

<b>Category:</b>	Health and Safety	<b>Number:</b>	CHEM-HS-0003
<b>Responsibility:</b>	Department Safety Officer	<b>Approval:</b>	Chair, Department of Chemistry
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## 1. Background

Safety in chemistry labs is of the utmost importance in order to lower the risk of personal injury and damage to property in the event of an emergency. It is the goal of the Department of Chemistry to foster a culture of safety in its research labs for all faculty, staff, students, and visitors.

## 2. Purpose

The following document outlines the *policy* for the storage of flammable and combustible liquids in the Cairns Family Health and Biosciences Research Complex and/or Mackenzie-Chown Complex. This policy is in accordance of the regulations established in the Ontario Fire Code.

## 3. Scope

This policy applies to any and all laboratories overseen by the Chemistry Department be they research or teaching labs. This policy applies equally to laboratories that are located within the Cairns Family Health and Biosciences Complex and to those that are in the Mackenzie-Chown Complex.

## 4. Policy

### 4.1. Location of Flammable and Combustible Liquids

- Flammable and combustible liquids shall not be stored adjacent to exits.
- Flammable and combustible liquids shall not be stored within 1.5 m (5 feet) of an exit.
- Electrical equipment in a location where flammable or combustible liquids are present shall conform to the Electrical Safety Code.
- Ensure stability of stored products.
- Cabinets should not be located in close proximity to open flames and other potential sources of ignition.

### 4.2. Dispensing of Flammable or Combustible Liquids

- When flammable liquids are dispensed, metallic containers are to be electrically connected to the fill stem, or rest on a conductive floor that is electrically connected to the fill stem (in the case of non-conductive containers, other measures to minimize static buildup must be taken).
- Dispensing of flammable and combustible liquids up to a size of 5 L must be done in a laboratory fume hood or other properly ventilated area.

### 4.3. Containers for Flammable and Combustible Liquids

- Individual containers of more than 5 L are required for storage of flammable or combustible liquids in a building.
- Safety containers conforming to ULC/ORD-C30 “safety containers” and not more than 25 L capacity shall be used.
- Glass and plastic containers are only permitted for use where the use of metal safety containers would create purity problems or the liquid will cause excessive corrosion of the metal container. Glass and plastic containers must comply with the following table:

Table 1. Relationship between the classification of flammable liquid and the maximum container size that it can be stored in.

Classification of Flammable/Combustible Liquid	Container Size
Class I	1 L maximum
Class II	5 L maximum
Class III	5 L maximum

#### 4.3.1. Solvent Cabinets

- Storage cabinets must meet the following criteria:
  - ULC-C1275 “storage cabinets for flammable liquids”.
  - ULI 1275 “flammable liquid storage cabinets”.
  - Must be factory mutual research approved or listed as meeting NFPA 30.

### 4.4. Storage of Flammable and Combustible Liquids

- Flammable liquids may be stored in containers of up to 5 L in volume. Storage of flammable liquids in 25 L containers provided that the container is metal and ULC/ORD-C30 approved.
- Flammable liquids are to be stored separately from corrosives or oxidizers.
- Storage containers containing flammables are to be labeled with a conspicuous flammable symbol or wording.
- Flammable storage cabinets are to be labeled to indicate that the cabinet contains flammable materials, and that open flame and/or ignition sources must be kept away.
- When flammable liquids are dispensed, metallic containers are to be electrically connected to the fill stem, or rest on a conductive floor that is electrically connected to the fill stem (in the case of non-conductive containers, other measures to minimize static buildup must be taken).
- Flammable liquids are not permitted to be stored in corridors.
- Sample containers for quality control or testing can be used.
- Arrangement of containers provides stability to prevent toppling which could result in a container being damaged and leaking.
- Flammable and combustible liquids are separated from other dangerous goods.
- Flammable and combustible liquids shall be kept in closed containers and stored:
  - In cabinets meeting maximum quantities (Refer to max quantities below).
  - In a room having no openings communicating directly with the public portions of the building.
- Only liquids are to be stored in a flammables cabinet.
- Cabinets are not intended to store cylinders of compressed or liquefied gases.

- Glass containers should be stored in cabinets (preferably cabinets designed for glass; with a lip).
- Where venting system is installed it should not compromise the performance of the cabinet during a fire.
- Liquid spills on the outside of a container should be cleaned prior to it being placed in the cabinet.
- Leaking containers should not be placed in the cabinet.
- Containers must be closed with stored in cabinets.
- Manufacturers instructions should be followed in regards to installation, maintenance, and usage of all cabinets.
- Liquids or other hazardous material that are not compatible with each other should not be stored in the same cabinet.
- Excess quantities maybe stored in a storage cabinet (conform to Fire Code 4.2.10) or in a storage room (conforms to Fire Code 4.2.9) provided there are no openings into public areas of the building.

Table 2. Specifications for Storage Rooms (Fire Code 4.2.9)

Maximum Quantity of Flammable/Combustible Liquids (L)	Minimum Fire Separation Around Room (Hr)	Maximum Density (L/m <sup>3</sup> )
1,500	1	100
10,000	2	200

#### 4.3.1. Maximum Quantities per Fire Compartment

- The total quantity of flammable and combustible liquids stored in cabinets in a single fire compartment shall not exceed the quantity permitted for one cabinet (500 L/Fire Separated Room, where not more than 250 L are Class I liquids)

Table 3. Maximum quantities of flammable and combustible liquids permitted in a given fire compartment.

Location	Flammable	Combustible	Maximum Quantity	Maximum Container Size
Fire Compartment	X		50 L	5 L
		X	250 L	5 L
Total			300 L	5 L

#### 4.3.1.1. Maximum Quantities Outside a Cabinet in a Laboratory

- 10 L including not more than 5 L of Class 1 liquids in a single room or 250 L, including not more than 60 L of Class II liquids, or 10 L of Class I liquids in a single fire compartment having at least a 45 min fire separation rating

#### 4.4. Compressed Gas Cylinders

- Must be secured in the upright position by a suitable retaining strap or chain.
- Cylinders that are not in use are required to have a protective valve stem cap in place.
- Cylinders of gases that may react with one another are not to be stored in the same location.
- Cylinders of flammable gases are not to be stored with oxidizing materials or with cylinders containing gases that support combustion.

#### 4.5. Fire Extinguishers

- Must be installed and in good working order in laboratories where hazardous processes are carried out, or significant quantities of flammable liquids are used or stored.

#### Amendments (revision history)

Date revised	Responsible
Enter date	Enter position/title