

## Toolbox Talk: Flammable Storage at Work

### Introduction/Overview:

Flammable materials have been around before [Greek fire](#) was invented in the 7<sup>th</sup> Century by the Byzantine Greeks. Like in modern days, these ancient flammable chemicals had to be stored in specific ways to keep these volatile chemicals from activating before use or during transportation.

Today we have federal and state agencies and other organizations to give guidance on how to store, transport, and use various flammable chemicals. These agencies and organizations include the National Fire Protection Association (NFPA) and the International Fire Code (IFC). However, these guidelines are not mandatory unless incorporated by reference in [1910.6](#). Federal Occupational Safety and Health Administration (OSHA) has mandatory requirements on storage and use of flammable liquids that must be followed. [29 CFR 1910.106](#) covers the mandatory requirements for General Industry. The construction industry refers to [29 CFR 1926.152](#) and for the shipyard industry, refer to [29 CFR 1915.36](#). The safety data sheet (SDS) will also give information on a given flammable liquid and should be reviewed. This toolbox talk will address flammable liquid storage in flammable cabinets and safety cans. For larger storage requirements, please refer to:

[https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=9752&p\\_table=standards](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9752&p_table=standards)

### Statistics:

Many of the fires and explosions experienced in industry were caused by or contributed to flammable liquids. According to a [News Release](#) from the Bureau of Labor Statistics dated December 16, 2020, it was reported that 99 fatalities in 2019 were due to fires and explosions. The good news is, this is a 14 percent drop from 2018.

### Talking Points:

OSHA/VOSH have specific storage requirements for each category of classification of flammable liquid. The four categories are based on the flashpoint of each liquid. Table 1 explains the categories and gives the flashpoint of each category.

[Flashpoint](#) is “the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air” near the liquid's surface. The vapor is what ignites, not the liquid. By definition, according to [1910.106\(a\)\(19\)](#), “Flammable liquid means any liquid having a flashpoint at or below 199.4 °F (93 °C).” Flammable liquids are classified into four criteria—the lower the classification number, the lower the flashpoint, and the more dangerous.

Developed by:



**Table 1: Classification Criteria and Label Elements**

Category	Category 1	Category 2	Category 3	Category 4
<b>Description</b>	Flash point < 23°C (73.4°F) and initial boiling point ≤ 35°C (95°F)	Flash point < 23°C (73.4°F) and initial boiling point > 35°C (95°F)	Flash point ≥ 23°C (73.4°F) and ≤ 60°C (140°F)	Flash point > 60°C (140°F) and ≤ 93°C (199.4°F)
<b>Pictogram</b>				No symbol
<b>Signal Word</b>	Danger	Danger	Warning	Warning
<b>Hazard Statement</b>	Extremely flammable liquid and vapor	Highly flammable liquid and vapor	Flammable liquid and vapor	Combustible liquid

Note, the lower the category, the greater the hazard and signal word. Category three and four the signal word is "Warning," whereas category one and two are "Danger." Category four is considered a combustible liquid because of the flashpoint above 140 degrees Fahrenheit and below 199.4 degrees Fahrenheit. OSHA/VOSH standards [1910.106\(a\)\(19\)\(i\)](#) through 1910.106(a)(19)(iv) give these definitions.

The below table, 1910.106, Table H-12, shows the 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 pint	1 quart	1 gallon	1 gallon
Metal (other than DOT drums)	1 gallon	5 gallons	5 gallons	5 gallons
Safety Cans	2 gallons	5 gallons	5 gallons	5 gallons
Metal Drum (DOT specifications)	60 gallons	60 gallons	60 gallons	60 gallons
Approved portable tank	660 gallons	660 gallons	660 gallons	660 gallons

Developed by:

OSHA/VOSH's structural requirements for flammable storage cabinets per [1910.106\(d\)\(3\)\(ii\)\(a\)](#) include:

- Constructed of 18-gauge steel or greater
- Double-walled with 1 ½ inch air space
- Joints shall be riveted or welded
- The door shall have a three-point lock
- The door sill shall be 2 inches above the bottom of the cabinet

During the manufacturing of flammable cabinets, bung openings are installed; these are for the cabinet's ventilation. However, no federal regulatory agency requires flammable cabinets to be [vented](#). But the local and state laws, and/or your insurance carrier may require flammable cabinets to be vented. The [National Fire Protection Association \(NFPA\) 30-2021 Edition, 9.5.4](#) states, "Storage cabinets shall not be required by this code to be ventilated for fire protection purposes." If you are required to vent a flammable cabinet, NFPA has specific guidelines for venting the cabinet.

Also, the Construction Standard [1926.152\(b\)\(2\)\(iii\)](#) states flammable "cabinets shall be labeled in conspicuous lettering, 'Flammable-Keep Away from Open Flames.'"

Wooden cabinets for flammable liquid storage are acceptable but must meet the requirements of [1910.106\(d\)\(3\)\(ii\)\(b\)](#).

Portable safety cans shall be either [Type I or Type II](#). Both are made of steel and have a self (spring) closing mechanism and a flame arrester. The difference between Type I and Type II is Type II has two openings, one for pouring and the second for filling. Type I is poured and filled through the same opening.

---

---

---

### **Final Thoughts:**

Improper flammable liquid storage may result in property loss, injuries, and loss of life. Always ensure applicable standards and safety practices are followed. Keep ignition sources and open flames far from storage cabinets and safety cans. Another point to remember is to have sprinkler systems or other fire control devices installed wherever flammable cabinets are stored. And remember, no more than three flammable cabinets can be stored in one storage area.

**NOTE:** Always promote discussion with the attendees. If a question comes up that no one in attendance can answer, please contact DHRM/OWC/Loss Control Consultants for assistance.

Developed by:



**Johnny Nugent**

Risk Management Specialist

[johnny.nugent@dhrm.virginia.gov](mailto:johnny.nugent@dhrm.virginia.gov)

804-225-2168

**Lee Affholter, COSS, ASC**

Loss Control Consultant

[laffholter@lcinnovations.com](mailto:laffholter@lcinnovations.com)

757-256-3364

**Curtis H. Stacy, MESH, ASC, COHC**

Loss Control Consultant

[curtis.stacy@dhrm.virginia.gov](mailto:curtis.stacy@dhrm.virginia.gov)

434-594-8978

**References:**

Greek fire and ancient chemicals.

<https://www.britannica.com/technology/Greek-fire>

29 CFR 1910.6 Incorporated by Reference

<https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.6>

Definition of flammable liquids (1910.106 (a) (19)

[https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=9752&p\\_table=standards](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9752&p_table=standards)

OSHA's four flammable liquid classifications (Table 1)

[https://www.schc.org/assets/docs/ghs\\_info\\_sheets/Flammable%20Liquids%20\\_Final-2017-10\\_.pdf](https://www.schc.org/assets/docs/ghs_info_sheets/Flammable%20Liquids%20_Final-2017-10_.pdf)

Definition of flashpoint and classification of flammable liquids.

<https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.106>

Defining flammables, categories, and common questions. 1910.106 Table H-12

<https://www.grainger.com/know-how/safety/emergency-response/fire-protection/kh-safety-flammables-combustibles-179-qt>

Developed by:



<https://www.ccohs.ca/oshanswers/chemicals/flammable/flam.html>

Flammable cabinet requirements both metal and wooden cabinets

<https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.106>

Cabinet ventilation

<https://www.grainger.com/know-how/safety/emergency-response/fire-protection/kh-pr-flammable-chemical-storage-cabinet-ventilation-215-qt>

Wording Flammable-Keep away from open flames

[https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=10673&p\\_table=STANDARDS](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=10673&p_table=STANDARDS)

NFPA 30-2021 9.5.4, No ventilation of storage cabinets shall be necessary for fire protection purposes.

<https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=30>

Industrial employee fatalities due to fires and explosions

<https://www.bls.gov/news.release/pdf/cfoi.pdf>

Developed by: