

# A GUIDE TO CONDUCTING A LABORATORY INSPECTION

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## 1.0 Purpose

This document serves as a guideline for conducting monthly inspections of labs and must be used in conjunction with all regulations and applicable codes and standards.

If further information is required, please contact the Safety Office at ext. 33587 or by email: [safety@uwaterloo.ca](mailto:safety@uwaterloo.ca).

The available laboratory safety documentation should include:

- Up to date chemical inventory
- Safety Data Sheets (SDS) – hard copy for all commonly used chemicals and for all compressed gases
- Risk assessments for all high-risk tasks
- Standard Operating Procedures (SOPs), protocols, emergency procedures,
- Safety training records for all staff/students who work in the lab (Note: records can be printed from Workday)
- Monthly lab inspection records

## 2.0 Emergency Preparedness

### 2.1 Required Signs and Labels

1. Are all required signs and labels posted? See the [Posting requirements page](#) for more information.
2. Have emergency procedures been reviewed with all who use the lab?
3. Is a [Lab Hazards Poster](#) up to date and posted in color on the outside of the entrance to the lab? This poster should be regularly reviewed for accuracy. Has off hour emergency contact information been provided to UW Police?
4. Does the lab have phone access? Does the phone have a 911 sticker?

### 2.2 First Aid Kit

1. Has the first aid kit been inspected as per the schedule inside the kit, and signed off by person doing the inspection?

More information: [First aid kits and stations – University of Waterloo](#)

2. Do students/staff know who the departmental first aiders are? Are first aiders names posted at the department first aid station?

## 2.3 Fire Extinguishers

1. Is the lab fire extinguisher accessible and inspected monthly? (sign-off on the attached tag)? If not, notify Plant Operations by email at [pltops.maintenance@uwaterloo.ca](mailto:pltops.maintenance@uwaterloo.ca) to report missed inspections.
2. Is the proper type of fire extinguisher present (fully charged) to deal with small fires?

More information: [Fire safety – University of Waterloo](#)

## 2.4 Eyewash /Shower Requirements

1. Has the Eyewash Standard been reviewed to ensure requirements are in place?

More information: [Eye/face washes and emergency showers – University of Waterloo](#)

2. Is the eyewash/shower obstructed in any way?
3. Is the eyewash accessible within 10 seconds and the path of travel free of obstruction from doors?
4. Is the eyewash/shower sign posted above the eyewash with clear visibility?
5. Is the eyewash/shower run weekly to ensure it is in working condition and provides clean water?

## 3.0 Facility

### 3.1 Inspection/Training Records

1. Training - Are training records available for all staff/students who work in the lab?
2. Monthly lab inspections – are labs inspected monthly and documents kept for 2 years (electronic back up is recommended)
3. Equipment pre-use inspections – the [Pre-use inspections page](#) lists equipment that requires pre-use inspections:

### 3.2 Lab Space Housekeeping

1. Are floors and aisle ways clean and clear of materials/equipment? Are there any exits blocked? Is there adequate lighting?
2. Are lab benches free of clutter, in good condition, clean and free of chemical residue?
3. Are there any slip/trip hazards present? Examples of slip/trip hazards are cables across a walkway, wet floors, loose/broken/missing tiles, torn carpets.
4. Are garbage containers regularly emptied?

5. If glassware is in use, is it inspected for cracks or breaks? Is a labelled broken glass container available in order to segregate broken glass from regular waste?
6. If needles are used, is a sharps container available for proper disposal? Are all needles safely stored when not in use?
7. Are shelves securely attached to the wall? Heavy objects should be stored low, shelves not overloaded or objects overhanging.
8. Are sinks kept clean and uncluttered?

### **3.3 Lab Environment**

1. Is there evidence of food or drink stored or used in the lab where chemicals are used?
2. Does the lab have storage space for Personal Protective Equipment (PPE)?
3. Is soap and paper towels available at the hand washing sink?

### **3.4 Ventilation**

1. Does the lab have adequate ventilation?
2. If dust is generated, are there dust control measures in place?

## **4.0 Equipment**

### **4.1 Thermometers**

1. Are any mercury thermometers still in use in the lab? Remove any and dispose to the Environmental Safety Facility and replaced with alternatives.

### **4.2 Fume Hoods**

1. Are all users trained in the proper [use of a fume hood](#)? Review the manufacture's operating manual.
2. If the fume hood is equipped with a vent alert flow alarm switch, is it in the ON position to alert a user if the hood were to fail? Does the vent alert flow alarm work? This should be tested daily before a hood is used.
3. Are any alarms activated? If in alarm, the hood must be marked as "Out of Service DO NOT USE" until fixed.
4. Do users keep the sash at the marked height when the fume hood is in use? Is the sash operable?
5. Do users close the sash when the fume hood is not in use?
6. Is the hood clean and free of excess materials/equipment/chemicals etc. that may be blocking the exhaust baffles at the back of the hood? Is the work surface, baffle and sash kept clean?
7. Are all controls for services (water, natural gas, compressed air) labelled and functional?

8. If equipment is used inside a hood, it must not block the exhaust baffles in any way.
9. Do all lights work? Are drains functional? Have ground-fault circuit interrupters been tested?
10. Are local exhaust ventilation (LEV) units present in the lab and used appropriately? LEV units are for nuisance exhaust and should never be used for flammable, corrosive or toxic chemicals which require a fume hood.

### 4.3 Ovens/ Water Baths

1. Are ovens used to heat any material from which a toxic vapor or gas would be expected to evolve? Provisions must be in place to exhaust the fumes.
2. Are ovens located away from chemicals or combustible materials?
3. Do ovens have backup thermostats in case the first thermostat fails? If oven has a single thermostat, it should not be used for long, unattended processes.
4. Are water baths used with timers?
5. Are electrical cords checked for frayed wires, broken plugs, missing ground prongs? If present remove and tag out of service until repairs are made.

### 4.4 Hot Plates

1. Are hot plates unplugged when not in use?
2. Are water baths in use with hot plates?
3. Are electrical cords checked for frayed wires, broken plugs, missing ground prongs? If present remove and tag out of service until repairs are made.
4. Are hot plates surfaces regularly checked for damage such as chipping or etching?

### 4.5 Refrigerators

1. Are all domestic refrigerators labeled “No food or drinks” and “No storage of flammables”?
2. Are all flammable chemicals requiring refrigeration stored in a refrigerator/freezer designed for the safe storage of flammables (lab safe refrigerator as designated by the manufacturer)? Flammable liquids are defined by the Ontario Fire Code as having a flash point of less than 37.8 degrees Celsius. **Any modified refrigerators/freezers must be replaced with lab safe refrigerators specifically designed for storage of flammables.**

### 4.6 Centrifuges

1. Are centrifuge rotors inspected and stored according to requirements set by the manufacturer?
2. Are spills within a centrifuge immediately cleaned? Is an operating procedure available and are staff/students trained?

3. Is the centrifuge equipped with an interlock to prevent the lid from being opened during operation of the centrifuge?
4. Are rotor logs kept for every ultracentrifuge, including username, date, duration, number of revolutions, and speed of use, and notes on condition of the rotor at time of use? Rotors must be retired after the number of revolution or years of service stated by the manufacturer, unless an annual stress test permits continued use.
5. Are all ultracentrifuges operated on a stable surface with at least 15cm clearance at sides and 10cm clearance at rear?
6. Are centrifuges located away from flammable chemicals or combustible liquids?
7. When not in use, are rotors stored according to manufacturer's recommendations? Fixed angle vertical tube or near-vertical tube rotors should be stored upside down with lids or plugs removed.

#### 4.7 Lab-specific Equipment

1. Does the lab maintain equipment manuals for use and preventative maintenance for all types of equipment in use?
2. Is the required preventative maintenance being done?

Reference: [Laboratory apparatus – University of Waterloo](#)

#### 5.0 Chemical Safety

1. Chemical Inventory – does the lab have an up-to-date chemical inventory for all chemicals stored and used? More information: [Chemical inventory system](#)
2. Safety Data Sheets – are SDSs available for all staff/students and do they know how to access electronic versions? More information: [WHMIS](#)
3. Have standard operating procedures been developed for all high hazard work?
4. [Chemical storage requirements](#) – are chemicals segregated by hazard class?
  - Flammables
  - Oxidizers
  - Acids – are oxidizing acids separated or segregated by containment from other acids)
  - Bases
  - [Peroxide Formers](#) - Are all containers of time-sensitive chemicals (peroxide forming solvents) properly managed? Are they marked with the date received/opened and disposed of within the timeframe specified according to peroxide formation hazard class? Is a record kept?
5. Is containment available for transporting of chemicals or chemical waste?

6. Spill kits/materials – are spill kits available for clean-up of small spills?
7. Are liquid chemicals stored in glass bottles above eye level? All glass bottles containing liquids should be kept below eyelevel.
8. Hazardous waste – does the lab have a waste poster? Is waste segregated by waste class? Are bottles of waste properly labeled with contents using a UW Waste chemical waste label? If waste bottles are stored on the floor, is it in containment? Is waste sent to the Environmental Waste Facility regularly? Ontario regulations limit on-site storage of hazardous waste to 90 days.
9. Are all bottles of chemicals (stored in cabinets, refrigerators or on bench tops) properly labeled with Supplier labels as per WHMIS requirements?
10. Have all liquids or solids which have been removed from a supplier container been labeled with a laboratory label indicating the hazard?
11. Are all squeeze bottles labeled as to contents, even if they contain deionized water?
12. Does the lab have any designated substances? Review the [Designated substances page](#) for more information. If designated substances are present a designated substances assessment must be done, contact the Safety Office for further information.
13. Are flammable or combustible liquids in containers of not more than a 5 L capacity?
14. Does the lab use any of the following? Are standard operating procedures in place?
  - a. Hydrofluoric acid - does the lab have calcium gluconate gel available and not expired?
  - b. Perchloric Acid - is there a perchloric acid hood available?
  - c. Aqua Regia, Piranha Solution – is there a written procedure and training on safe use including safe disposal?

References:

- [Chemical Safety - University of Waterloo](#)

## 5.1 Compressed Gases

1. Are copies of Safety Data Sheets readily accessible in the lab for all gases?
2. Are cylinders in an upright position and secured firmly with chains or clamps?
3. Are safety goggles available when handling or using compressed gases?
4. If oxygen cylinders are in use, has all oil or grease been removed from the area?
5. Is an appropriate leak test solution available? Are leak tests done? Are hoses examined for cracks, kinks or evidence of damage? Is the appropriate type of hose in place for flammable gases?

6. Are the regulators ever used as hooks or for storage of hand tools, lab coats or equipment?
7. Are cylinders stored in laboratories or does the lab use an in/out policy?
8. Are empty cylinders (leave 25psi in tank) marked and removed from the lab?
9. Are all cylinders of toxic gases placed in ventilated cabinets or if not available in dedicated fume hoods?
10. Are all oxygen cylinders separated from cylinders containing flammable gases or other combustible materials by 6m, or by a 1.5m high fire-resistant wall with a rating of at least 30 minutes?
11. Are all propane tanks greater than 5 lbs. stored outdoors?
12. Does the lab exceed the allowable quantities of flammable or toxic gases?

	Flammable or oxidizing gas	Liquefied flammable gas	Gases with health hazard rating of 3 or 4 (LC50 < 3000 PPM) (stored in ventilated cabinet)
Number of large cylinders per 500 ft <sup>2</sup>	3	2	3

## 5.2 Handling Compressed Gases

1. If cylinders must be moved by lab staff, is a suitable cylinder cart available? Is the cylinder cart inspected prior to use?
2. Is the valve cap securely in place to protect the valve whenever the cylinder is not connected for use? This includes during transport.
3. Have students/staff who use and handle compressed gas cylinders completed online training course SO1030 as well as been given hazard specific awareness training?

More information: [Compressed gas and cryogenic liquids](#)

## 5.3 Cryogenic gases

Cryogenic liquids (argon, nitrogen, helium, hydrogen and oxygen) and certain other liquefied gases are at extremely low temperatures (-60°C to -266°C). Very small amounts of these liquids produce large amounts of gas. Consult the product's SDS for specific guidelines regarding health and safety information, personal protective equipment and emergency recommendations.

1. Are protective gloves, lab coats, splash resistant safety goggles and face shield available for use?
2. Are cryogenic materials stored only in well ventilated areas? Cryogenic gases are capable of displacing air necessary for respiration and causing asphyxiation. Has



a cryogenic risk/hazard assessment been completed for the room where cryogenic gases are used or stored?

3. Are tongs available to withdraw objects immersed in a cryogenic liquid?
4. Are operations performed slowly to minimize boiling and splashing when charging a warm condenser or when inserting objects into a cryogenic liquid?
5. Do staff/students void wearing clothing or jewelry (watches, rings, etc.) which may trap a cryogenic fluid close to the skin?

#### **5.3.1 Storage of Cryogenic Gases**

1. Are dollies used for moving cryogenic containers? Avoid rolling containers by holding the neck as it is the main support for the inner portion of the container.
2. Are containers kept clean? Avoid contaminating them with materials which may create hazardous conditions upon contact with the cryogenic fluid or gas.
3. Report to the supplier:
  - a. all leaking or improperly set relief valves
  - b. safety valves with broken seals
  - c. safety valves with any frost, ice formation, or excessive corrosion
4. Remove the container to a remote location and contact the supplier if plugs of ice or foreign material develop in container vents or opening. Do not attempt to remove the plug.
5. Vent containers with an approved safety device which permit excess gas to escape.
6. Are containers labeled clearly?

#### **5.3.2 Cryogenic Gases - First Aid**

Are all users of cryogenic gases familiar with first aid procedures? Have all users completed online training course SO1030 as well as been given hazard specific awareness training?

### **5.4 Laboratory PPE Requirements**

1. Is [appropriate PPE](#) readily available based on the assessment of the hazards in the lab?
2. Do standard operating procedures identify the required types of PPE to be used for hazardous tasks? For example, chemical/glove compatibility, specific eye and face protection, resistant protective garments (acid, heat, flame)
3. Have staff/students been trained on use and inspection of PPE?

## 6.0 Electrical Safety

1. Does electrical equipment contain Electrical Safety Authority (ESA) or equivalent certification markings?
2. Are extension cords used as permanent wiring? Extension cords may only be used on a temporary basis (for a few hours). Power bars may be used and can have a 10-foot-long cord, must be CSA approved and plugged directly into an electrical outlet. Daisy chaining of power bars is not permitted.
3. Is any electrical cord damaged, frayed or show evidence of wear? Equipment must be removed from use by lock out/tag out as appropriate.

More information:

- [Electrical hazards](#)
- [Electrical Awareness \(SO2033\)](#) training module

## 7.0 Working Alone Guidelines

Are staff/students aware of high-risk activities where [working alone](#) is prohibited?

## 8.0 Risk Assessment

Has a [risk assessment](#) been done for all high-risk tasks? Refer to the [Laboratory safety page](#) for more information on conducting a risk assessment.

### 8.1 Hazard Recognition and Standard Operating Procedures (SOPs)

Does the lab maintain written copies of SOPs for all high-risk tasks which outlines hazard recognition and controls?

## 9.0 Safety Program Participation

Does the lab require participation in any of the following programs?

- [Biosafety](#)
- [Laser](#) – Permit required for class 3B or class 4 lasers
- [X-ray](#)
- [Radiation](#)
- [Nanomaterials](#)