



MNOSHA Instruction **STD 1-5.7A**

March 30, 2016

**Reissued in accessible format:** April 13, 2022

## **SUBJECT: Storage or Use of Flammable Liquids Inside of Industrial Plants or Similar Operations.**

### **Purpose:**

To guide the enforcement of 1910.106 (d) and (e) and clarify the differences between the OSHA and NFPA requirements for storage of flammable liquids.

### **References:**

1. NFPA 30-2015, Flammable and Combustible Liquids Code
2. NFPA 91-2015, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids

### **Cancellation:**

This directive supersedes STD 1-5-7, Storage or Use of Flammable and Combustible Liquids Inside of Industrial Plants or Similar Operations, dated March 11, 2010.

### **Background:**

Inside storage rooms (Liquid Storage Rooms) are normally used: when the containers are opened for mixing, pouring, dispensing, or transfer of flammable liquids; if the quantity is too large to fit into an approved cabinet; if the quantity is excessive for any one fire area; and / or if the opened containers cannot be separated from potential sources of ignition. As defined by NFPA 30 paragraph 3.3.34, Liquid Storage Room is a room used for storage of liquids in containers, portable tanks or intermediate bulk containers, has a floor area that does not exceed 500 square feet may be completely inside of the building; or inside with one common wall; or outside with one common wall of the building.

Storage and use of flammable liquids is generally permitted outside of a flammable liquid storage room or cabinet if the storage is considered to be warehousing only, or it is "Incidental storage and use of flammable liquids" in accordance with paragraph 1910.106(e)(2).

## **Action:**

### **A. CONSTRUCTION AND VENTILATION OF INSIDE FLAMMABLE LIQUID STORAGE ROOMS.**

1. 29 CFR 1910.106(d)(4) identifies the requirements for the design and construction of inside storage rooms, including the ventilation requirements in subparagraph (iv). NFPA 30-2015, paragraph 18.6, addresses the same subject with additional and differing requirements.
2. The portions of 29 CFR 1910.106(d)(4)(iv) which apply when a mechanical ventilation system equipped with a control switch located outside of the door, which operates the lights and ventilation system, and requires a pilot light adjacent to the switch if Category 1 liquids with a flash point below 100° are dispensed, will not be enforced if continuous mechanical ventilation is provided.
3. The following provisions of NFPA 30-2015, paragraph 18.6 will be enforced using General Duty for mechanical ventilation systems provided the system was installed after 1977 in rooms where flammable materials with a flash point below 100°F are dispensed. (recommended for older systems):
  - a. A continuous mechanical system shall be used if Category 1 liquids with a flash point, 100°F are dispensed in the room (Para. 18.6).
  - b. Exhaust air shall be taken from one side of the room, near a wall, within 12" (300 mm) of the floor (Para 18.6.1).
  - c. Make up air inlet(s) shall be on the opposite side of the room from the exhaust outlet, within 12" (300 mm) of the floor (Para. 18.6.1).
  - d. Placement of air inlet(s) and outlet(s) shall enable the system to cause air movement across all portions of the floor (Para. 18.6.2).
  - e. Exhaust shall be directed to the outside of the building without recirculation. (Exception: A fail-safe, continuous monitoring system with an alarm and capability to stop recirculation and provide full exhaust to the outside in the event that vapor-air mixtures in concentration over ¼ the lower flammable limit are detected, may be used to monitor recirculated air) (Para. 18.6.3).

- f. All ducts used for ventilation shall not be used for any other purposes (Para. 6-18.6.4).
  - g. All ducts used shall comply with NFPA 91, 2015 (Para. 18.64).
  - h. Inlet(s) located on a wall within the building shall be equipped with a fire door or damper with a fusible link or other approved thermal unit as required in NFPA 91, 2015. Installation shall be as required in NFPA 91, 2015 (Para. 18.6.4.1).
  - i. Mechanical systems shall provide a minimum of one cubic foot of exhaust air per minute per square foot (0.3 cubic meters / minute per square meter) of floor area, but not less than 150 CFM (4 cubic meters / minute) (Para. 18.6.5).
  - j. Mechanical ventilation systems for dispensing areas shall be equipped with an air flow switch or other device, inter-locked to sound an audible alarm upon failure of the system (Para. 18.6.5.1).
4. Processing areas where flammable liquids are used should be ventilated to follow NFPA 30 -2015 paragraph 17.11 which says; “enclosed processing areas handling or using class I liquids or class II or II liquids heated to temperatures at or above their flash points where the room temperature is heated to a temperature higher than the flash point shall be ventilated at a rate sufficient to maintain the concentration of vapors within the area at or below 25 percent of the LFL.”

## **B. INCIDENTAL STORAGE OF FLAMMABLE LIQUIDS OUTSIDE OF A FLAMMABLE LIQUID STORAGE ROOM**

1. When the only operation involved is the storage of flammables in containers or tanks that are closed and remain closed throughout their storage, the storage area shall be considered, and referred to, as a warehouse as described in paragraph 1910.106(d)(5)(v). In this instance, Tables H-14 and H-15 shall be used.
2. When procedures involve mixing, transferring, or other exposure of the liquid to vaporization through operational procedures in which the containers do not remain closed in the storage area, 1910.106(e)(2)(ii)(a) shall be considered to refer to a storage area and determine the permissible quantities as described in paragraphs (d)(3) or (4). In this instance, Table H-13 shall be used to determine permissible quantities.
3. 1910.106(e)(2)(ii)(b) refers to the amount of flammable liquids that may be stored in any one fire area, outside of an approved storage room or cabinet in approved containers. OSHIs should use the chart in Appendix A as a quick guide to the classification of common flammable liquids. Reference

to the SDS with regards to the flashpoints and boiling points are important as it determines the Category. Category 1 has a flashpoint below 73.4 Degrees F and a Boiling point at or below 95 degrees F. Category 2 liquids have a flashpoint below 73.4 degrees F and a boiling point above 95 degrees F. Category 3 includes liquids at or above 73.4 degrees F and below 140 degrees F.

4. 1910.106(e)(2)(iv)(d) is the section which shall be used to cite for failing to use a safety can or closed piping system for transferring flammable liquids at the point of final use. 1910.106(e)(2)(iv)(d) also allows transfer by means of a device drawing through the top, from a container or portable tanks by gravity through an approved self-closing valve, or through a closed piping. NOTE: 1910.106(d)(2)(i) refers to the size of containers (reference Table H-12) and containers meeting D.O.T. requirements in storage. It does not necessarily require a "safety" can.

---

James Krueger, Director MNOSHA Compliance  
For the MNOSHA Management Team

Distribution: OSHA Compliance and WSC Director

Attachments: Appendix A - Classification of Common Flammable Liquids

NOTICE: Minnesota OSHA Directives are used exclusively by MNOSHA personnel to assist in the administration of the OSHA program and in the proper interpretation and application of the occupational safety and health statutes, regulations, and standards. They are not legally binding declarations, and they are subject to revision or deletion at any time without notice

**APPENDIX A: CLASSIFICATION OF COMMON FLAMMABLE LIQUIDS**

CATEGORY 1 – FP < 73.4°F, BP ≤ 95°F	FP °F	BP °F
Collodion	-61.6	93
Furan	-58	89.6
Ethyl Ether	-49	94
Acetaldehyde	-36	69
Methyl Ethyl Ether	-35	52
Isopropylamine	-35	91
Propylene Oxide	-35	94
Vinylidene Chloride	-2	89
Ethylamine	1	62
CATEGORY 2 – FP < 73.4°F, BP > 95°F	FP °F	BP °F
Pentane	-57	97
Gasoline	-45	102
Hexane	-7	156
Acetone	0	133
Petroleum Ether	0	140
Benzene	12	176
Methyl Acetate	14	135
Methyl Ethyl Ketone	16	175
VM & P Naphtha	20-55	203-320
Ethyl Acetate	24	171
Heptane	25	209
Methylcyclohexane	25	214
Toluene	40	232
Methyl Alcohol	52	147
Tert-Butyl Alcohol	52	180
Isopropyl Alcohol	53	181
Ethyl Benzene	55	277
Ethanol	55	173
Octane	56	258
Methyl Isobutyl Ketone (Hexone)	64	242
Isobutyl Acetate	64	243
Allyl Alcohol	70	205
Propyl Alcohol	72	207
CATEGORY 3 – FP 73.4°F - 140°F	FP °F	BP °F
Banana Oil (Isoamyl Acetate)	77	287

Amyl Acetate	77	301
Isobutyl Alcohol	82.4	108
n-Butyl Alcohol	84	243
Styrene	88	293
Xylene	90	292
Epichlorohydrin	93	242
Turpentine	95	309
Stoddard Solvent	102-110	309-396
Acetic Acid	103	117
Diesel Fuel	125	320
CATEGORY 4 – FP > 140°F, ≤ 199.4°F	FP °F	BP °F
Butyl Cellosolve	143	339

Note: Temperatures are based on NIOSH Pocket Guide to Chemical Hazards. Refer to SDS for actual product Flash point and Boiling point temperatures.