

Flammable Liquids Storage and Handling

1. Purpose

This policy establishes requirements to minimize the fire and explosion hazards associated with flammable liquids in containers and portable tanks.

2. Scope

This policy contains storage and handling requirements for flammable liquids and applies to all personnel in the workplace who may handle flammable liquids.

The following sections of the safety manual contain related policies and should be consulted for additional requirements and guidance:

- Electrical Safety
- Fire Protection
- Hazard Communication
- Safety Signs and Color Coding
- Personal Protective Equipment
- Hot Work
- Cold Work
- Quality Control Test Room Safety

3. Minimum Requirements

	Minimum Requirements	Supporting Documentation
1.	Containers and portable tanks used to store flammable liquids shall be approved or listed by a nationally recognized testing laboratory.	Section 6.1
2.	The use of plastic buckets to collect, store, or transfer flammable liquids is prohibited unless the liquid would react with metal.	Section 6.1
3.	Flammable liquids shall not be dispensed into containers unless the nozzle and container are electrically interconnected.	Section 8
4.	Storage in general purpose warehouses or in portions of such buildings cut off by standard firewalls shall be in accordance with Table I, Indoor Container Storage, or Table II, Indoor Portable Tank Storage, in Appendix I.	Appendix I

4. Definitions

Bonding—The process of connecting two or more conductive objects together by means of a conductor to minimize potential electrical differences between the conductive objects.

Closed container—A container sealed by means of a lid or other device that prevents the escape of liquid or vapor at ordinary temperatures, even if it is upset from its normal upright position.

Container—Generally this policy uses the term to mean any can, barrel, or drum designed to hold less than 60 gallons and meeting the requirements of a nationally recognized standard for holding flammable liquids.

Flammable liquid—Means any liquid having a flashpoint at or below 199.4 °F (93 °C). Flammable liquids are divided into four categories as follows:

1. Category 1 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point at or below 95 °F (35 °C).
2. Category 2 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point above 95 °F (35 °C).
3. Category 3 shall include liquids having flashpoints at or above 73.4 °F (23 °C) and at or below 140 °F (60 °C).
4. Category 4 shall include liquids having flashpoints above 140 °F (60 °C) and at or below 199.4 °F (93 °C).

Note: Previous versions of this policy referred to flammable *and combustible* liquids. Flammable liquids had a flashpoint below 100 °F and combustible liquids had a flashpoint at or above 100°F. This new definition is part of a global harmonization effort, but it is important to note that different agencies may still be using different definitions.

For example, BP's Incident Reporting requirements define flammable liquids as having flashpoints below 73 °F. The US Department of Transportation (DOT) standard 49 CFR 173.120 defines flammable liquids as having flashpoints below 140 °F. We have chosen the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.106 definition since that regulation forms the basis for this policy. Consult the other sources, or your Safety or Environmental Coordinator for questions related to BP reporting or DOT shipping requirements.

Flash point—The lowest temperature at which a liquid gives off sufficient vapor to form an ignitable mixture with air.

Grounding—The process of connecting one or more conductive objects to the ground to minimize potential differences between the objects and the ground. Grounding dissipates an electric charge to the earth.

Portable tank—Generally for this policy the term means a closed container having a liquid capacity over 60 gallons and not exceeding 660 gallons, not intended for fixed installation.

Static electricity—The electrification of materials through physical contact and separation and the various effects resulting from the positive and negative charges so formed. Static is generated when liquids move into contact with other materials, such as in pouring, draining, mixing, pumping, filtering, or agitating.

5. Roles and Responsibilities

- A. Operations Team Leaders:
 1. Shall implement and enforce the requirements of this policy.

6. Container and Portable Tank Storage

6.1. General

- A. Containers and portable tanks used to store flammable liquids shall be approved or listed by a nationally recognized testing laboratory. These containers and portable tanks must have labels to identify their contents and display the appropriate hazard warnings. Refer to the Hazard Communication policy for appropriate label information.

- B. The use of plastic buckets to collect, store, or transfer flammable liquids is prohibited unless the liquid would react with metal.
- C. Flammable liquids shall be kept in closed containers when not in use.
- D. Containers may be stacked if designed to do so.

6.2. Storage Inside Buildings

- A. Flammable liquids shall not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people.
- B. Storage shall not be in areas occupied by offices, but may be in separate areas in storage cabinets.
- C. The total quantity of liquid that may be located outside of an inside storage room or storage cabinet in a building or in any one fire area of a building shall not exceed any one of the following:
 - 25 gallons of Category 1 flammable liquids in containers.
 - 120 gallons of Category 2, 3, or 4 flammable liquids in containers.
 - 660 gallons of Category 2, 3, or 4 flammable liquids in a single portable tank.
- D. Storage in general purpose warehouses or in portions of such buildings cut off by standard firewalls shall be in accordance with Table I, Indoor Container Storage, or Table II, Indoor Portable Tank Storage, in Appendix I. Materials that cannot create a fire exposure hazard to the flammable liquids may be stored in the same area.

6.3. Storage cabinets

- A. Flammable liquid storage cabinets shall be Underwriter Laboratories (UL) listed or Factory Mutual (FM) approved. Alternatively, cabinet manufacturers may state cabinets comply with OSHA 1910.106 standards or meet NFPA 30 recommendations.
- B. No more than 60 gallons of Category 1, 2, or 3 flammable liquids, or no more than 120 gallons of Category 4 flammable liquids may be stored in a single storage cabinet.
- C. When used for storage of closed containers, a flammable liquid storage cabinet is not required to be vented. If the cabinet is not vented but has vent openings, they must be sealed with properly fitted metal bungs. If the cabinet is vented, it shall be vented to a safe area outdoors in a manner that will not compromise the performance of the cabinet.
- D. Cabinets shall be conspicuously labeled with the warning "Flammable—Keep Fire Away."

7. Hoses, Piping, and Connections

- A. Hoses, piping, and connections shall be designed for the material being handled. If low-melting point materials such as aluminum or brass, or non-ductile materials such as cast iron are used in above ground systems or inside buildings, they shall be suitably protected against fire exposure or so located that any spill resulting from the failure of these materials could not unduly expose persons or buildings, and could be readily controlled by remote valves.
- B. All pressure hoses and couplings in service at loading/unloading docks shall be inspected at intervals appropriate to the service. The hose and couplings shall be tested with the hose extended and using the "in-service maximum operating pressures." Any hose showing material deteriorations, signs of leakage or weakness in its carcass or at the couplings shall be withdrawn from service and repaired or discarded.
- C. Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid in normal operation and in the event of physical damage.

8. Handling Flammable Liquids

- A. Employees and contractors shall wear the appropriate PPE noted in the USPL PPE Matrix when handling flammable liquids.
- B. Flammable liquids must be drawn from or transferred into indoor containers, portable tanks, and vessels only by a closed piping system, from safety cans by means of a device drawing through the top, or from a container or portable tank by gravity through an approved self-closing valve.
 - 1. Transferring flammable liquids by means of gas or air pressure on the container or portable tank is prohibited.
 - 2. Bonding is not required where a container is filled through a closed system.
- C. Bonding is not required when storing flammable containers on non-conductive materials for secondary or tertiary containment.
- D. Flammable liquids shall not be dispensed into containers unless the nozzle and container are electrically interconnected, i.e. bonded.
- E. Flammable liquids may be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.
- F. Where flammable liquids are used or handled, except in closed containers, means shall be provided to dispose promptly and safely of leakage or spills.
- G. Flammable liquids with a flashpoint below 100 °F shall not be drawn from or filled within buildings unless provision is made to prevent the accumulation of flammable vapors in hazardous concentrations.
- H. At least one portable fire extinguisher having a rating of not less than 12-B units shall be located not less than 10 feet, nor more than 25 feet, from any Category 1, 2, or 3 flammable liquid storage area inside a building.

9. Training

- A. Personnel who work with containers and portable tanks of flammable liquids shall be trained in the safe storage and handling of flammable liquids per the USPL Training and Competency Matrix.

10. References

- 1. Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, 29 CFR 1910.106, "Flammable and Combustible Liquids."
- 2. National Fire Protection Association (NFPA) 30, "Flammable and Combustible Liquids Code."

Appendix I

Indoor Storage Limits for Flammable Liquids

Table I. Indoor Container Storage		
Category Number	Storage Level	Unprotected⁴ storage maximum per pile (gallons)
1	Ground and upper floors	660
	Basement	Not permitted
2	Ground and upper floors	1,375
	Basement	Not permitted
3 - Flashpoint < 100 °F	Ground and upper floors	4,125
	Basement	Not permitted
3 - Flashpoint ≥ 100 °F	Ground and upper floors	4,125
	Basement	Not permitted
4	Ground and upper floors	13,750
	Basement	Not permitted

Note 1: When 2 or more categories of materials are stored in a single pile, the maximum volume (in gallons) permitted in that pile shall be the smaller of the 2 or more separate maximum gallons.

Note 2: Aisles shall be provided so that no container is more than 12 feet from an aisle. Main aisles shall be at least 3 feet wide and side aisles at least 4 feet wide.

Note 3: Each pile shall be separated from each other by at least 4 feet.

Note 4: Unprotected means the area does not have an approved automatic sprinkler system or equivalent extinguishing system designed for flammable liquid storage.

Table II. Indoor Portable Tank Storage		
Category Number	Storage Level	Unprotected⁴ storage maximum per pile (gallons)
1	Ground and upper floors	Not permitted
	Basement	Not permitted
2	Ground and upper floors	2,000
	Basement	Not permitted
3 - Flashpoint < 100 °F	Ground and upper floors	5,500
	Basement	Not permitted
3 - Flashpoint ≥ 100 °F	Ground and upper floors	5,500
	Basement	Not permitted
4	Ground and upper floors	22,000
	Basement	Not permitted

Note 1: When 1 or more categories of materials are stored in a single pile, the maximum volume (in gallons) permitted in that pile shall be the smaller of the 2 or more separate maximum gallons.

Note 2: Aisles shall be provided so that no portable tanks are more than 12 feet from an aisle. Main aisles shall be at least 8 feet wide and side aisles at least 4 feet wide.

Note 3: Each pile shall be separated from each other by a distance of at least 4 feet.

Note 4: Unprotected means the area does not have an approved automatic sprinkler system or equivalent extinguishing system designed for flammable liquid storage.