



Subject: **HANDLING & STORAGE OF FLAMMABLE & EXPLOSIVE CHEMICALS IN LABORATORIES**

Policy No. 105

APPLICATION

New York University

PURPOSE

To comply with *Rules of the City of New York, Title 3 - Fire Department, Chapter 10 §10-01(Formerly NYC Fire Prevention Directive 1-66)* and to reduce the risk of fires resulting from improper handling or storage of flammable chemicals.

POLICY AND GENERAL INFORMATION

1.0 Explosive Material

Explosive material, defined by *Rules of the City of New York, Title 3 - Fire Department, Chapter 10 §10-01 (Formerly NYC Fire Prevention Directive 1-66)* as any quantity of Class A, B or C explosives as classified by the Department of Transportation (D.O.T.) and any other chemical compounds or mixtures thereof used as the propelling or exploding material in any cartridge or other explosive device, is NOT permitted to be used or stored in NYU laboratories. Any current supplies shall be disposed of through the Hazardous Waste Disposal Program (refer to separate Hazardous Waste disposal policy). Exceptions are those type substances as listed in section 4.2 of this policy.

2.0 Flammable Chemicals

2.1 Definitions (from *RCNY Chapter 10 §10-01; NFPA 30: Flammable and Combustible Liquids Code, 1993 Edition*).

2.1.1 Flammable Liquid - any liquid mixture, substance or compound which will emit a flammable vapor at a temperature below 100° F, when tested in a Tagliabue closed cup tester.

2.1.2 Flammable Solid - a solid other than one classified as an explosive, which is liable to cause fire through friction, absorption of moisture, spontaneous chemical changes, or as a result of retained heat from manufacturing or processing. Examples are: white phosphorus, nitrocellulose, metallic sodium and potassium, and zirconium powder.

2.1.3 Flash Point - the minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

2.2 Storage of Chemicals and Flammable Gases

ISSUE DATE	REPLACES	ORIGINATOR	APPROVAL
11/05	02/02	ENVIRONMENTAL SERVICES	SR. VP OPERATIONS AND ADMINISTRATION

2.2.1 Storage of Chemicals

RCNY Chapter 10 §10-01 sets maximum laboratory storage limits in 4 separate types and permits are issued by the NYC Fire Department as follows:

- Type I - 2 hour fire rating and sprinklers; permitted to store up to 30 gallons flammable liquid, up to 15 lbs. of flammable solid, up to 50 lbs. of oxidizing materials, up to 12 lbs. unstable reactives.
- Type II - 1 hour fire rating and sprinklers; permitted to store up to 25 gallons flammable liquid, up to 10 lbs. of flammable solid, up to 40 lbs. oxidizing materials, up to 6 lbs. unstable reactives.
- Type III - 2 hour fire rating but no sprinklers; Permitted to store up to 20 gallons flammable liquid, up to 6 lbs. flammable solid, up to 30 lbs. oxidizing materials, up to 3 lbs. unstable reactives.
- Type IV - 1 hour fire rating and no sprinklers; permitted to store up to 15 gallons flammable liquid, up to 3 lbs. flammable solid, up to 20 lbs. oxidizing materials, up to 2 lbs. unstable reactives.
- In order to legally maintain a Type I, II, III or IV laboratory, a permit must be issued by the NYC Fire Department. Similarly a valid Certificate of Fitness must be held by a qualified person who has the authority to perform work in the permitted laboratory.

Any laboratory exceeding its storage limit due to special circumstances must obtain prior clearance from the Environmental Services Department. Stockpiling of flammable chemicals in laboratories is not permitted. It is recommended that chemicals be ordered in reduced quantities, more often. Most commonly used chemicals are available on a same day or next day basis from chemical stores. Some chemical supply houses will also provide quick delivery.

- ### 2.2.2 Storage of Flammable Gases - *Rules of the City of New York Chapter 10 §10-01* states that storage and use of flammable gases within laboratories shall be in accordance with the table below. Only flammable gas being used in an on-going operation plus an equal reserve may be kept in a laboratory. (See separate Compressed Gas Cylinder policy.)

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Area of Lab in square feet	up to 500 sq. ft.	per additional 100 sq. ft.	Maximum per Lab Unit
Maximum Capacity** in cubic feet	9.24 cu. ft.	1.54 cu. ft.	15.4 cu. ft.

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**Water container capacity

3.0 Fire Prevention

Prudent use of flammable chemicals is based upon (a) prevention of flammable vapor accumulation, and (b) removal of sources of ignition. Adherence to the following guidelines will help to reduce fire risk.

- 3.1 All operations involving the generation of flammable vapors are to be conducted in a fume hood with a minimum average face velocity of 80 feet per minute (fpm), with the face velocity at any point not less than 75 feet per minute or greater than 200 feet per minute. The average face velocity of a fume hood shall not exceed 150 feet per minute, to avoid unsafe air diffusion or inappropriate exhaust.
- 3.2 Flammable liquids shall not be stored in a refrigerator or cold room unless such equipment is explosion proof. Flammable liquids may be stored in day ice chests or ice boxes, provided such equipment is non-electrical.
- 3.3 Keep flammable liquids in approved safety cans, with maximum 2 gallon capacity whenever possible. If use of safety cans compromises chemical purity, the flammable liquids may be kept in their original glass containers. Such bottles may have a maximum 1 gallon capacity.
- 3.4 Whenever possible, store flammable liquids in approved flammable liquid storage cabinets or in metal laboratory cabinets. There should not be storage in fume hoods. To prevent accidental breakage, do not store flammable liquids on the floor. Store containers away from sources of heat such as radiators.
- 3.5 Store flammable liquids away from acids and oxidizers to prevent dangerous chemical reactions in the event of spills or leakage
- 3.6 Do not use open flame apparatus for heating or distilling flammable liquids.
- 3.7 Smoking is not permitted in laboratories, or in any area in which flammable liquids are used or stored.
- 3.8 Electrical equipment used with flammable liquids must be approved for such use. All laboratory electrical equipment shall be grounded. All ignition sources (heaters, switches, relays, open motors, thermostats) shall be kept remote from equipment containing flammable liquids, unless approved for use in hazardous locations.
- 3.9 Dispensing flammable liquids from larger to smaller containers shall be performed only by the use of an approved hand or foot pump. If both containers are metal, bonding must be used to prevent static sparking.

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3.10 If more than 5 gallons of flammable liquids are used or stored in a laboratory, there must be a fixed overhead safety shower within 25 feet of the laboratory door. This shower must remain unobstructed and accessible at all times.

4.0 Labeling

To insure that laboratory personnel are aware of the hazards associated with the chemicals they work with, the following conditions shall be met:

4.1 All chemical containers shall be properly and legibly labeled, indicating chemical name, concentrations and hazards. Containers of laboratory prepared solutions and mixtures shall also be labeled.

4.2 Containers of chemicals belonging to the following functional groups shall be labeled with the date of delivery, shelf life and expiration date.

4.2.1 Picrics at less than 10% hydration

4.2.2 Perchlorates

4.2.3 Peroxides

4.2.4 Peroxidizable materials

4.2.5 Polymerizers that react violently in polymerization or become hazardous after polymerization

4.2.6 Any other material stored or used in the lab, which is known to deteriorate over time to an unstable condition (such as ether).

5.0 Emergency Protocols and Equipment

Adherence to the above guidelines for flammable chemicals will reduce the risk of emergency situations; however, all handlers of chemicals should be familiar with proper response to the following situations.

5.1 Flammable Liquid Spills

Extinguish all sources of ignition. For details on handling chemical spills, refer to separate policies addressing Chemical Spill Plans and Emergency Protocols.

5.2 Fires Involving Flammable Chemicals

Follow fire safety protocols and the separate policy for Fire Incident Protocol.

6.0 Emergency Equipment

6.1 All laboratories must be equipped with a 10 lb. dry chemical (ABC type) fire extinguisher for each 2500 sq. ft. of floor area. Notify the Building Manager if one is needed.

6.2 Laboratory personnel should familiarize themselves with the locations of the nearest exits, fire blankets, emergency showers, and eyewash stations.

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- 6.3 Laboratories should maintain up-to-date Material Safety Data Sheets (MSDS) for the chemicals used in the lab. MSDS provide detailed information on first aid procedures, protective equipment, and chemical properties. MSDS should accompany deliveries of chemicals. If it is missing, Environmental Services can assist in obtaining them.