

Lakehead University
Chemical Storage Standard

Approved on: September 27, 2005

Revised on: February 28, 2006; March 6, 2009, October 30, 2012, March 26, 2015

Approved by: Associate Vice President, Human Resources

Intent:

This standard was written to provide guidance regarding safe storage of laboratory chemicals. This standard was developed in accordance with the University's policy on health and safety and to ensure compliance with Ontario Occupational Health and Safety regulations and the Ontario Fire Code.

Scope:

This procedure applies to all hazardous chemicals stored on Campus and all members of the University Community, including guests, visitors and contractors, who work with hazardous chemicals.

Definitions:

<i>WHMIS</i>	<i>Workplace Hazardous Materials Information System. A Canada wide information system that deals specifically with safe management and use of hazardous materials legislated by both Federal and provincial government.</i>
<i>MSDS</i>	Material Safety Data Sheet. A document required under WHMIS regulation containing specific data about hazardous material properties and safe handling procedures.
<i>Hazardous Products</i>	Products regulated by WHMIS.
<i>NFC</i>	National Fire Code of Canada
<i>Storage Area</i>	Any whole or portion of a room, space or designated furniture where chemicals are stored for departmental, laboratory or individual use.
<i>BSC</i>	Biological Safety Cabinet
<i>Eye level</i>	At the eye level of the shortest person accessing the hazardous

material.

Applicable Legislation:

Occupational Health and Safety Act, Sections 37(1)
Regulation 851, R.R.O. 1990, Industrial Establishment
Regulation 860, R.R.O. 1990, WHMIS
Ontario Reg. 833 R.R. O. 1990, Control of Exposure to Biological and Chemical Agents
Ontario Reg. 835-846, R.R.O. 1990, for Designated Substances

Ontario Fire Code (O. Reg. 388/97)
National Fire Code of Canada
Controlled Drugs and Substances Act, 1996 (c. 19)
Hazardous Products Act and Regulation, R.S.C. 1985, C. H-3.

Procedure:

Storage Areas

- Storage areas must be secure when not in use and are available to authorized personnel only.
- Storage areas are well illuminated.
- Open flames, smoking and localized heating units are not permitted in or near storage areas.
- Mixing of chemicals on surfaces used for storage is not allowed.
- Aisles surrounding storage areas are free from obstruction and other tripping hazards.
- It is recommended that storage areas are not visible from public hallways, or chemicals are stored behind non-transparent doors.

Shelf Storage

- Large or heavy bottles and containers are stored on shelves no higher than waist level.
- Containers of chemicals are stored at or below eye level, where possible.
- Reagent bottles or containers do not protrude over the shelf edges.
- Enough storage space is allotted, ensuring that shelves are not crowded.
- Empty bottles are removed from the shelves and disposed of in accordance with Lakehead University's Hazardous Waste Procedure.
- Shelves and benches are level and stable. Shelving units are securely fastened to the wall.
- The weight limit of the shelves is not exceeded.
- Shelves are clean, free from chemical contamination, or any other obstruction or waste (e.g. papers).

Storage Containers

- Storage containers are inspected periodically for rust, corrosion and leakage.
- Damaged containers are replaced or repaired immediately.
- Chemicals are stored in sealed containers, not beakers or open vessels.
- Stoppers are easily removed from bottles or containers.
- Containers of mercury are well stoppered, see designated substance procedure.
- Eye-dropper bottles are not used for storing corrosive or water-reactive chemicals.

Labelling of Chemical Containers

Use of a colour coded storage system is strongly advised. Reagent bottles that are not categorized by the manufacturer should be marked with the appropriate coloured tape. Fisher Scientific's ChemAlert scheme is given below as an example.

Red - Flammable. Store in area segregated for flammable reagents.

Blue – Health hazard. Toxic if inhaled, ingested or absorbed through skin. Store in secure area.

Yellow – Reactive and oxidizing reagents. May react violently with air, water or other substances. Store away from flammable and combustible materials.

White – Corrosive. May harm skin, eyes, mucous membrane. Store away from red- yellow- and blue- coded reagents.

Gray – Presents no more than moderate hazard in any of the above categories. Acceptable for general chemical storage.

Exception: *Reagent incompatible with other reagents of the same color bar. Store separately.*

NOTE: *ChemAlert is an instant guide only. It should be supplemented by reading the rest of the label (which provides detailed instructions in the event of accidental exposure, spill or fire, and applicable OSHA, DOT and ANSI* data), the appropriate Material Safety Data Sheet (MSDS) and standard references.*

- All containers must be properly labelled with appropriate WHMIS supplier labels or workplace labels.
- All labels are readable and free from encrustation.
- Labels are firmly attached to the containers.
- Container labels include both date of receipt and anticipated disposal (necessary only for chemicals which degrade over time).

Guidelines

- Chemicals are not exposed to direct sunlight or localized heat.
- It is recommended that containers of corrosive chemicals be stored in trays large enough to contain spillage or leakage.
- Chemicals are stored by reactive class (i.e. flammables with flammables, oxidizers with oxidizers).
- Incompatible chemicals are physically separated from each other.

- MSDS for each chemical must be consulted for proper storage instructions and must be accessible to the storage area.
- Current chemical inventory is accessible to the storage area and updated regularly.
- Bottle carriers are used to transport glass bottles containing hazardous chemicals.
- Waste chemicals shall be segregated.
- If an emergency situation occurs, Security will be notified by dialling 8911 from a safe distance, as well as, the laboratory supervisor.
- Requests for special consideration for non-compliance should be made to Human Resources – Health and Safety.

General Storage Information

In all cases, the material safety data sheet (MSDS) must be consulted for specific instruction on safe storage and incompatibility information.

Acids

- Large bottles are stored on a low shelf or in acid cabinets.
- Oxidizing acids are segregated from organic acids, flammable and combustible materials.
- Acids are separated from caustics and from reactive metals such as sodium, magnesium and potassium.
- Acids are segregated from chemicals which can generate toxic gases on contact such as sodium cyanide and iron sulphide.
- Spill control procedures and materials (neutralizers, absorbent materials) are available.

Caustics

- Caustics are stored away from acids.
- Solutions of inorganic hydroxides are stored in polyethylene containers.
- Caustics are stored below eye level.
- Spill control procedures and materials (neutralizers, absorbent pillows) are available.

Flammables

- All flammable liquids are stored in a NFC approved flammable liquid cabinet.
- All flammable liquids are kept in a flammable cabinet, except for quantities required in one day's work.
- Containers used for the storage of flammable or combustible liquids in a laboratory shall be of not more than 5 L capacity.
- Quantities of flammable and combustible liquids greater than 300L must be stored in a designated and approved chemical storage room.
- Flammable liquids are to be kept away from any open flames or other sources of ignition.
- Only approved explosion proof or flammables refrigerators should be used to store flammable liquids.

- Smoking is prohibited in areas where flammable substances are used and stored.

Peroxide Forming Chemicals

- Peroxide forming chemicals must be stored in airtight containers in a dark, cool and dry place.
- Peroxide forming chemicals should be properly disposed prior to the date of expected peroxide formation.
- Suspicion of peroxide contamination is immediately evaluated by use of safe procedures.
- Chemicals are labelled with date received and expiry date.

Water Reactive Chemicals

- Water reactive chemicals are stored in a cool, dry place.
- In case of fire, a Class D fire extinguisher is available where water reactive compounds are stored.

Oxidizers

- Oxidizers are stored away from flammable, combustible and reducing agents (e.g. zinc, alkaline metals).
- Oxidizers should not be stored on combustible surfaces.

Toxic Materials

- In all areas where toxic materials are in use, a written guideline, for training purposes, will be used to address personal hygiene, use of personal protective equipment, control and use of fume hoods and BSCs and appropriate disposal.
- When toxic gases are in use, a written code of practice will be in place for the use of air purifying respirators and other PPE required for the hazard. PPE should be inspected regularly and records kept of their inspections.
- Toxic materials shall be stored separately from flammable liquids.
- Toxic materials shall be transported in public areas only with appropriate safeguards.
- Toxic materials shall be disposed according to Lakehead University approved methods of disposal.
- Toxic compounds are stored according to the nature of the chemical, with appropriate security employed where necessary.
- A poison control network telephone number is posted.
- If commercially available, antidotes for any toxic material in use or stored will be provided by the Supervisor and accessible in each area that material is used or stored.

Radioactive Compounds

- Must be stored in accordance with Lakehead University's consolidated license conditions and the conditions listed on the Lakehead University Internal Permit to work with radioactive compounds.
- Contact the Health and Safety Officer or the Laboratory and Biosafety Specialist in Human Resources for guidance.

Evaluation:

This procedure shall be evaluated by the Health and Safety Officer and/or Lab and Biosafety Officer in conjunction with the Joint Health and Safety Committee every three years.