



Flammable Liquids Storage: Standard for Storage Rooms

Many laboratories present a high fire risk caused by the storage of flammable liquids. This risk can be reduced by minimizing the quantities stored in the laboratories and also by ensuring that flammable liquids are stored in appropriate storage cabinets. Quantities of flammable liquids that exceed the maximum permissible in the laboratory must be stored in specially designed rooms. This standard is based on Regulation 851, as amended (Regulation for Industrial Establishments) made under the *Occupational Health and Safety Act* of Ontario and Regulation 388 (the Fire Code) made under the *Fire Protection and Prevention Act*.

Note: In this standard, "worker" includes faculty, staff, students and visitors.

Scope:

All storage rooms where flammable liquids are stored and/or dispensed.

Responsibilities:

Departments shall:

- ensure that flammable storage rooms, under their jurisdiction, are in compliance with all requirements of this standard;
- ensure that flammable storage rooms have restricted access and are properly identified (includes signage to indicate the nature of the materials stored in the room, what activities are permitted in the room (i.e. is dispensing permitted) and who to contact in the event of problems or emergency (such as spills, fire); and
- workers are informed regarding the proper use and storage of flammable liquids in the room.

Workers shall:

- store and/or dispense flammable materials in accordance with this standard

Storage Rooms for Flammable Materials

The following outlines the requirements for these rooms:

1) Basic Requirements

Flammable storage rooms shall:

- not be located in the basement of a building.
- be separated from the rest of the building with partitions having a minimum one-hour fire resistance rating;



- have self-closing doors, hinged to swing outwardly on their vertical axes.
- be equipped with
 - a drain connected to a dry sump or holding tank;
 - liquid-tight seals between interior walls and floor and liquid-tight ramped sill at any door opening, which is not in an exterior wall.
- have natural ventilation to the outdoors by upper and lower exterior wall gravity louvres.

In addition to the above requirements, storage rooms where "opened" containers of flammable liquids or Class IA flammable liquids are kept shall:

- contain no potential sources of ignition;
- have explosion venting to the outdoors;
- have a spark-resistant floor.

2) Ventilation of Flammable Storage Rooms

Natural or continuous ventilation may be used if:

- Class I liquids are processed, stored, dispensed or used in a manner which does not release flammable vapours into the room; or
- only Class II (combustible) liquids are processed, dispensed or used;
- Class I liquids are stored in closed containers and dispensing operations are not performed.

If vapours from Class I liquids can be released into the room, continuous mechanical ventilation is required:

- it must be able to exhaust at least 18 m³/hr per square metre of room area but not less than 250 m³/hr
- if ventilation is required, the air inlets and outlets must be placed appropriately:
- where the flammable vapour is heavier than air, at least one air inlet and outlet must be located no more than 30 cm above floor level
- where the flammable vapour is lighter than air, at least one air inlet and outlet must be located no more than 30 cm below the ceiling

3) Maximum Quantities in Storage

A maximum quantity of 1500 L may be stored in a room which has a minimum fire separation of 1 hour and a maximum density of 100 L/ m²

4) Dispensing Flammable Liquids in Storage Room



If flammable liquids are dispensed in the storage room in such a way that vapours could be released into the room, then the following requirements must be met:

- mechanical ventilation from floor level to the outdoors must be provided at the rate of 18 m³ /hr per square metre of floor area (but not less than 250 m³/hr); and
- containers and dispensing equipment must be bonded and grounded when dispensing flammable liquids

Other General Requirements for Flammable Storage Rooms

- must have clear, unobstructed access and to and from the room and its contents;
- must have appropriate spill cleanup equipment (such as absorbents) and appropriate personal protective equipment;
- spill procedures must be posted and room users trained;
- aisle widths inside the room must be at least 1 m apart;
- sign posted on door indicating the nature of the materials stored in the room and who to contact in the event of a problem or emergency;
- do not store incompatible materials together;
- have an appropriate fire extinguisher readily available.

Definitions

Class I Flammable Liquids:	A liquid, which has a flash point below 37.8°C and a vapour pressure below 275 kPa absolute at 37.8°C.
Class IA Liquids:	Includes those liquids that have flash points below 22.8°C and boiling points below 37.8°C.
Class IB Liquids:	Includes those liquids that have flash points below 22.8°C and boiling points at or above 37.8°C.
Class IC Liquids:	Includes those liquids that have flash points at or above 22.8°C but below 37.8°C.
Class II Combustible Liquids:	A liquid, which has a flash point at or above 37.8°C and below 60°C.