

# Chemical Storage Guidelines: Flammable Materials



Many chemicals require special storage to minimize serious risk for personal injury and damage to property and equipment. Safe storage of chemicals begins with the proper identification of chemicals to be stored and their hazards. Safety Data Sheets (SDS) provide basic information specific to that chemical.

Some chemicals are more flammable than others, and storage and handling requirements are defined by flash point and boiling point. Storage requirements are also affected by the quantity of chemicals being stored, proximity of other materials, and by whether they are stored indoors or outdoors.

## Flammable liquids

The flash point is the lowest temperature at which a liquid can form an ignitable mixture (vapor) with air. Flammable liquids vaporize and form flammable mixtures when containers are left open, leaks or spills occur, or the liquids are heated. Vapor mixed with air can ignite with exposure to a spark or a flame. Flammable liquids form flammable vapors at temperatures below 100° F. Flammable liquids form flammable vapors and have a flash point of less than 200° F. At normal room temperatures, extremely flammable liquids form flammable vapors below 73° F.

The handling and use of flammable liquids and their vapors may cause health hazards from ingestion, inhalation, or skin contact. Health effects vary,

depending on the particular chemical, the chemical concentration, and route of exposure. Dangers include toxicity, reactivity, instability, or corrosivity of the material. The ability of a chemical to either burn or support burning is a potentially disastrous physical hazard. Combustion byproduct contaminants are also a concern because they are different from those of the original flammable material. Byproducts include fumes, gases, smoke, and dust particles. They can produce toxic effects, as in fire fatalities resulting from poison gases.

### Common Flammable Liquids

Flammable Flash point < 200° F (93.3° C)	Extremely flammable Flash point < 73° F (23° C) Boiling point < 95° F (38° C)
Diesel oil Furniture polish Kerosene Oil-based paints Fuel oil Nail polish remover Paint thinner Rubber cement Turpentine Gasoline	Charcoal starter fluid Cigarette lighter fluid Spray paints Wood stains

*Information excerpted from the Handbook of Chemical and Environmental Safety in Schools and Colleges, 1990, J.B. Lippincott Company.*

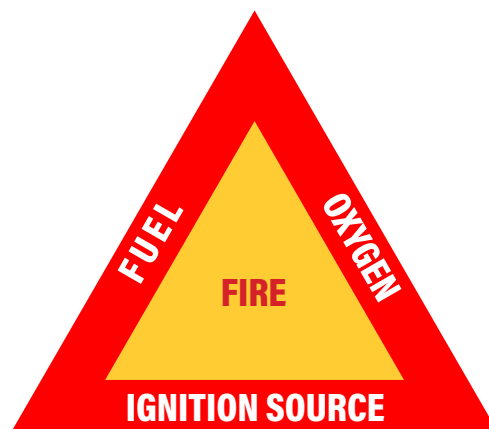
Inappropriate storage can result in hazardous chemical interactions. Keep flammable materials away from incompatible chemicals. For example, the [NIOSH Pocket guide](#) identifies turpentine as incompatible and reactive with strong oxidizers, chlorine, chromic anhydride, stannic chloride, and chromyl chloride.

### Do not store flammables with the following:

- Oxidizing agents such as chlorates, nitrates, perchlorates, permanganates, and peroxides. They usually do not combust on their own but provide the oxygen to accelerate the combustion rate of other chemicals.
- Corrosive chemicals (acids or bases that destructively attack organic and inorganic material). Common acids include sulfuric acid (battery acid), acetic acid, and nitric acid. Although acetic acid and nitric acid are both acids, they are incompatible. Common alkalis (bases) include ammonium hydroxide, calcium oxide (lime), and sodium hydroxide (lye).
- Materials susceptible to spontaneous heating and/or explosions. Hydrogen peroxide contacting combustible material can result in spontaneous combustion. Picric acid can be explosive.
- Substances that react with air or moisture to create heat. Sulfuric acid is a corrosive that reacts violently with water, giving off an irritating and toxic fume.

Avoid storing flammables in direct sunlight or near other heat sources; eliminate all sources of ignition. Keep the area dry and cool. Use explosion-proof refrigerators designed for chemical storage when chemicals require extra cool temperatures. Most flammable vapors are heavier than air and settle low. Provide adequate ventilation to prevent the accumulation of large amounts of vapor.

## THE CHEMICAL REACTION - FIRE



Store flammable materials in a designated and approved fireproof cabinet or storage rooms as required by 29 CFR 1910.106, Flammable Liquids. Cabinets must be labeled: **FLAMMABLE - KEEP FIRE AWAY**. Metal cabinets must be constructed with at least 18-gauge sheet iron and double-walled, with 1½ inch air space. The doorsill must be at least 2 inches above the bottom of the cabinet. *NFPA 30, Flammable and Combustible Liquids Code*, does not require venting for fire protection purposes. Vent openings must be sealed with bungs according to manufacturer's instructions. However, if the cabinet is vented, it should be vented from the bottom directly outdoors.

Storage rooms have specific construction and ventilation requirements; see 29 CFR 1910.106. Check local fire codes for additional storage requirements.

Store flammable solids in fireproof storage cabinets but not with flammable liquids. Flammable solids such as sulfur, calcium carbide, and white phosphorus can ignite in the presence of air or oxygen and continue to burn until the material is spent.

**Before storing flammables, ask:**

- Is the inventory of flammables appropriate to the workload?
- Are containers closed and stored in appropriate fireproof storage containers, cabinets, or rooms when not in use?
- Are approved safety cans in use, and are they in good condition?
- Are flammables stored with compatible chemicals?
- Are flammable liquids stored in areas where vapors cannot collect and away from electrical motors and other sources of ignition?
- Are containers labeled appropriately and expiration dates observed?
- Are bonding and grounding provisions in place for transfer of flammables?
- Are fire extinguishers available? *Note:* Fire extinguishers need to be appropriate for the type of chemical fire (e.g., class B for flammables).
- Are there established procedures for the cleanup of spills and the disposal of chemicals and cleanup materials?
- Does the quantity of in-use or stored liquids outside of flammable-storage cabinets or storage rooms exceed 29 CFR 1910.106 requirements?

Note that Safety Data Sheets may not cover specifics for safe storage and chemical segregation. To learn more about chemical reactivity between mixed chemicals, consult this [detailed information](#).

**Sources**

- *Handbook of Chemical and Environmental Safety in Schools and Colleges*, published by J.B. Lippincott Company
- *NFPA 30, Flammable and Combustible Liquids Code*, 2000 Edition

**More information**

- [29 CFR 1910.106, Flammable Liquids, rule](#)
- [OAR 437-002, Hazardous Materials](#)
- [Federal OSHA, Chemical Reativity Hazards](#)
- [Federal OSHA, Flammable Liquids Fact Sheet](#)
- [Oregon OSHA Flammable and Combustible Liquids resource page](#)



Visit Oregon OSHA

**Workers**

Your employer cannot retaliate against you for reporting a workplace health or safety concern or violation. For more information on your rights, visit the Oregon OSHA website.

**Table H-12 – Maximum Allowable Size of Containers and Portable Tanks for Flammable Liquids**

Container type	Category 1	Category 2	Category 3	Category 4
Glass or approved plastic	1 pt	1 qt	1 gal	1 gal
Metal (other than DOT drums)	1 gal	5 gal	5 gal	5 gal
Safety cans	2 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications)	60 gal	60 gal	60 gal	60 gal
Approved portable tanks	660 gal	660 gal	660 gal	660 gal

See the full rule [here](#)