI/laboratory supervisor must ensure that all laboratory personnel under their direction possess the requisite knowledge, training and education to safely handle hazardous chemicals in the laboratory.
- All laboratory personnel are responsible for following appropriate work practices when using hazardous chemicals.
- Hazardous chemical work in laboratories must be registered with the EHS department through Bioraft. This information should be updated as research and chemical inventories change.
- Avoid work with hazardous chemicals alone or at night when assistance and emergency response capabilities are limited. Use a partner system and work only with the approval of the PI or faculty member directing the research

“Designated Area” and Facility Controls:

- Laboratories where hazardous chemicals, infectious materials, radioactive materials/sources or physical hazards exist must have provisions for restricting access by unauthorized persons.
- Food, drinks, cosmetics and medication for consumption or use are prohibited inside laboratories where hazardous chemicals are used or stored.
- Hazardous chemicals may only be used in laboratory facilities specifically designed and engineered for such work. They may not be used in areas not intended for such use; including (but not limited to) offices, storage rooms, shared equipment areas, cold rooms and other areas lacking the appropriate infrastructure and a proper means of ventilation.
- Use an uncluttered chemical fume hood when opening, pouring or handling chemicals or substances that would otherwise enter the atmosphere without containment. Minimize all chemical exposures and avoid an underestimation of the risk - never deliberately taste or smell chemicals and absolutely never mouth pipette.
- Containment and ventilation should be the primary method to prevent inhalation and control flammable vapors, respirators are only appropriate as a secondary control. Respirator use requires training from EHS. It is your responsibility to report ventilation needs or problems (malfunctions, alarms or evidence of failure) to facilities maintenance personnel.
- Keep all doors to the laboratory closed when using the fume hood to ensure proper hood operation. Open laboratory doors can adversely effect hood performance.
- Ensure unrestricted access to a suitable eyewash station and drench shower. A person with compromised vision should be able to reach the eyewash or drench shower in less than 10 seconds. In the event of a hazardous chemical exposure or spill, move to a safe location and flush exposed area with water.

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Personnel Controls

- Always select and wear the right personal protective equipment when handling hazardous chemicals. That may include chemically resistant gloves, chemical splash goggles, face shields, safety glasses, lab coats, fire resistant clothing, aprons or chemically resistant coveralls depending on the hazards posed by your work. Assistance in selecting protective equipment is always available from EHS.
- Protect your clothes and exposed skin through the use of laboratory coats or gowns. Open toed shoes, sandals, shorts and other apparel that leave exposed skin are prohibited when handling hazardous chemicals. Lab coats must not be worn outside of research areas--such as to the library, outside of the building, etc.
- Keep all containers tightly closed when not in use. All waste collection containers must also be kept closed. Evaporation of hazardous chemicals is not an approved disposal method.
- Good housekeeping is mandatory in all laboratories using or storing hazardous chemicals. Ensure that all chemical spills are cleaned up promptly and safely. Dispose of old chemicals, mixtures and solutions routinely (after each term). Keep exit routes, emergency eyewash and safety shower access clear. Keep clutter to a minimum in fume hoods, workbenches and on the floor. Ensure trash, recycling, sharps and chemical wastes are promptly and properly disposed of.
- If you need to ship or transport hazardous chemicals contact EHS for training and assistance. Never put chemicals in the mail, in your personal vehicle, college vehicles or allow movers or contractors to handle or move them unless arranged through EHS. Concealing hazardous chemicals in the mail or shipment via air is forbidden and may result in federal penalties.
- Hazardous chemicals can be safely transported within and between buildings using bottle carriers and suitable carts. Avoid riding elevators with cryogenes, toxic compressed gasses, air or water reactive chemicals and highly toxic or volatile materials.
- After working with laboratory chemicals, carefully remove your gloves and thoroughly wash your hands and forearms. In all circumstances, wash your hands before leaving the laboratory. Remove gloves before leaving the lab or touching commonly used surfaces like doorknobs, telephones, etc.
- Never dispose of hazardous chemicals down the drain, in the trash or via evaporation, it is a violation of federal, state and local regulations.

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Information and Training:

EHS provides basic laboratory safety training that covers the safe handling and disposal of hazardous materials through the Bioraft web site and in person. The PI and/or laboratory supervisor are responsible for providing health and safety information to his or her staff on the specific hazards found in their laboratory on an on-going basis. Documentation of this activity should be kept in the lab (See Appendix E for a sample training sign in).

The hazard communication training module on the EHS web site is designed to provide support staff (Facilities, Operations and Management (FO&M) and DMS facilities) with training on basic chemical hazards, MSDS/SDS sheets, selection of personal protective equipment and emergency response initiation (awareness level training) for work in and around lab facilities. The academic and research community has an obligation to communicate potential health hazards to any individual working in your area. Specific tasks are evaluated by facilities supervisors and may require additional training or specialized contract personnel.

Safety Data Sheets:

The Occupational Safety and Health Administration (OSHA) requires that information on the physical and health effects of hazardous chemicals be readily available to employees who must work with or potentially be exposed to such substances (29 CFR 1910.1200 and 29 CFR 1910.1450). The required form of this information are fact sheets--known commonly as Safety Data Sheets—formally known as MSDS. According to OSHA, these sheets must be readily available to employees during working hours in an easily accessible location.

At Dartmouth, an on-line SDS database is available through Bioraft, in addition most SDS sheets can be found through a Google search. SDS sheets are a good starting point for safety and handling information, they can be supplemented by literature searches and use of safety databases (i.e. National Toxicology Program, EPA Integrated Risk Information System)

In addition to the online system, laboratories must keep copies of current MSDS/SDS sheets for any commercial products used in the lab (mixtures, experimental compounds, proprietary compounds etc.) and any MSDS/SDS sheets not available through online sources.

Labeling Containers in the Laboratory

Container labels are an essential form of hazard communication in the lab and are required by law. They provide information to you, your co-workers and even regulatory inspectors or emergency response personnel. It is essential that all containers in the lab

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have, at a minimum a legible label to identify the contents – even if it is water or benign material.

Hazardous chemical containers must have the following:

- Original manufacturer label with the date received written on it – OR-
- Printed label identifying the contents, concentration, primary hazards, owner and date prepared.

Personal Protective Equipment:

Personal protective equipment (PPE) is a vital means of worker protection, but it should be used in combination with fume hoods, safety shields and work enclosures. Additional guidance on the use of PPE can be found in OSHA 29 CFR 1910.132 and in the Dartmouth College [Personal Protective Equipment Policy](#).

Eye/Face Protection: Minimum protection for chemical work is impact resistant safety glasses, splash Goggles are required for handling toxic or corrosive liquids in larger quantities (>100ml) or in high risk systems (pressurized or aerosolized). Face shields may be used in conjunction with goggles or glasses for additional impact and splash protection. Contact EHS for help with specialty eyewear for UV light, lasers or welding. Look for the ANZI Z87 stamp on all protective eyewear.

Hand Protection: Minimum protection for lab scale chemical work is available from disposable nitrile gloves (4 mil thick). These gloves provide a barrier to exposure and are disposable (single use). High-risk work (toxics or high probability exposure scenarios) may require impervious reusable gloves, consult permeation guides to select the best glove. Specialty gloves (for handling cryogenic material/high heat applications, or cut protection) can be ordered. Contact EHS if you need assistance in selecting the proper type of gloves for the chemicals you handle.

Protective Clothing: Flame resistant lab coats for work with solvents, basic lab coats, chemically resistant aprons, coveralls and shoe covers are available in a variety of styles, both disposable and reusable. Contact EHS for help selecting the proper type and check out the stockrooms to see what they have.

Respiratory Protection: Respirators should not be used in the laboratory without prior approval of EHS. Laboratory supervisors are not authorized to select or recommend the use of respiratory protection, **regardless of the type**. Call EHS if you feel that you need respiratory protection. (The selection, fitting and use of respirators is referenced in OSHA standard 29 CFR 1910.134)

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