



PENNSYLVANIA LUMBERMENS MUTUAL
INSURANCE COMPANY

FLAMMABLE LIQUIDS STORAGE ROOM: NFPA 30 AND 70

The purpose of this article is to provide basic information regarding the set-up of a flammable liquids storage room. In essence, the intent of such a room is to prevent the ignition of flammable vapors. Basic provisions to be discussed include: explosion-proof wiring and lighting, smoking control, fire separation from other parts of the building, prevention of static electricity through bonding and grounding, active or passive ventilation, and spill prevention and containment.

Definition: A flammable liquids storage room is defined as a Class I Division 2 location. A **Flammable Liquid** is any liquid that has a closed-cup flash point below 100°F (37.8°C), as determined by certain test procedures. **Flash Point** means the minimum temperature of a liquid at which sufficient vapor is given off to form an ignitable mixture with the air, near the surface of the liquid or within the vessel used, as determined by the appropriate test procedure and apparatus specified in NFPA 30. You will find the flash point listed on your Material Safety Data sheets (MSDS). For our purposes, we are not dealing with combustible liquids, with flash point above 100 degrees F, even though there can be some similar fire concerns.

A **Class I, Division 2** location is a location:

- (1) In which volatile flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment, or
- (2) In which ignitable concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors are normally prevented by positive mechanical ventilation and which might become hazardous through failure or abnormal operation of the ventilating equipment, or
- (3) That is adjacent to a **Class I, Division 1** location (such as a spray room or a spray booth), and to which ignitable concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors above their flash points might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

Room Construction Considerations: There are several requirements in order to provide a flammables storage room that will reduce the chance for a fire loss.

1. Walls and ceiling that provide a minimum of 1 hour fire rating separation from the rest of the building (a minimum double five-eighths fire code sheetrock).
2. Location: Class I Division 2 rooms cannot be located in basements, since the typical storage is lacquers and lacquer thinners.
3. Fire Protection: A 40 pound Class B fire extinguisher should be mounted within 10 feet of the door of the room.
4. Light switch should be mounted on the exterior wall of the room, and should be listed for a Class I Division 2 location (explosion-proof).

5. Luminaires (lights) within the room should be heavy duty, globe type, with a metal enclosure that prevents damage to the luminaire. The luminaire should be hung from the ceiling via a heavy duty metal pipe.
6. All wiring within the room should be Class 1 Division 2 type, threaded metal. Any junctions should also be Class 1 Division 2. (Explosion-proof wiring).
7. Depending on the size of the room, there should be either passive ventilation opening 12 inches from the floor and another opening on the opposite side about ceiling level, or a fan and opening to the outside with an opening on the opposite side of the room within 12 inches of the floor. There should be a self-closing device to close the ventilation opening in the event of fire.
8. In the event that the building is sprinklered, sprinkler coverage should be extended into the flammable liquids storage room.
9. The room itself should be constructed so that there is a lip around the edges, which will be sufficient to contain liquids in the event of most spills. Either concrete block or concrete built-up will suffice to keep a spill contained until clean-up can be complete.
10. The room should be equipped with a fire door rated at least as substantial as the walls and ceiling, and be self-closing.

Loss Prevention Issues:

1. The flammable liquid storage room should have a large, clearly visible sign warning of flammables, and that smoking is strictly prohibited in the area. This should be strictly enforced. Designated smoking areas should be well away from this area. No smoking is allowed during clean-up of this room.
2. In the event that there are any open 55 gallon drums or 5 gallon pails, every one should be grounded to an approved ground.
3. During any mixing, both the original container and the recipient container should be properly bonded to each other, to prevent static electricity from igniting the flammable liquid during pouring.
4. In the event that mixing or pouring is conducted, and finishing rags are in use, these rags must be immediately placed within a self-closing rag disposal container with a self-closing lid, and the rags must be taken outside the building daily, due to the potential of spontaneous combustion.
5. Stock should always be so arranged as not to block emergency egress from the room.

Alternate:

In the event that your total gallons of flammable storage is not that significant, it is possible to purchase up to three flammable storage cabinets. The maximum amount of storage in any one cabinet is 120 gallons. The total maximum amount of storage in all cabinets cannot be more than the total gallons allowed for the specific occupancy, information which is usually provided by the local fire marshall. These cabinets are available for purchase commercially, and are designed and constructed to limit the internal temperature at the center of the cabinet and 1 in. (25 mm) from the top of the cabinet to not more than 325°F (163°C), when subjected to a 10-minute fire test that simulates the fire exposure of the standard time–temperature curve specified in NFPA 251, Standard Methods of Tests of Fire Resistance of Building Construction and Materials, shall be acceptable. All joints and seams shall remain tight and the door shall remain securely closed during the test.

Metal storage cabinets constructed in the following manner shall be acceptable:

- (a) The bottom, top, door and sides of the cabinet shall be at least No. 18 gauge sheet steel and shall be double-walled, with 1 in. (38 mm) air space.
- (b) Joints shall be riveted, welded, or made tight by some equally effective means.
- (c) The door shall be provided with a three-point latch arrangement, and the door sill shall be raised at least 2 in. (50 mm) above the bottom of the cabinet to retain spilled liquid within the cabinet.

Storage cabinets shall be marked in lettering that is at least 2 in. (50 mm) high as follows:

WARNING: FLAMMABLE — KEEP FIRE AWAY.