

SUBJECT: Flammable and Combustible Liquids

REGULATORY STANDARD: 29 CFR 1910.106

DATE: January 2000

An estimated 575,000 chemical products are already in existence, and hundreds of new chemicals are introduced annually. Many of these chemical products contain properties that classify them as flammable or combustible. This can pose a serious hazard for exposed workers and their employers. OSHA's Standard, 29 CFR 1910.106, establishes uniform requirements to ensure that the hazards associated with the storage, handling, and use of all chemicals used in U.S. workplaces are evaluated, and that this hazard information is transmitted to all affected workers.

GENERAL

This manual is intended to address the issues of storage, handling, and use of flammable and combustible chemicals, and establish appropriate protective measures for employees.

SUPERVISOR'S RESPONSIBILITY

Supervisors control the work environment. If proper workplace controls are not followed, the storage and dispensing of flammable and combustible liquids can be extremely dangerous. To prevent catastrophic results, the following procedures must be closely followed.

A. Classes of Flammable and Combustible Liquids

The following information is provided to ensure that users of this document are aware of the classes of flammable and combustible liquids.

1. Flammable liquid is defined as any liquid having a flashpoint below 100 °F (37.8 °C) except any mixture having components with flashpoints of 100 °F (37.8 °C) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids are known as Class I liquids. Class I liquids are divided into three classes as follows:
 - a. Class IA includes liquids having flashpoints below 73 °F (22.8 °C) and having a boiling point below 100 °F (37.8 °C).
 - b. Class IB includes liquids having flashpoints below 73 °F (22.8 °C) and having a boiling point at or above 100 °F (37.8 °C).
 - c. Class IC includes liquids having flashpoints at or above 73 °F (22.8 °C) and below 100 °F (37.8 °C).
2. Combustible liquid is defined as any liquid having a flashpoint at or above 100 °F (37.8 °C). Combustible liquids are divided into two classes as follows:

- a. Class II includes liquids with flashpoints at or above 100 °F (37.8 °C) and below 140 °F (60 °C), except any mixture having components with flashpoints of 200 °F (93.3 °C) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.
- b. Class III includes liquids with flashpoints at or above 140 °F (60 °C). Class III liquids are subdivided into two subclasses:
 - (1) Class IIIA includes liquids with flashpoints at or above 140 °F (60 °C) and below 200 °F (93.3 °C), except any mixture having components with flashpoints of 200 °F (93.3 °C) or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.
 - (2) Class IIIB includes liquids with flashpoints at or above 200 °F (93.3 °C). This section does not cover Class IIIB liquids. Where the term "Class III liquids" is used in this section, it must mean only Class IIIA liquids.

B. Handling of Flammable and Combustible Liquids - General Requirements

1. Flammable liquids must be kept in covered containers when not actually in use, and waste must be kept in approved covered metal containers.
2. No open flames or other sources of ignition can be present in any area where flammable liquids are used or within 20 feet unless separated by a partition.
3. Transfer of liquids should be accomplished by using a closed piping system, by gravity through a self-closing valve, or by use of safety cans.
4. *NO SMOKING* signs must be posted in all locations where flammable or combustible liquids are used or stored.
5. The transfer of flammable liquids must be done using appropriate bonding and grounding of containers.
6. Hot surfaces (steam pipes, etc.) cannot be located in areas where combustible residues may accumulate without approved fire protection controls.
7. Electrical equipment located within areas where combustible residues may accumulate must be approved for Class I Division 1 locations. Electrical equipment adjacent to a spraying area where combustible residues may accumulate and are not separated by a partition must be approved for Class I Division 2 locations.
8. Maintenance operations involving hot work or the use of spark producing tools may be done if the area has been proven safe. Hot Work procedures must be followed.
9. Housekeeping, including cleaning of spills and leakage control, must be strictly controlled in areas where flammable and combustible liquids are used or stored.

C. Containers and Portable Tanks

Maximum Allowable Size of Containers and Portable Tanks

(applies to containers stored outside of storage cabinets)

Container type	Flammable Liquids			Combustible Liquids	
	Class IA	Class IB	Class IC	Class II	Class III
Glass or approved plastic:	1 pt	1 qt	1 gal	1 gal	1 gal
Metal (other than DOT drums):	1 gal	5 gal	5 gal	5 gal	5 gal
Safety cans:	2 gal	5 gal	5 gal	5 gal	5 gal
Metal drums (DOT specs):	60 gal	60 gal	60 gal	60 gal	60 gal
Approved portable tanks:	660 gal	660 gal	660 gal	660 gal	660 gal

D. Storage Cabinets

1. Maximum capacity: Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.
2. Fire resistance: Storage cabinets used on the Montana Tech campuses must be designed and constructed to meet NFPA 251-1969 requirements.
3. Labeling: Cabinets must be labeled in conspicuous lettering, "Flammable - Keep Fire Away."

E. Storage of Flammable and Combustible Liquids Inside Buildings

1. Egress: Flammable or combustible liquids must not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people.
2. Containers: The storage of flammable or combustible liquids in containers or portable tanks must comply with 29 CFR §1910.106.
3. Office areas: Storage is prohibited except where required for maintenance and operation of building and operation of equipment. Such storage of flammable or combustible materials must be kept in closed metal containers stored in a storage cabinet, in safety cans, or in an inside storage room not having a door that opens into that portion of the building used by the public.
4. Leaking containers: Leaking containers must be removed from a storage area and the contents transferred to an undamaged container, using a fume hood if possible for the transfer.

F. Fire Control

Suitable fire control devices, such as a small hose or portable fire extinguishers, must be available at locations where flammable or combustible liquids are stored.

1. Portable and special equipment: Appropriate portable fire extinguishers and control equipment must be provided in adequate quantities and types.
2. Special extinguishers: Special extinguishing equipment such as those utilizing foam, inert gas, or dry chemical must be provided as needed or indicated by the special hazards of operation dispensing and storage.
3. At least one portable fire extinguisher having a rating of not less than 12-B units must be located outside of, but not more than 10 feet from, the door opening into any room used for storage.
4. At least one portable fire extinguisher having a rating of not less than 12-B units must be located not less than 10 feet, nor more than 25 feet, from any Class I or Class II liquid storage area located outside of a storage room but inside a building.
5. Sprinklers: When sprinklers are provided, they must be installed in accordance with NFPA requirements.
6. Open flames and smoking: Open flames, ignition sources and smoking are not permitted in flammable or combustible liquid storage areas.
7. Water reactive materials: Materials that will react with water must not be stored in the same room with flammable or combustible liquids.

G. Maintenance

All fire protection systems must be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition and will serve their purpose in time of emergency.

H. Sources of Ignition

1. Adequate precautions must be taken by all employees to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.
2. Grounding. Class I liquids must not be dispensed into containers unless the nozzle and container are electrically interconnected.

I. Housekeeping

1. Maintenance and operating practices must control leakage and prevent the accidental escape of flammable or combustible liquids. Spills must be cleaned up promptly.
2. Adequate aisles must be maintained for unobstructed movement of personnel and so that fire protection equipment can reach any part of a flammable or combustible liquid storage or use area.
3. Combustible waste material and residues must be kept to a minimum, stored in covered metal receptacles and disposed of daily.
4. Ground area around buildings should be kept free of weeds, trash, or other unnecessary combustible materials.