

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.

RETAIL & FLEET VEHICLE MOTOR FUELING FACILITIES

RETAIL

(Tank Location)

50 feet from a building

50 feet from nearest public way

50 feet from a dispenser (**Dispenser location**=10ft from any building, 10ft to property line)

100 feet from property line, including opposite side of a public way

* See NFPA 30A Chart for vaulted, protected tank, or fire-resistant tank.

COMMERCIAL, INDUSTRIAL, GOVERNMENTAL, OR MANUFACTURING ESTABLISHMENTS

(Tank Location)

40 feet from Buildings-**Exception:** Tanks may be located closer to noncombustible constructed buildings.

40 feet from property lines, including the opposite side of a public way.

100 feet from residences.

50 feet to dispenser (over 6,000 gallon, Class I (Gas), 12,000 gallon, Class II (Diesel).

(**Dispenser location**=5ft from any building opening, 10ft to property line).

* See NFPA 30A Chart for vaulted, protected tank, or fire-resistant tank.

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

Tank Gauges: Means shall be provided in determining the liquid level in each tank.
Double Wall Tanks: Audible alarm at 90%, overfill prevention at 98%, or flow restrictor at 95%.

Valves: **Tank**=External control valve/Emergency fire valve/Solenoid Valve. **Note:** Valves installed externally to the tank shall be of steel or ductile iron.
Dispenser=Automatic emergency shutoff valve, or "impact valve" with fusible link.

Vents: Pressure Vacuum & Emergency Vents. Vent pipes for class I (gas) shall be 12-ft from the ground. 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" within 20ft.

Vehicle Protection: Required to protect all equipment, piping, tanks, and dispenser.

1. Guard post shall be constructed of steel not less than 4 in. in diameter & shall be filled with concrete.
2. Spaced not more than 4ft between posts on center.

3. Set not less than 3ft deep in a concrete footing of not less than 15-in. diameter.
 4. Set with the top of the post not less than 3ft aboveground.
 5. Located not less than 3ft from the protected object.
- 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).

**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 Size: **Retail**=12,000 gallons per dispenser with total aggregate on site 48,000 gal. **Commercial**=class II&III-20,000 gal. per dispenser with total aggregate on Site=80,000. Class I (Gas) =Retail Rules.

Trespass Precautions: **Retail**= Chain link fence at least 6ft high. The fence shall be separated from the tanks by at least 10ft with an access gate. Note: The gate shall be secured from Unauthorized entry. **Non-Retail**-As an alternate to fencing, locked controls is acceptable.

Lighting: Security light required at retail sites.

Fire Extinguisher: 20 lb. fire extinguisher with a minimum 40 B:C rating within 100ft of each pump, & storage tank fill pipe opening.(Annually inspected)

Emergency Shut-off: Installed in approved locations but not less than 20ft or more than 100ft from the fuel dispensing device.
Attended sites=Available to the attendant.
Unattended sites=Accessible to patrons and at least one device or disconnect shall be readily accessible to each group of dispensing devices on an individual island. Emergency instructions and a phone shall be provided. **Note:** Emergency shut-off(s) shall be labeled.

Signs: **Warning/Operating Instructions:**

1. It is unlawful and dangerous to dispense gasoline into unapproved containers.
2. No Smoking.
3. Stop Motor.
4. No filling of portable containers in or on a motor vehicle.
5. Place container on ground before filling.

Hoses/Nozzles: Emergency breakaway device designed to retain liquid on both sides of the breakaway point. An automatic-closing type hose nozzle valve, with or without a latch-open device. Hose length not to exceed 18-ft.

Piping: Piping shall be labeled, protected from corrosion, and physical damage. Piping shall be properly supported to prevent settlement and movement of pipes. Piping shall contain a sufficient number of valves to control the flow of liquid in normal operation & in the event of physical damage. All piping shall be above the normal liquid level.

“No gravity flow or pressurization of the tank”.
 “No connection to aboveground tanks at bulk plants”.

- 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.
- Leak Detection:** Required for remote/submersible pumping systems. Each pump shall have installed on the discharge side a listed leak detection device. **Note:** Not required if all piping is visible.
- Static Protection:** All equipment such as tanks, machinery, and piping shall be bonded & grounded.
- 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 wall shall be 5ft.
- Electrical Services:
(NFPA 70)**
- Dispenser**-Class I Division I inside dispensers and under dispensers. Class I Division II within 18 inches vertical from dispenser and within 20 feet horizontally.
 - 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.

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 above 1,100 gallon, **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 **Flammable/Combustible liquids** 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 the following:**

- 1) Aboveground tanks of 1,100 gallons or less capacity; 2) Farm Tanks of 2,000 gallons or less storing Gasoline, and tanks of 5,000 gallons or less storing Diesel Fuel. 3) 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.

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, 2009 edition
NFPA 58 - Standard for Storage and Handling of Liquefied petroleum Gases, 2008 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 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 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.