

Guide for Laboratory / Workshop Inspection Checklist

The Environmental Health & Safety Office (EHS) inspects laboratories and workshops on regular intervals or upon request. Inspections are intended as a mechanism to increase the overall safety awareness by identifying risks associated with laboratory/workshop activities and providing corrective actions to prevent reoccurrence. The EHS inspection team works with Faculty members and/or the Department Safety Officer to coordinate and schedule inspections in order to minimize interruptions to any teaching or research activities.

The following guidance document provides details on some inspection questions found on the [Laboratory/Workshop/Studio Inspection Checklist \(EHS-FORM-059\)](#). These details should help maintaining a safe and healthful work environment. Should you have any questions regarding inspections, please contact EHS at ehs@concordia.ca.

General Safety

Is the information on how to report maintenance deficiencies and injuries/near-misses posted?

- Laboratory/workshop users must know how to report maintenance deficiencies such as a leaky sink, temperature problems, improper ventilation, etc. to the Service Centre at extension 2400. Furthermore, any injury or near-miss must be reported to EHS by filling up an [Injury/Near-Miss Report](#) available on the EHS website at concordia.ca/ehs.

(Source: Concordia University recommendation)

Is the lighting in the laboratory adequate and in good condition?

- Burnt out fluorescents should be reported to the Service Centre at extension 2400. The standard for science laboratory lighting is 30 ft/c and 50 ft/c for vertical and horizontal brightness respectively. General lighting can be supplemented as requested by Principal Investigators (PIs) or the person responsible of the work area.

(Source: IESNA Lighting Handbook)

Is the temperature in the laboratory well controlled?

- Normal ambient laboratory temperature is generally 21–24°C. If the temperature does not seem comfortable, please contact the Service Centre at extension 2400.

(Source: Laboratory Design Handbook; Laboratory Health and Safety Handbook; ASHRAE 55)

Are the ceiling tiles in place and free of any water leaks or stains?

- Water leaks and stains can lead to mold growth. Ceiling tiles should be intact and in place to prevent contamination of laboratory experiments by dust or mold. Intact barriers are also necessary for fire safety.

(Source: Laboratory Health and Safety Handbook; National Fire Code of Canada)

Are the food and beverage rules observed? (food and drinks should not be consumed or stored in areas where chemicals are used)

- Food and drinks can become contaminated by contact with unwashed hands, gloves or clothing or simply by being left exposed in the workplace. Food, drinks, gum and cosmetics should not be consumed or worn in laboratories/workshops where hazardous materials are used. Storage of food and beverages in refrigerators containing chemicals go against good laboratory practice and may result in the contamination of food and subsequent ingestion exposure.

(Source: American Chemical Society; CCOHS; Concordia University Laboratory Safety Manual; National Academy of Sciences; OSHA)

Are laboratory/workshop doors kept closed?

- University work areas where hazardous materials are used are under negative pressure. Laboratory/workshop doors must be kept closed in order to maintain the proper room pressurization and prevent possible contamination of external areas. Keeping doors closed insures the best possible ventilation efficiency, temperature and humidity controls.

(Source: Laboratory Design Handbook; Concordia University Laboratory Safety Manual)

Are benchtops and storage areas uncluttered and orderly?

- Proper housekeeping leads to a safer environment. Electrical equipment, porous materials (e.g. cardboard boxes) and hazardous materials should not be stored on the floor. Workspaces and storage areas should be clear and neat. Aisles must be free of obstructions and tripping hazards such as chairs, boxes, waste receptacles or electrical cords. Floors must be clear of spilled materials, excessive dust and other items that could cause a slipping hazards.

(Source: American Chemical Society; Concordia University Laboratory Safety Manual)

Are heavy objects stored on lower shelves?

- Storage shelves must be firm and secured against sliding and collapse. Shelves must be well supported and in no danger of tilting. Large containers should be placed on low shelves.

(Source: American Chemical Society)

Personal Protective Equipment (PPE)

Are the personnel and students wearing closed-toe shoes and lab coats?

- Protection for body and feet should be provided by a lab coat and closed shoes. Lab coat should always be buttoned up when worn. Shoes that have high heels, open-toed or made of cloth or woven fabrics should not be worn since they do not provide adequate protection. Legs should be covered with long pants to minimize skin exposure to solvents and corrosives.

(Source: Regulation Respecting Occupational Health and Safety, American Chemical Society)

Are protective gloves available and matched to the hazard?

- Skin contact is a potential source of exposure and hands are the main area in contact with hazardous materials. Protection from exposure is necessary by wearing protective gloves. Different gloves types have different chemical resistance and permeability. One must only use gloves following the manufacturer's recommendations in order to protect against the penetration of hazardous materials for which they have been designed. Refer to the chemical's SDS or to the manufacturer's glove compatibility charts for more information concerning which gloves to be used.

(Source: Concordia University Laboratory Safety Manual; CCOHS; American Chemical Society)

Is eye/face protection available and used?

- Eye protection and face protection is required of anyone who is exposed to a danger that may cause injury to his/her eyes by either flying particles or objects, dangerous substances or molten metals or intense radiation. Safety glasses must have side shields. Goggles and/or face shields must be worn when there is a danger of splashing chemicals. Safety glasses or goggles must always be worn under face shield when working with strong corrosives, glassware under pressure, glass apparatus used in combustion or other high-temperature operations and cryogenic liquids.

(Source: Regulation Respecting Occupational Health and Safety; Concordia University Laboratory Safety Manual; American Chemical Society)

Are lab coats only worn in the laboratory and are removed before entering offices, lunchrooms, restrooms and other non-laboratory general use areas?

- Food and drink can be contaminated by contact with unwashed hands, gloves or clothing. Lab coats should not be worn or brought to areas where food is consumed. Lab coats should be washed separate from personal laundry.

(Source: American Chemical Society; CCOHS; Concordia University Laboratory Safety Manual)

Emergency Measures

Are all emergency and evacuation procedures displayed?

- Emergency procedures, such as department emergency information and emergency contact numbers must be posted in the laboratory or workshop. Staff, students and visitors must be familiar with their area's evacuation procedure.

(Source: American Chemical Society; Concordia University recommendation)

Are aisles and exits free from obstruction?

- A clear unobstructed path to exit must be maintained according to fire prevention regulations.

(Source: National Fire Code of Canada; American Chemical Society; NFPA 45)

Are fire extinguishers located in designated areas, accessible and free from obstructions?

- Each laboratory/workshop is equipped with a fire extinguisher adapted to the hazard present. Fire extinguishers should be readily available, located strategically, in good working condition and properly labeled. Access to a fire extinguisher should never be blocked.

(Source: Regulation Respecting Occupational Health and Safety, National Fire Code of Canada, NFPA 10, Concordia University Policy VPS-49)

Are extinguishers functional, labeled and inspected recently?

- Extinguishers shall be inspected regularly and records shall be kept on tag or labels attached to the extinguisher. At Concordia, a full inspection is done annually by an external contractor.

(Source: National Fire Code of Canada, Regulation Respecting Industrial and Commercial Establishments, NFPA 10)

Is there an 18” clearance from the ceiling?

- The distance between sprinklers and the top of storage shall be 46 cm (18”) or greater.

(Source: National Fire Code of Canada, NFPA 13)

Are first-aid kits in designated areas? Are they properly stocked with the supply list inside?

- Each laboratory was provided with a first-aid kit. Kits must be properly stocked kept clean and in good order. Consult the [Emergency Management \(Security\) website](#) for the first-aid kit supply list and order form.

(Source: First-aid Minimum Standards Regulation; Concordia University Policy VPS-45)

Safety Equipment

Are safety showers and eyewash facilities accessible and free from obstructions?

- The safety showers and eyewash facilities must be readily accessible and access to emergency equipment must never be blocked.

(Source: ANSI Z358.1)

Are eyewashes in good condition, clean and capped?

- The nozzles to eyewash stations need to be protected from airborne contaminants. Eyewash stations need to be kept clean and are designed with pop-off covers that must remain in position until the unit is activated. ANSI standards requires that eyewash units be tested (activated) and verified weekly. An [eyewash checklist](#) is available from the EHS website.

(Source: ANSI Z358.1)

Are fire blankets available and stored correctly?

- Fire blankets are available in service corridors and certain laboratories or workshops. As with all other emergency equipment, access should never be blocked.

(Source: American Chemical Society; Prudent Practices for Handling Hazardous Chemicals in Laboratories)

Are emergency switches clearly identified for power and gas supply and easily accessible?

- Circuit breakers and cut-off switches should be labeled and accessible.

(Source: American Chemical Society, NFPA 70E)

Are fume hoods in good condition, sashes open and close, and glass intact?

- Fume hoods should be cleaned regularly and sash operation shall be smooth and easy throughout its travel.

(Source: CSA Z316.5)

Are missing or deteriorating fume hood labels being replaced?

- Instruction labels and calibration labels should be visible and in good condition.

(Source: CSA Z316.5)

Are fume hoods clean and free of stored chemicals?

- Laboratory hoods should not be used for storing chemicals or apparatus. Storage in hoods can interfere with the air flow in the hood. A cluttered fume hood does not provide the space required to work safely and may lead to spills or accidents and increases the amount of chemicals that could become involved in a hood fire.

(Source: American Chemical Society; Concordia University Laboratory Safety Manual; Prudent Practices for Handling Hazardous Chemicals in Laboratories)

Training Compliance

Do all laboratory or workshop users, including visitors, have up-to-date training compliance?

- Supervisors, managers and PIs must ensure that employees, students and visitors under their supervision have up-to-date EHS safety trainings. They must also provide training concerning specific hazards present in their respective work area. The employer must keep track of these trainings and provide refresher training sessions on a regular basis.

(Source: Act Respecting Occupational Health and Safety)

Laboratory / Workshop Equipment

Are electrical apparatus equipped with ground plugs or properly grounded and not connected to extensions cords.

- Laboratory/workshop equipment using 110V or higher should have a standard three conductor line cord that provides an independent ground connection to the chassis of the apparatus. An overload-protection device that will disconnect the electrical circuit if the apparatus fails or is overloaded can also be acceptable. Extension cords are only intended as temporary solutions, to prevent overloaded circuits. Please contact the Service Centre at extension 2400 to arrange for additional electrical outlets.

(Source: American Chemical Society, Prudent Practices for Handling Hazardous Chemicals in Laboratories, NFPA 70E)

Is the wiring on laboratory equipment in good condition and secured along the wall or benches?

- Frayed or worn wiring, plugs and cords must be replaced. Wires should not be stretched across the floor causing a tripping hazard. Electrical outlets should have cover plates.

(Source: American Chemical Society, NFPA 70E)

Are electrical cords and appliances away from flammables and water (sinks), do they have grounding plugs? Are extension cords used only for computers?

- Carefully place power cords so they don't come in contact with water or chemicals. Contact with water is a shock hazard. Keep flammable materials away from electrical equipment. The equipment may serve as a source of ignition for flammable or explosive vapors. Power cords must have grounding plugs or be double insulated, corrosives and solvents can degrade the cord insulation. Extension cords should not be used in laboratory or only for personal computers and their components.

(Source: NFPA 70E)

Are red outlets being used for critical equipment that require continuous power?

- Red outlets are available in most laboratories. These outlets provide emergency power in the event of a power failure. Please ensure that appliances and equipment needing continuous power are connected to these outlets. If red outlets are required but not available in your work area, please contact the Service Centre at extension 2400.

(Source: Concordia University recommendation)

Are microwaves labeled "Laboratory Use Only"?

- Laboratory microwaves are to be used for laboratory usage only; food should not be prepared or stored in a laboratory.

(Source: American Chemical Society, Prudent Practices for Handling Hazardous Chemicals in Laboratories)

Are vacuum pump belt guards in place and exhaust vented?

- Vacuum pump belt drives should be equipped with belt guards. The exhaust from pumps should be vented to a laboratory hood or local exhaust system.

(Source: American Chemical Society)

Are mercury-containing equipment or instruments (e.g. thermometers) present?

- Mercury and mercury vapors are toxic and any mercury spills must be treated as serious. In order to minimize the potential of mercury spills, EHS has a mercury thermometer exchange program. Contact EHS at hazardouswaste@concordia.ca to inquire about the exchange of mercury-containing instruments. Any equipment where mercury is used (e.g. porosimeter) must be connected to a local exhaust system. A mercury spill kit must be present in any areas where mercury is being used.

(Source: Concordia University Laboratory Safety Manual)

Are 3-D printers enclosed or properly exhausted?

- Certain types of filament material used for 3-D printers are known to emit the release of toxic fumes and harmful nanoparticles. 3-D printers must either be enclosed or connected to a local exhaust system.

(Source: Environmental Science & Technology)

Chemical Safety

Are all chemical containers well labeled, capped and in good condition?

- All chemical containers should be labeled according to WHMIS regulation. Containers should be sealed and in good condition to prevent vapors or spills.

(Source: Hazardous Products Act; Hazardous Products Information Regulation)

Are all chemicals stored correctly, segregated by hazard and according to compatibility (e.g., organic from oxidizers, flammable from acid)?

- Specific instructions on chemical storage may be obtained from the manufacturer's SDS or on the container label. Incompatible chemicals must be stored separately, as opposed to alphabetically. Classify the chemicals into hazards and in storage groups. All chemicals should have a definite storage place and be returned to this place after being used.

(Source: American Chemical Society; Prudent Practices for Handling Hazardous Chemicals in Laboratories; Concordia University Laboratory Safety Manual)

Are flammable/combustible liquids stored in flammable cabinets, away from ignition sources?

- Flammable/combustible liquids must be stored away from ignition sources in fire resistant storage cabinets.

(Source: American Chemical Society; National Fire Code of Canada; NFPA 45)

Are hazardous materials used/stored limited to small quantities?

- Quantities of chemicals stored in a laboratory should be limited to the minimum quantity necessary to perform the work being done. Flammable and combustible liquid storage is limited based on the laboratory size and fire rating.

(Source: National Fire Code of Canada; NFPA 45)

Are chemicals kept away from offices/desks?

- Chemicals belong in designated storage areas and away from non-laboratory/workshop work areas.

(Source: American Chemical Society; Prudent Practices for Handling Hazardous Chemicals in Laboratories; NFPA 45)

Are signs on chemical storage cabinets and areas consistent with hazards within?

- Cabinets and storage areas shall be identified by signs to warn emergency response personnel of hazards.

(Source: Hazardous Products Act; National Fire Code of Canada, NFPA 45)

Are flammables stored in *chemical storage, spark-proof or explosion-proof* refrigerators and/or freezers?

- When refrigerators and/or freezers are used for the storage of flammable chemicals, they must be specially designed for such purpose. Flammable liquids can only be stored

in approved refrigeration units (NFPA 45). Household refrigerators have various control switches that can spark and ignite flammable materials.

(Source: American Chemical Society; Prudent Practices for Handling Hazardous Chemicals in Laboratories; NFPA 45)

Are refrigerators and freezers sound and free of chemical spills or contamination with containers tightly closed?

- Housekeeping practices should keep chemical storage areas neat and orderly. Containers of liquids should be well sealed and placed in trays that have rims high enough to furnish secondary containment in case of spills or leaks.

(Source: American Chemical Society; Prudent Practices for Handling Hazardous Chemicals in Laboratories)

Are corrosive & flammable chemicals stored below eye level?

- Liquid chemicals, large containers of reagents and especially corrosives should be stored on low shelves below eye level to prevent injuries to the eye.

(Source: American Chemical Society; Prudent Practices for Handling Hazardous Chemicals in Laboratories; Concordia University Laboratory Safety Manual)

Is there an updated inventory of the chemicals in the laboratory?

- Laboratories/workshop must have an up-to-date inventory of their chemicals. The University is required to provide this list to the Montreal Fire Department annually.

(Source: Hazardous Products Act; By-Law Concerning Fire Safety)

Are primary & secondary chemical containers labeled with identity and appropriate hazard warnings?

- Containers must have either the supplier label or a workplace label containing the following information: product identifier, safe handling measures (including risk phrases, precautionary measures and first aid measures) and SDS statement.

(Source: Hazardous Products Act; Hazardous Products Information Regulation)

Are safety data sheets (SDSs) available for all chemicals present in the work area?

- SDSs for all chemicals stored in the work area must be available to users, either being an electronically or a hard copy version. SDSs must always be up-to-date (less than 3 years old) and available in French and/or English.

(Source: Hazardous Products Act; Hazardous Products Information Regulation)

Compressed Gas Cylinders

Are cylinders properly labeled?

- Cylinders must be labeled according to WHMIS regulations.

(Source: Regulation Respecting Occupational Health and Safety; Hazardous Products Information Regulation; Hazardous Products Act)

Are gas cylinders properly chained/secured and in use?

- Gas cylinders must be stored in an upright position with the valves facing upwards and be solidly held in place with chains or straps or a suitable stand. Cylinders in use shall be

connected through a regulator or to a manifold to deliver gas to a lab operation. Cylinders not in use shall not be stored in the laboratory.

(Source: American Chemical Society; NFPA 45; Regulation Respecting Occupational Health and Safety)

Are regulators, proper connections and tubing in good condition/use?

- Only regulators approved for the specific gas should be used. Valves should be closed with all pressure released from equipment connected to the cylinder at the end of a work shift.

(Source: Act Respecting Pressure Vessels; Laboratory Safety Institute)

Are cylinder caps in place when cylinders are not in use or being moved?

- All compressed gas cylinders shall be equipped with a protective cap for the valves when not connected for use.

(Source: Regulation Respecting Occupational Health and Safety)

Are full and empty cylinders stored separately?

- When cylinders are empty, regulators should be removed promptly and the protective caps replaced. The cylinders should be labeled as empty and stored separately.

(Source: Regulation Respecting Occupational Health and Safety; Laboratory Safety Institute)

Are cylinders transported on a cart with chains?

- When moving cylinders, use only a properly designed 4-wheel cart. The cylinders must be properly fastened to the cart and have the protective cap over the valves.

(Source: American Chemical Society; Regulation Respecting Occupational Health and Safety)

Hazardous Waste Disposal

Are there sufficient and appropriate waste containers in laboratory?

- Waste containers can be obtained from EHS at hazardouswaste@concordia.ca

(Source: Concordia University Laboratory Safety Manual)

Are waste containers kept closed using tight-fitting lids?

- Containers should be in good condition with properly fitting caps.

(Source: Concordia University Laboratory Safety Manual)

Are the waste containers clearly labeled and the chemicals identified?

- Waste containers must be clearly identified using the Concordia chemical waste label. Indicate the chemical name or common name of each substance in the mixture. Indicate the percentage of the substance for mixtures. Do not use chemical formulas, abbreviations, symbols or equations. Indicate room location and phone extension in case EHS needs clarification concerning the waste.

(Source: Concordia University Laboratory Safety Manual)

Are waste being separated appropriately (e.g. solid vs. liquid, chemical vs. biohazardous...)?

- When disposing of chemicals, put each class of waste chemical in its specifically labeled disposal container.

(Source: Concordia University Laboratory Safety Manual; American Chemical Society)

Do waste containers have secondary containment?

- Large waste containers stored on the floor must have a second containment in case of breakage or spill.

(Source: Prudent Practices for Handling Hazardous Chemicals in Laboratories)

Are syringes and other sharps disposed into puncture-proof biohazard waste containers?

- Sharps such as needles, syringes, scalpel, razor blades, clinical glass such as Pasteur pipettes and any other items capable of puncturing skin must be disposed of in a puncture-proof biohazardous container. Biohazardous waste containers can be obtained from EHS at hazardouswaste@concordia.ca

(Source: Concordia University Laboratory Safety Manual)

Is regular garbage free of broken glass, sharps and hazardous materials?

- For the safety of lab personnel and custodial staff, broken glass, sharps and hazardous materials must be disposed of in appropriate waste containers, following the University hazardous waste procedures. Regulations prohibit the disposal of hazardous waste with regular refuse. Hazardous materials are collected through specific waste containers and collected by EHS. For more information on hazardous waste disposal, refer to the [EHS Hazardous Waste Disposal Procedures website](#).

(Source: Concordia University Laboratory Safety Manual; Basic guidelines for the safe use of hazardous materials are regulated by the Hazardous Products Act and the Quebec Act Respecting Occupational Health and Safety)

References:

- [Act Respecting Occupational Health and Safety, Quebec, R.S.Q., chapter S-2.1](#)
- [Act Respecting Pressure Vessels, Quebec, s, A-20.01](#)
- American Chemical Society: Safety in Academic Chemistry Laboratories, 7th Edition, 2003
- ANSI Z358.1, American National Standards Institute
- ASHRAE 55, American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc. standards
- By-Law Concerning Fire Safety 12-005, Ville de Montréal
- [Canadian Centre for Occupational Health and Safety \(CCOHS\) website](#)
- CSA Z316.5, Canadian Standards Association
- [Concordia University Laboratory Safety Manual](#)
- [Concordia University Policy VPS-45](#)
- [Concordia University Policy VPS-49](#)
- Environmental Science & Technology, Emissions of Ultrafine Particles and Volatile Organic Compounds from Commercially Available Desktop Three-Dimensional Printers with Multiple Filaments, Azimi, P. et al., 2016, 50, pp. 1260–1268
- [First-aid Minimum Standards Regulation, Quebec, chapter A-3.001, r. 10](#)
- [Hazardous Products Act; Federal, R.S. 1985, c. H-3](#)

- [Hazardous Products Information Regulation, Quebec, chapter S-2.1, r. 8.1](#)
- IESNA, Lighting Handbook, 9th Edition. Illuminating Engineering Society of North America, 2000
- Laboratory Design Handbook, Crawley Cooper, E., CRC Press, 1994
- Laboratory Health and Safety Handbook, Stricoff, R.S., Walters, D.B., A. Wiley-Interscience, 2nd Edition, 1995
- Laboratory Safety Institute, Laboratory Health and Safety Notebook, 2002.
- National Fire Code of Canada 2015
- NFPA 45, National Fire Protection Association, Codes and Standards
- NFPA 10, National Fire Protection Association, Codes and Standards
- NFPA 70E, National Fire Protection Association, Codes and Standards
- [Occupational Safety and Health Administration \(OSHA\) website](#)
- [Regulation Respecting Occupational Health and Safety, Quebec, chapter S-2.1, r. 13](#)
- [Regulation Respecting Industrial and Commercial Establishments, Quebec, chapter S-2.1, r. 6](#)
- Prudent Practices for Handling Hazardous Chemicals in Laboratories, NRC, National Academy Press, 1981