

Flammable and combustible liquids storage rooms

Flammable and combustible liquids are a significant property hazard. Engineering controls are required to reduce the risk of vapors finding an ignition source or vapor concentrations reaching their flammable limit. A storage room for flammable and combustible liquids should be designed to contain a fire if one should occur. If liquids are dispensed, UFG recommends installing an automatic fire suppression system to control loss severity in the event of a fire. If no dispensing is involved and there is no automatic fire suppression system, storage volumes (gal/ft²) are to be reduced. See below for details.

Liquids storage rooms

Storage room construction requirements are based on the floor area:

- Less than or equal to 150 square feet requires 1-hour fire-rated walls, ceilings and intermediate floors, and ¾-hour fire-rated door.
- Greater than 150 square feet but less than 500 square feet requires 2-hour fire-rated walls, ceilings and intermediate floors.

Fire protection

Grounding and bonding

When flammable liquids are being transferred between containers, the containers must be grounded (tank filling the smaller tank) and bonded to prevent static electricity that could ignite vapors.

Fire extinguishers

Two fire extinguishers are necessary when a flammable liquids storage room is present.

- One portable fire extinguisher with capability of at least 40:B located outside of (but within 10 feet from) storage room door.
- One portable fire extinguisher having capability of at least 40:B within 30 feet of a flammable liquids storage room (or any Class I or Class II liquids outside of a flammable liquids storage area). This can be substituted for an 80:B fire extinguisher within 50 feet.

Suppression systems

Fire suppression systems are required in some situations. In others, the quantity of liquids stored can be increased when an automatic fire suppression system is present.

Fire suppression provided:

- Storage room 150 to 500 square feet allows 10 gallons per square foot.
- Storage room up to 150 square feet allows 5 gallons per square foot.

No fire suppression (sprinklers/package) installed:

- Storage room 150 to 500 square feet allows 4 gallons per square foot.
- Storage room up to 150 square feet allows 2 gallons per square foot.

Automatic fire suppression is always preferred. UFG recommends installation of an automatic fire suppression system within your flammable liquids storage room.

The information in this document is based on NFPA 30 (2018); for further guidance on flammable liquids storage, refer to NFPA codes.

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Electrical

Electrical inside of a storage room depends on a couple issues, including classification of liquids and whether they are dispensing.

- Flammable liquids with no dispensing (stored in the room, no pumping or pouring).
 - Class I Division II wiring.
- Flammable liquids with dispensing (paint kitchen).
 - Class I Division I wiring.
- Combustible liquids.
 - Ordinary electrical.
 - Watch these closely. If there are storage changes in the room, improvement to the wiring may be required.

Containment

In the event of a fire, it's important to keep liquids contained. Storage rooms should be designed and operated to prevent liquids from being discharged to sewers, public water ways or adjacent properties.

Containment can be achieved by:

- Noncombustible, liquid-tight raised sills, curbs or ramps.
- Open grate trenches or floor drains.

Ventilation

Ventilation must exhaust to a safe location outside the building.

Recirculation of exhaust is only allowed when monitored, automatically sounds an alarm, stops recirculating, and provides full exhaust to the outside if vapor-air mixture exceeds $\frac{1}{4}$ of the lower flammable limit (LFL).

- Mechanical exhaust ventilation is required where Class I liquids are dispensed.
 - Makeup air for mechanical ventilation taken from inside the building must be equipped with a fire door or damper (in the event of a fire, containment is key).
 - Must have an airflow switch or other reliable method that is interlocked to sound an audible alarm should the ventilation system fail.
- Gravity system is allowed for Class II, III, and IIIA liquids.
- Exhaust air (mechanical or gravity) should be taken from an area 12 inches above the floor.
- Air makeup inlets should be on the opposite side of the room from exhaust, 12 inches above the floor. The air makeup inlets must be ducted from the exterior of the building. If air makeup is ducted to the inside of the building, explosive dampers should be installed.
 - Arranged to promote air movement across the floor (keep the vapors under 25% of the LFL).

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