

Department of Civil and Environmental Engineering University of Waterloo

Safety Information for Environmental Labs

This information is relevant for the following rooms in DWE:

DWE-1407	DWE-2407
DWE-1417	DWE-2411
DWE-1421	DWE-2417
DWE-1427	DWE-2421
DWE-1431	DWE-2427
DWE-1431	DWE-2429
DWE-1433	DWE-2429
DWE-1437	DWE-2431
DWE-1447	DWE-2441
DWE-1457	DWE-2461
DWE-2451	DWE-2451A

Before working in the labs:

- Complete all mandatory safety courses
- Know the required PPE in each area
- Attend a lab orientation session

Introduction

This laboratory safety manual is prepared for researchers within the Civil and Environmental Engineering Department at the University of Waterloo, including visiting researchers, postdoctoral fellows, registered graduate students, employees, and undergraduate students. It is important that you read this material before you begin working in the laboratory.

Within the Environmental and Water Resources Engineering Research Group in the Civil and Environmental Engineering Department, a WATLUC (Laboratory Users Committee) has been established to discuss laboratory resources and safety issues. This committee consists of graduate student representatives, staff representatives and faculty members. Any safety issues you have should be discussed with your supervisor or a member of the WATLUC committee.

This manual is intended to supplement other training that you will receive through WHMIS, the University of Waterloo Safety Office, the laboratory orientation course, and project specific training as discussed with your supervisor. Everyone working in the laboratory must as a minimum have taken the department laboratory orientation course, WHMIS and the on-line laboratory safety training program. The safety training programs offered by the UW Safety Office are available at <http://www.safetyoffice.uwaterloo.ca/hse/training/cbt.html>.

The Safety Office at the University of Waterloo has an on-line safety manual www.safetyoffice.uwaterloo.ca/hse/lab_safety/index.html that provides documents relating to workplace and laboratory safety, including procedures and training, contacts, and government acts & policies. It is important to read and review with your supervisor any documents that are relevant to your research. The Lab Safety Index is provided as part of this manual.

It is important that you assess any safety issues before you begin working in the laboratory, or before you begin a new procedure. Any concerns or training that you require should be discussed with your supervisor. This can include areas such as personal protective equipment, laboratory and equipment procedures, spills and waste management. This is particularly important if you are working with hazardous materials or equipment, or will be conducting field work.

Before you use any hazardous equipment or chemicals, ensure that you have been properly trained by knowledgeable personnel and have read any documentation available. Knowledgeable personnel only include faculty members, staff (technicians, research associates) and postdoctoral fellows, unless otherwise stipulated by your supervisor.

General Laboratory Safety

There are potential hazards from glassware, corrosives, poisons, fumes and sources of heat inherent in every laboratory. At all times be knowledgeable about the chemicals and equipment you are handling and organize both your thoughts and the laboratory space you are using.

- IF YOU DON'T UNDERSTAND - ASK!
- Determine potential hazards, safety precautions, remedial actions and waste disposal techniques before starting any laboratory procedure.
- Ensure that all chemicals, solutions, samples and waste are correctly and clearly labeled (refer to the WHMIS guidelines).
- Obtain the proper training and read the associated documents/SOPs/manuals before you use any new equipment, chemicals, biological material or techniques.
- Do NOT eat, drink, smoke or apply cosmetics in any laboratory.
- Do NOT wear contact lenses when performing laboratory work.
- Footwear must have enclosed toes and heels (no sandals).
- Wear a lab coat to prevent contamination with chemicals or biological material.
- Lab coats are restricted to laboratories - do NOT wear lab coat in non-lab areas.
- Wash hands with soap and water before leaving the work area – even if you wore gloves.
- Report any and all accidents immediately to your supervisor.
- Use laboratory equipment only for its intended purpose.
- Do not perform unauthorized experiments.
- Use the correct personal protective equipment for your work (eg. safety goggles, gloves, fume hood).
- Confine long hair, loose clothing or jewellery when in laboratory.
- Practise good housekeeping. Clean up spills immediately. Keep the workbench clear of all but the required materials. Keep aisles free of obstruction.
- Telephones are located in several labs for emergency and local calling. UW Police can be reached at ext. 22222 for assistance or to report major spills.
- Know the location of fire exits, pull-stations, and extinguishers
- Avoid working alone at night or on weekends (use a buddy system with a friend, spouse or the UW police).
- Keep labs locked when unoccupied.
- Keep windows closed.

Handling Chemicals

All chemicals can be hazardous unless properly handled. Serious skin and eye irritations and damage to clothing can result from spills and sprays. Before working with any chemical, it is essential to KNOW its properties (which are to be found in the MSDS). Hazardous chemicals include those materials which are flammable, toxic, corrosive and/or reactive by nature. Apparently harmless substances can become hazardous under certain conditions of use. Vapours can be toxic, flammable or both. Therefore, volatile chemicals should be handled in fume hoods.

- Be familiar with first aid measures (e.g., safety showers, eye wash station, fire exit, first aid kit) BEFORE using chemicals.
- For chemical splashes or spills on your person, immediately flush affected area with lots of water (a follow-up medical measure should be taken).
- Wipe up all spills and bottle rings immediately and wash area down.
- Be aware of chemical compatibilities and incompatibilities.
- NEVER pour water into acid!
- Work in the fume hood when using volatile chemicals such as solvents or strong acids or bases.
- Label all chemicals and solutions as per WHMIS guidelines as soon as you take or make them.
- Wash hands with soap and water before leaving the work area even if you were wearing gloves.
- When handling chemicals, keep hands away from the face, eyes and body until after hands have been washed thoroughly.
- Never return unused chemicals to stock bottles. Either dispose of unused portion, or store it in a separate, labeled container.
- Do not handle with gloved hands something you plan to handle later without gloves (e.g. door handles). Do NOT wear gloves in non-lab areas.
- Dispose of chemical waste into appropriately labeled containers (Do not mix incompatible waste).
- Storage of chemicals and their solutions should employ appropriate and compatible containers (e.g. volumetric flasks are NOT appropriate) and appropriate cabinets (i.e. flammable storage).

Fire and Explosions

Fire is one of the major hazards in the laboratory. Many organic solvents and their vapours are flammable.

- Familiarize yourself with the location of the fire extinguishers, fire alarms, fire exits, safety shower, fire blankets and first aid kits.
- Become familiar and knowledgeable about the fire extinguishers/extinguishing agents available in your area.
- Keep open flames, electric sparks and heating elements away from all solvents.
- Whenever handling solvents work in a fume hood, keep caps and lids on containers as much as possible.
- Limit flammable liquids to amount actually needed for immediate use.
- If clothing catches fire, use safety shower or roll on floor to put out fire. **DO NOT RUN!**
- In case of a fire or explosion leave the immediate vicinity and activate pull station at nearest exit to call the fire department. **IF POSSIBLE**, shut all laboratory windows and turn gas valves off and close door behind you. Do not re-enter until confirmation of safety to do so is received.
- Avoid inhaling smoke and gases resulting from fire or explosion.
- **NEVER USE WATER ON ELECTRICAL FIRES!**
- Dry powder ABC type fire extinguishers may be used on most fires except for sodium, potassium, magnesium, lithium and aluminum. Active metal fires may be smothered with fine, dry soda ash (Na_2CO_3), sodium chloride and/or sand.
- Assemble apparatus such that control valves and switches will remain accessible if a fire should occur (e.g. Do not set up so that it is necessary to reach through the assembly to turn water, gas or electricity on or off.)

Microbiology Laboratory

- Treat all microorganisms in culture and *in situ* as **potential pathogens**.
- Wear a laboratory coat to protect yourself and your clothing.
- Bench tops should always be washed down with disinfectant before beginning any work and at the completion of immediate work.
- Never place any objects such as pens, pencils or fingers into your mouth while in the laboratory; and never rub your eyes in the microbiology laboratory
- Report any accident involving a cut or burn to our supervisor, to ensure steps are taken to reduce the risk of microbial infection into an open wound
- Never leave a bunsen burner unattended when not in use, and always be sure not to have any loose clothing or hair near an open flame
- Inoculating needle and loops when used should be heated to a red-hot stage before and after each use. This is mandatory in preventing cross-contamination of experimental work.
- Always place tubes containing culture in a secure upright position in a test tube rack
- Lab material containing microorganisms must always be appropriately and immediately disposed of when no longer needed, using the proper discard trays provided. All material must be autoclaved prior to disposal.
 - ⇒ glass microscope slides: in a Sharps container or other labelled container.
 - ⇒ pasteur pipettes: in a Sharps container
 - ⇒ plastic petri dishes: in a biohazard bag. Must be autoclaved prior to disposal
 - ⇒ remove all markings on glassware before autoclaving
 - ⇒ if the material develops an odour before the bag is full, autoclave and dispose of immediately
- **Always** leave your workstation clean to reduce the risk of contamination. Be sure tools used are put back in place clean and in good working order

ALWAYS WASH YOUR HANDS BEFORE LEAVING THE MICROBIOLOGY LABORATORY

Waste Disposal

- Each person is responsible for taking their own **properly labelled waste** for pick up and disposal. Ensure that your waste is stored in an acceptable container and that a completed waste label is attached to the container. Labels can be obtained from the wash-up room or the safety office.
- All chemical, biological and radioactive wastes are to be disposed of at the **ENVIRONMENTAL SAFETY FACILITY** located on the first floor of Earth Sciences and Chemistry (ESC) Rm. 150.
- A weekly waste pick-up is made in the loading/elevator area of the DWE building every Tuesday afternoon at 1:15 p.m.
- Material may be delivered to the waste disposal facility Monday to Friday from 11:00 am to 12:00 noon, or a pickup may be arranged by calling ext. 35755.
- University policy requires compliance with environmental regulations. Do not put any hazardous materials in the regular garbage or into the drains.
- See the Chemical Waste webpage link for detailed label and waste packaging instructions: http://www.safetyoffice.uwaterloo.ca/hse/environmental/waste_segregation.htm

Emergency Contact Information

General

Ambulance 911
Fire alarm pull station for fire department
UW Health Services ext. 33544
UW Police ext. 22222
Spill Control ext. 22222
Plant Operations ext. 33793
Poison Control Centre or 1-800-268-9017

Department

Dept. of Civil Engineering Safety Contact - Administrative Assistant, ext. 36381

Safety office - Doug Dye (Environmental Health Coordinator) ext. 35613
- Kate Windsor (Director) ext. 35814

Laboratory specific

Refer to the emergency contact form posted in the lab.

Pre Lab Safety Instructions

Please ensure you know the following information before commencing lab work

Fire and Evacuation Emergency Procedures:

- Our designated walkout location
- Location of fire exits, fire extinguishers and pull stations
- Location of telephone and alternate telephone. The emergency telephone numbers are 6- 911 and the UW Police 22222 (the importance of using the U of W hardwired telephone for the feature of UW Police call trace and dispatch).
- Remind the students that they are not Firefighters and should leave the building if a fire is discovered or the alarm sounds.
- I will lock the Lab doors last.

First Aid Procedures:

- Location of the FIRST AID Kit and reasons for its use.
- Location of MSDS Sheets
- Location of EYE-WASH and deluge SHOWER and reasons for its use.
- Location of Health and Safety Building.

Lab Procedures:

- Location of Lab coats, goggles and gloves and recommend use.
- Read lab handout/manual prior to the lab. **Note specific hazards and the necessary precautions**
- Place your winter wear, backpacks, and personal bags around the perimeter of the lab to avoid tripping hazard.
- Do not wear contacts lenses or sandals in the lab area.
- NO Food, drink and avoid putting pens or pencils in your mouth during the lab.
- Location of Spill Kit** (Apply appropriate spill kit for acid/base or solvent. Use absorbent pads to collect spill, vent area).
- Use the same Lab. Station and group # for the entire term to make setup easier for Technician and so that previously prepared samples and apparatus can be returned to your workstation so that you don't have to search for it.
- Spills and exposure to skin. (Apply spill kit for acid/base. Use absorbent for aqueous/Organic and vent area. Skin exposure rinse with large amounts of cold water).
- Point out the location of **the Chemical Waste containers** in the lab.
- ALWAYS wash hands before leaving at one of the sinks at the front where hand soap and paper towels are provided.**

Note: Again, mention the reagents to watch out for in this lab. The handling of Chemical wastes.

For a detailed safety guide look to:

http://www.safetyoffice.uwaterloo.ca/hse/lab_safety/general_lab.htm