

# Flammable Storage Design Review Checklist

Preventive Medicine Data: 40-5e

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# Flammable Material Storage (FMS) Design Review Checklist

OSHA 29 CFR 1910.106, Flammable and Combustible Liquids  
NFPA 30, Flammable and Combustible Liquids Code, 2008 Edition  
NFPA 70, National Electrical Code, 2011 Edition  
NFPA 101, Life Safety Code, 2009 Edition  
UFC 3-600-01, Fire Protection Engineering for Facilities, 26 September 2006  
National Guard Design Guides, 2009

## OCCUPANCY CLASSIFICATION AND MEANS OF EGRESS

### Detached unprotected buildings

1. Means of egress shall not exceed 75 ft (23 m) (NFPA 101)?

## CONSTRUCTION

### Tanks

1. Is the distance between any two aboveground tanks greater than 3 ft (914 mm) (29 CFR 1910.106)?
2. Does the distance between the aboveground tanks and the property line meet the minimum distance (29 CFR 1910.106, NFPA 30)?
3. Is a drainage system used for the aboveground tanks? Does it terminate in vacant land or a impound basin (29 CFR 1910.106, NFPA 30)?
4. Are dikes used to surround aboveground tanks (29 CFR 1910.106, NFPA 30)? If so is it,
  - a. Sized to contain the amount on liquid released from the largest tank?
  - b. Walls constructed of earth, steel, concrete or masonry?
  - c. Liquid tight?
  - d. Wall height not greater than 6 ft (1.8 m) above interior grade?
5. Are underground tanks in use (29 CFR 1910.106, NFPA 30)? If so are they,
  - a. Surrounded with 6 inches (152 mm) of noncorrosive materials?
  - b. Covered with a minimum of 2 ft (609 mm) of earth? Or
  - c. Covered with 1 ft (305 mm) of earth and 4 inches (102 mm) of reinforced concrete?
6. Are underground tanks exposed to vehicular traffic (29 CFR 1910.106, NFPA 30)? If so are they:
  - a. Covered with a minimum of 3 ft (914 mm) of earth? or
  - b. Covered with 18 inches (457 mm) of earth and 6 inches (152 mm) of reinforced concrete or 8 inches of asphaltic concrete?
  - c. If concrete is used it must extend at least 1 ft (305 mm) horizontally beyond the outline of the tanks in all directions?

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7. Does the bedding extend 12 inches (305 mm) in all directions beyond the perimeter of the tank (NFPA 30)?

### Outside storage

1. Do all container/portable tank locations meet the minimum distance requirements between (29 CFR 1910.106, NFPA 30):

- a. Other tanks and containers?
- b. Property lines?
- c. Streets, alleys, and public ways?

2. Is storage area graded to divert spills away from buildings (29 CFR 1910.106, NFPA 30)?

3. Is the storage area surrounded by a curb at least 6 inches (152 mm) high (29 CFR 1910.106, NFPA 30)?

4. Is there storage of liquid adjacent to exterior wall of a building (NFPA 30)? If so:

- a. Does the exterior wall have a 2-hour fire resistance?
- b. Is there openings at or above grade within 10 ft (3 m) horizontally of the storage?
- c. Is there openings directly above the storage?
- d. Is there openings below grade within 50 ft (15 m) horizontally of the storage?

### Inside storage room

1. Is the storage area an inside area (29 CFR 1910.106)? If so, does it have:

- a. An automatic sprinkler system?
- b. A 4 inches (102 mm) sill/ramp or a sunken floor 4 inches (102 mm) lower than the surrounding area?
- c. A self-closing fire door in all openings?
- d. Liquid tight wall joints?
- e. Fire resistant construction of 2 hours for an area with a maximum floor area of 500 ft<sup>2</sup> (46 m<sup>2</sup>)?
- f. Fire resistant construction of 1 hour for an area with a maximum floor area of 150 ft<sup>2</sup> (14 m<sup>2</sup>).

2. Are there storage cabinets in the flammable materials storage room?

- a. If so, does the total volume of flammable liquids exceed the allowable maximum for the control area based on the occupancy (NFPA 30)?
- b. Are the cabinets vented? If so, are they vented directly outside? (NFPA 30)

3. Are the number of control areas correct for the floor level they are located (NFPA 30)?

4. Is the storage area an inside area (NFPA 30)? If so, is it:

- a. Have 1 hour construction for interior walls, ceilings, and intermediate floors for rooms with floor areas less than 150 ft<sup>2</sup> (14 m<sup>2</sup>)?
- b. Have 2 hour construction for interior walls, ceilings, and intermediate floors for rooms with floor areas greater than 150 ft<sup>2</sup> (14 m<sup>2</sup>) less than 500 ft<sup>2</sup> (46 m<sup>2</sup>)?
- c. Have the correct fire rated door based on the fire resistance rating of the wall?

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5. Is the storage area an attached building or cutoff room (NFPA 30)? If so, is it:
  - a. Constructed in accordance with paragraph 4.4.2?
  - b. Have 1 hour construction for interior walls, ceilings, roof, and intermediate floors for rooms with floor areas less than 300 ft<sup>2</sup> (28 m<sup>2</sup>)?
  - c. Have 2 hour construction for interior walls, ceilings, roof, exterior walls, and intermediate floors for rooms with floor areas greater than 300 ft<sup>2</sup> (28 m<sup>2</sup>) less than 500 ft<sup>2</sup> (46 m<sup>2</sup>)?
6. Is there a portable fire extinguisher outside of and within 10 ft (3 m) from the rooms door (NFPA 30)?
7. Are there individual containers that exceed 10 gal (38 L)? If so provide curbs, scuppers or drains for containment. (NFPA 30)
8. Is the flammable materials storage area part of the main building (DG 415-5)? If so:
  - a. Does it have an exterior door?
  - b. Does it have an interior automatic self-closing noncombustible fire door?
  - c. Is the entire storage area surrounded by a liquid-tight 4 inch (102 mm) high curb?
9. Do interior finishes meet the requirements of the Tables in Appendix C of DG 415-1: Readiness Center, 415-2: Logistics Facilities, and 415-3: Aviation Facilities?

### Detached unprotected buildings

1. Building shall have a horizontal separation of at least 200 ft (60 m) from exposed business, industrial, mercantile and storage occupancy and at least 1000 ft (303 m) of horizontal separation for all other occupancies (NFPA 30)?
2. Building shall not exceed one story in height (NFPA 30).
3. Building shall not have accessible underfloor areas (NFPA 30).

### HVAC

1. Is the ventilation system gravity or continuous mechanical exhaust (NFPA 30)?  
Then, if Class I liquids are dispensed in the room, is mechanical ventilation used be used (NFPA 30)?
2. Does the exhaust system provide 6 air changes per hour (29 CFR 1910.106)?  
Then, ask, Mechanical ventilation of 1 cfm/ft<sup>2</sup> of floor area (no less than 150 cfm or any room (NFPA 30)?
3. Is the exhaust vented outside (NFPA 30)?
4. If gravity ventilation is used, is the fresh air intake and exhaust outlet on the exterior of the building (29 CFR 1910.106)?

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5. Are exhaust and make-up air inlets on opposite walls? Are the inlets within 12 inches (305 mm) of the floor? (NFPA 30)
6. Is the fan roof- or wall-mounted exhaust (DG 415-5)?
7. Is there a wall or door louver near the floor (DG 415-5)?

### **ELECTRICAL**

1. If Class I liquids are present, do the electrical systems comply with Division 2 Hazardous location requirements (NFPA 30, NFPA 70, 29 CFR 1910.106)?
2. If Class II or III liquids are present, electrical systems comply with general use requirements (NFPA 30, NFPA 70, 29 CFR 1910.106)?
3. If the flammable material storage area is used for dispensing, will the mechanical ventilation airflow switch be interlocked with an audible alarm (NFPA 30), i.e., does the alarm sound with the ventilation system fails?
4. Is the mechanical ventilation system controlled by a switch located outside the door that is interconnected with the lights (29 CFR 1910.106)?