

**Iowa State Fire Marshal Division**  
**[Flammable and Combustible Liquid Codes]**

Enclosed is the information on flammable and combustible liquids that you have requested. Iowa has adopted the 2003 edition of NFPA 30 - Flammable and Combustible Liquids Code published by the National Fire Protection Association as the rules governing flammable and combustible liquid storage and handling. In addition, the 2003 edition of NFPA 30A - Automotive and Marine Service Station Code has been adopted as the rules governing dispensing of fuels into motor vehicles. These rules were adopted by Iowa Administrative Code 661-221(101) along with some exceptions and additions.

**Bulk Fueling Facilities**

<b>Distances:</b>	<b>Property Line, Including The Opposite Side of a Public Way</b>	<b>Important Building, Including Nearest Side of a Public Way</b>
<b>Tank Capacity (gal)</b>	<b>(ft)</b>	<b>(ft)</b>
275 or Less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45

**Note:** No dispensing device shall be located less than 100ft to a dwelling unit.

**Note:** Distances to buildings may vary depending on construction type & usage.

**Tank Type:** UL or approved equivalent. **Note:** Tanks designed and stamped for underground use shall not be installed for aboveground use.

**Vents:** Pressure Vacuum & Emergency Vents. All vents shall be sized in accordance with proper size & type for each respective tank.

**Tank Labeling:** All tanks shall be labeled with the contents contained within. Warning signs shall be posted for "NO SMOKING" or "OPEN FLAMES".

**Vehicle Protection:** Required to protect all equipment, piping, & tanks.

1. Guard post shall be constructed of steel not less than 4 in. in diameter & shall be filled with concrete.
2. They shall be spaced not more than 4ft on center
3. They shall be set not less than 3ft deep in a concrete footing of not less than 15-in. diameter

**Note:** Other approved protection is acceptable.

**Containment:** Aboveground tanks shall be located in a diked area that will contain 110% of the largest tanks capacity in accordance with NFPA 30(Cement sealed, steel, or other professional engineered equipment). **Note:** Dikes containing an aggregate capacity of 150,000 or greater shall be subdivided by intermediate dikes or drainage channels. Dike walls shall be no closer than 10ft to any property that is or can be built upon.

\*\*Where a provision is made for draining water from diked areas, such drains shall be controlled in a manner so as to prevent flammable and/or combustible liquids from entering natural water courses, [public waterways], public sewers, public drains, or [adjoining property].

- Tank spacing:** Spacing between tanks shall be 1/6 the sum of adjacent tank diameters but not less than 3ft apart. The minimum distance between tanks and toe of the interior dike walls shall be 5ft.
- Loading/Unloading:** Loading & Unloading shall be provided with drainage or other means to contain spills. Loading and unloading structures shall be of noncombustible construction. Loading & unloading facilities shall be separated from aboveground tank buildings, or nearest line of adjoining property that can be built upon by a distance of at least 25ft for a class I liquid, and 15ft for class II & III.
- Inspection/Maintenance:** Ground areas around tank storage facilities shall be kept free of weeds, trash, or other unnecessary combustible materials. All equipment shall be properly maintained in good working order.
- Trespass Precautions:** Sites shall be protected from trespass and tampering. (Fencing/Locked Controls).
- Lighting:** Security light required if after hour loading.
- Fire Extinguisher:** 20 lb. fire extinguisher with a minimum 40 B:C rating within 50ft. (Annually inspected)
- Emergency Shut-off:** Installed in approved locations but not less than 20ft or more than 100ft from the fuel loading nozzle. Note: The emergency shut-off shall be labeled.
- Valves:** **Tank**=External control valve/Emergency fire valve. **Loading Tank Pipes**= Check valves to prevent backflow. Piping systems shall contain a sufficient number of valves to properly control the flow of liquid both in normal operation & in the event of physical damage. **Note:** Valves installed externally to the tank shall be of steel or ductile iron.
- Piping:** Piping shall be labeled, protected from corrosion, and physical damage. Piping shall be properly supported to prevent settlement and movement of pipes. **Note:** “No connection to storage tanks at motor fuel dispensing facilities”.
- Tank Supports:** Supports shall be of concrete, masonry, or protected steel. **Note:** Steel supports shall have a fire resistant rating of not less than 2 hours.
- Electrical Services:  
(NFPA 70)** **Loading**-Class I Division I within 3ft of point of venting to atmosphere, extending in all directions. Class I Division II area between 3ft and 15ft from point of venting to atmosphere, extending in all directions; also , up to 18 in. above grade within a horizontal radius of 10ft from point of loading connection. **Tank**-Class I Division I area inside dike where dike height is greater than the distance from the tank to the dike for more than 50 percent of the tank circumference. **Shell, ends, or roof & dike area**-Class I Division II within 10ft of shell, ends, or roof of tank; area within dike to level of top of dike.
- Static Protection:** All equipment such as tanks, machinery, and piping shall be bonded & grounded.
- Emergency Planning** Emergency procedures and training shall be developed to provide safe shutdown of operations in the event of an emergency. All personnel shall be trained in the use of all equipment.

### **NFPA 30 2.3.2.3.3 Double-walled tank Requirements**

Double-wall tanks shall be Underwriters Laboratories (UL) listed steel double-walled tank or a UL listed steel inner tank with an outer containment tank wall constructed in accordance with nationally accepted industry standards (e.g., those codified by the American Petroleum Institute, the Steel Tank Institute and the American Concrete Institute). Control of spillage for double-walled tanks shall comply with the U.S. Environmental Protection Agency Oil Pollution Control Act 40 CFR 112 and all of the following:

- (a) The capacity of the tank shall not exceed 12,000 gal. for Class I (Gas), & 20,000 gal. Class II (Diesel).
- (b) All piping connections to the tank shall be made above the normal maximum liquid level.
- (c) Means shall be provided to prevent the release of liquid from the tank by siphon flow.
- (d) Means shall be provided for determining the level of liquid in the tank. This means shall be accessible to the delivery operator.
- (e) Means shall be provided to prevent overfilling by sounding an alarm when the liquid level in the tank reaches 90 percent of capacity and by automatically stopping delivery of liquid to the tank when the liquid level in the tank reaches 95 percent of capacity. In no case shall these provisions restrict or interfere with the proper functioning of the normal vent or the emergency vent.
- (f) Spacing between adjacent tanks shall be not less than 3 ft.
- (g) The tank shall be capable of resisting the damage from the impact of a motor vehicle or suitable collision barriers shall be provided.
- (h) Where the means of secondary containment is enclosed, it shall be provided with emergency venting sized in accordance with recognized standards.
- (i) Means shall be provided to establish the integrity of the secondary containment, in accordance with 2.4.2.3 & 2.4.2.4. The secondary containment shall be designed to withstand the hydrostatic head resulting from a leak from the primary tank of the maximum amount of liquid that can be stored in the primary tank.
- (j) The tank fill opening shall be provided with a spill container, which will hold a minimum 5 gallons.
- (k) The interstitial tank space shall be monitored by an approved, continuous, automatic detection system that is capable of detecting liquids, including water.

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Before installing aboveground tanks storing flammable or combustible liquids, **plans** must be submitted to the State Fire Marshal's Office for approval per IAC 661-221(101). Remember to include details concerning the UL listing of the tanks, necessary distances from the tanks, specifications for normal venting, emergency venting, secondary containment, piping, fuel dispensers, electrical wiring, required valves, warning signs, the fire extinguisher, and any other details or information needed to show the installation will meet the requirements when double wall tanks or vaults are used.

Local jurisdictions (full time fire departments) may require plans to be submitted to them for a local permit in addition to obtaining approval from this office. Consult your local entities for their requirements. Underground tanks, which have been approved in accordance with the UST rule 591-15.6(455G), do not need to be submitted to the state fire marshal for approval.

Aboveground **petroleum** (gas, diesel, and oil) storage tanks that are greater than 1,100 gallons in capacity must be registered with the State Fire Marshal's Office. Note: Tank registration shall not be construed as plan approval. Plan approval is **Required** for **ALL** tanks; registration is not. Tanks that **do not** need to be registered include:

- 1) Aboveground tanks of 1,100 gallons or less capacity;
- 2) tanks used for storing of heating oil for consumptive use on the premises where stored;
- 3) underground tanks defined by Code of Iowa section 455B.471; or
- 4) flow-through process tanks or tanks containing regulated substances, other than motor vehicle fuel for transportation purposes, used as part of a manufacturing process, system, or facility.

**Note:** "Petroleum" means petroleum, including crude oil or any fraction of crude oil which is liquid at standard conditions of temperature and pressure (sixty degrees Fahrenheit and fourteen and seven-tenths pounds per square inch absolute).

**Other standards adopted that relate to flammable liquids and gases include:**

NFPA 31 - Standard for the Installation of Oil Burning Equipment, 2001 edition

NFPA 37 - Installation and Use of Stationary Combustion Engines and Gas Turbines, 2002 edition

NFPA 54 - National Fuel Gas Code, 2006 edition

NFPA 58 - Standard for Storage and Handling of Liquefied petroleum Gases, 2004 edition

NFPA 59A - Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)

NFPA 329 - Underground Leakage of Flammable and Combustible Liquids

NFPA 385 - Standard for Tank Vehicles for Flammable and Combustible Liquids, 2000 edition;

NFPA 395 - Standard for Storage of Flammable & Combustible Liquids on Farms & Isolated Construction Projects, 1993 edition

NFP A 407 - Standard for Aircraft Fuel Servicing, 2007 Edition

- Copies of the standards may be purchased from NFPA by calling toll free (800) 344-3555.

**This guide was produced to assist the installation of aboveground storage facilities. This handout is NOT a substitute for the Iowa Administrative Code (IAC) 661-221(101) or the National Fire Protection Association (NFPA) pamphlets 30 and 30A. Consult these documents for complete details' regarding aboveground storage tanks and motor vehicle fuel dispensing. Note: NFPA can be reached at 1-800-344-3555 to order the pamphlets.**