

Information Bulletin

NUMBER 1

Storage and Handling of Flammable and Combustible Liquids

Flammable and combustible liquids are the most frequently encountered special hazard in manufacturing and processing risks. They are present to some degree in almost every manufacturing risk in the form of paints and coatings, solvents and thinners, cutting oils and lubricants, hydraulic fluids, adhesives and fuels.

Primary Hazards

Fire and explosion of the flammable vapors emitted by these liquids are the primary hazards. This hazard is either the point of origin or a significant contributor to loss severity in most major manufacturing fires. Flammable vapors are usually invisible, can be conveyed great distances from their source, and can collect in areas with unprotected ignition sources. In addition, their ignition sensitivity is so extreme that static discharge, ordinary electrical fixtures and equipment, and hot surfaces such as light bulbs or heating pipes are all potential ignition sources.

The danger of fire or explosion can be controlled through strict compliance with safe storage and handling procedures. Capping containers is the simplest way, though not the complete way to prevent vaporization. Controls suitable for the type, quantity and conditions are essential due to the extreme hazard inherent to these substances. Physical controls and practices must comply with NFPA 30® Flammable and Combustible Liquids Code. Contact your local Farmers Loss Control Representative for additional information.

Storage Areas

Storage should be segregated from potential ignition sources and other property to reduce the potential for loss and loss severity. Storage areas should not impede egress or expose public walkways, roadways and places of assembly.

Bulk Storage

Bulk Storage and supplies not in use should be stored in a storage cabinet, storage room, separate building or outdoors. They should be stored away from property in a way which does not pose a threat to public safety. A separate storage building or outdoor storage is preferred, but is not always practical. Prefabricated hazardous liquid storage buildings that comply with applicable building and fire codes are available through some safety equipment dealers.

Incidental Storage

The maximum quantity of liquids permitted for incidental operations in a single fire area shall not exceed the greater of the following:

- A one day supply (working quantity)
- 25 gallons of Class IA liquids in containers
- 120 gallons of Class IB, 1C, II or III in containers
- 1 portable tank not exceeding 660 gallons of Class IB, IC, II or III liquids.

Quantities are permitted to be increased 100 percent where stored in approved flammable liquids storage cabinets or in safety cans in accordance with the local fire code. Check with your local fire officials.

Storage Cabinets

The purpose of a storage cabinet is to contain spills and delay the involvement of its contents in a fire. They may be constructed of 1" exterior grade plywood or double walled 18 gauge steel with 1 1/2" air space. Doors should be tight fitting with 2" liquid-tight sills to contain spills. Doors must be kept closed and conspicuously labeled "FLAMMABLE - KEEP FIRE AWAY."

The maximum allowable storage per cabinet is 120 gallons, and not more than 60 gallons of that total may be Class I and II liquids. In an industrial occupancy, 3 cabinets may be grouped together. Additional groupings of 3 cabinets must be at least 100 feet distant.

Storage Rooms

Storage rooms are required when larger quantities are stored indoors, unless it is a dedicated storage building. They must be constructed with 2 hour fire-rated materials and listed 1 1/2 hour fire doors for walls and openings into adjacent rooms or buildings. If the room is over 150 sq. ft., all walls must be 2 hour fire-rated. Storage rooms may not exceed 500 sq. ft., and it is preferable to locate them on an exterior wall.

Two exits are required for rooms exceeding 15 ft. in length. Doors should be normally closed, with 4" noncombustible, liquid-tight sills or ramps. Drains sized to handle sprinkler discharge should be provided. Electrical wiring, fixtures and equipment must be UL-listed (explosion proof) for Class I, Division 2 hazardous locations where flammable liquids are being stored. General purpose wiring is acceptable for combustible liquids if they are stored at temperatures below their flash point.

Ventilation is required with ducts that draw from floor level, as vapors are usually heavier than air. Gravity exhaust is allowed for dispensing of combustible liquids. Continuous mechanical exhaust is required whenever flammable liquids are dispensed. Exhaust air must not discharge near any intake openings, equipment or other potential ignition sources. Fresh air intakes should draw from outside the building and should be located at least 1 foot above the floor level. Heating equipment and devices should not be present in the room and hot pipes should not pass through the room. Indirect heating should be utilized when the room must be heated.

All electrical equipment and wiring shall be of a type specified by and installed in accordance with NFPA 70, National Electrical Code®.

In a room is under 150 sq. ft. storage may not exceed 2 gallons per sq. ft. When automatic fire protection is provided, this limit may be increased to 5 gallon per sq. ft. In rooms up to 500 sq. ft. storage may not exceed 4 gallons per sq. ft. When automatic fire protection is provided, this limit may be increased to 10 gallons per sq. ft. Storage of Class IA liquids may not exceed 660 gallons unless automatic fire protection is provided.

Ignition Source Control

Ignition sources must be excluded from storage and handling areas. "No Smoking" signs should be posted and strictly enforced. Employee training should address ordinary electrical devices as a potential ignition source. Ordinary power drills with mixing attachments are a common safety violation that can result in fire or explosion and serious injury.

Static Electricity

Ground dispensing drums in the flammable liquid storage and dispensing area. Grounding is done by connecting the container to an already grounded object that will conduct electricity. This could be a buried metal plate, a metallic underground gas piping system, metal water pipes or a grounded, metal building framework. Bonding both containers and grounding one of them "drains off" static charges and prevents the discharge of sparks. All grounding and bonding connections must be bare metal to bare metal. Remove all dirt, paint, rust or corrosion from points of contact. Specially designed and approved bonding and grounding wire assemblies are available from safety equipment retailers. Check bonding and grounding connections regularly to ensure they are in good condition.

Ref: 29 CFR, Part 1910.106, Flammable and combustible liquids

This bulletin is intended only as a reminder and is offered solely as a guide to assist management in its responsibility of providing a safer working environment. This bulletin is not intended to cover all possible hazardous conditions or unsafe acts that may exist. Other unsafe acts or hazardous conditions should also be noted and corrective action taken.