

NFPA 30A

Code for Motor Fuel Dispensing Facilities and Repair Garages

2003 Edition



NFPA, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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NFPA 30A
Code for
Motor Fuel Dispensing Facilities and Repair Garages
2003 Edition

This edition of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, was prepared by the Technical Committee on Automotive and Marine Service Stations and acted on by NFPA at its May Association Technical Meeting held May 18–21, 2003, in Dallas, TX. It was issued by the Standards Council on July 18, 2003, with an effective date of August 7, 2003, and supersedes all previous editions.

Note: The text of 9.2.5.4 was revised from that published in the ROP and ROC to reflect a Tentative Interim Amendment issued by the Standards Council on July 17, 2003.

This edition of NFPA 30A was approved as an American National Standard on July 18, 2003.

Origin and Development of NFPA 30A

This code originated as Chapter 7 of NFPA 30, *Flammable and Combustible Liquids Code*, and was developed by the Technical Committee on Flammable and Combustible Liquids to provide more detailed requirements for vehicle fueling and to anticipate the need to address self-service fueling and alternative fuels. It was first adopted in 1984. The second edition, adopted in 1987, recognized unattended self-service fueling, and a third edition, adopted in 1990, incorporated requirements for lubrication-only service facilities. The fourth edition, adopted in 1993, incorporated several major amendments, the most important of which allowed aboveground fuel storage tanks at retail motor fuel dispensing facilities, based on a Tentative Interim Amendment to the 1990 edition.

The fifth (1996) edition of NFPA 30A included the following significant changes:

- (1) An increase in the maximum allowable aboveground fuel storage for Class II liquids (i.e., diesel fuel) at fleet refueling operations to 20,000 gal (75,700 L) per tank, with a maximum aggregate capacity of 80,000 gal (302,800 L)
- (2) A new Chapter 10 that provided comprehensive fire safety requirements for marine motor fuel dispensing facilities, including fuel dispensing practices
- (3) More specific requirements for installation and function of the emergency shear valve at the base of the fuel dispenser
- (4) A new Section 3.8 on low melting point piping materials

After the adoption of the 1996 edition of NFPA 30A, the Technical Committee on Automotive and Marine Service Stations was given responsibility for NFPA 88B, *Standard for Repair Garages*, and was also charged with responsibility for developing fire safety requirements for alternative fuels, such as compressed natural gas (CNG), when these fuels are dispensed along with liquid fuels. With respect to repair garages, the technical committee decided to integrate the technical requirements of NFPA 88B into NFPA 30A.

The sixth (2000) edition of NFPA 30A included the following significant changes:

- (1) A change in the title of the document to *Code for Motor Fuel Dispensing Facilities and Repair Garages* to more accurately reflect its scope
- (2) A complete editorial review to enhance readability and to replace ambiguous text
- (3) Revisions to the minimum separation distances for aboveground storage tanks, including minimum separation distances for protected aboveground tanks and tanks in vaults
- (4) Addition of basic requirements for protected aboveground tanks
- (5) Corrosion protection requirements for tanks and piping
- (6) New and more detailed requirements for installation and testing of piping systems, including secondary containment piping
- (7) Revisions to the requirements for emergency power disconnects for fuel dispensing systems
- (8) Incorporation of requirements for repair garages from NFPA 88B
- (9) Addition of a new chapter that sets requirements for compressed natural gas (CNG), liquefied natural gas (LNG), and liquefied petroleum gas (LP-Gas)

The 2003 edition of NFPA 30A contains one major revision and several less far-reaching changes. The major revision is the addition of a new chapter, Chapter 13, Farms and Remote Sites, which incorporates the requirements of NFPA 395, *Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites*. NFPA 395 was withdrawn in 2002.

Other changes include a revision of the definition of fire resistant tanks in Chapter 3, a change in scope to reflect the incorporation of requirements from NFPA 395, and the addition of material from TIA No. 733 containing requirements and annex material warning people of electrostatic and other hazards that occur during dispensing operations.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on safeguarding against the fire and explosion hazards associated with the general storage, handling, and dispensing of flammable and combustible liquids at automotive and marine service stations, farms, and isolated construction sites and with related activities such as dispensing gaseous fuels.

This committee shall also have primary responsibility for documents on construction, control of fire hazards, ventilation, fire protection, and maintenance of repair garages.

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Code for

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Information on the fire hazard properties of common liquids found at motor fuel dispensing facilities and repair garages can be found in Annex B.

Information on referenced publications can be found in Chapter 2 and Annex D.

Chapter 1 Administration

1.1* Scope.

1.1.1 This code shall apply to motor fuel dispensing facilities; marine/motor fuel dispensing facilities; and motor fuel dispensing facilities located inside buildings, at fleet vehicle motor fuel facilities, and at farms and isolated construction sites. This code shall also apply to motor vehicle repair garages.

1.1.2* This code shall not apply to those motor fuel dispensing facilities where only liquefied petroleum gas (LP-Gas), liquefied natural gas (LNG), or compressed natural gas (CNG) is dispensed as motor fuel.

1.2* Purpose. The purpose of this document shall be to provide reasonable safeguards for dispensing liquid and gaseous motor fuels into the fuel tanks of automotive vehicles and marine craft.

1.3 Application. (Reserved)

1.4 Retroactivity. The provisions of this code reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this code at the time the code was issued.

1.4.1 Unless otherwise specified, the provisions of this code shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the code. Where specified, the provisions of this code shall be retroactive.

1.4.2 In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this code deemed appropriate.

1.4.3 The retroactive requirements of this code shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

1.5 Equivalency. Nothing in this code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this code.

1.5.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.5.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.6 Enforcement. This code shall be administered and enforced by the authority having jurisdiction designated by the governing authority. (See Annex C for sample wording for enabling legislation.)

1.7* Classification of Liquids. Any liquid within the scope of this code and subject to the requirements of this code shall be known generally as either a flammable liquid or a combustible liquid and shall be defined and classified in accordance with this section. [30:1.7.3]

1.7.1 Combustible Liquid. Any liquid that has a closed-cup flash point at or above 100°F (37.8°C), as determined by the test procedures and apparatus set forth in 1.7.4 of NFPA 30. Combustible liquids are classified as Class II or Class III as follows: (1) *Class II Liquid* — any liquid that has a flash point at or above 100°F (37.8°C) and below 140°F (60°C); (2) *Class IIIA* — any liquid that has a flash point at or above 140°F (60°C), but below 200°F (93°C); (3) *Class IIIB* — any liquid that has a flash point at or above 200°F (93°C). [30:1.7.3.1]

1.7.2* Flammable Liquid. Any liquid that has a closed-cup flash point below 100°F (37.8°C), as determined by the test procedures and apparatus set forth in 1.7.4 of NFPA 30. Flammable liquids are classified as Class I as follows: *Class I Liquid* — any liquid that has a closed-cup flash point below 100°F (37.8°C) and a Reid vapor pressure not exceeding 40 psia (2068.6 mm Hg) at 100°F (37.8°C), as determined by ASTM D 323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*. Class I liquids are further classified as follows: (1) *Class IA liquids* — those liquids that have flash points below 73°F (22.8°C) and boiling points below 100°F (37.8°C); (2) *Class IB liquids* — those liquids that have flash points below 73°F (22.8°C) and boiling points at or above 100°F (37.8°C); (3) *Class IC liquids* — those liquids that have flash points at or above 73°F (22.8°C), but below 100°F (37.8°C). [30:1.7.3.2]

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this code and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10, *Standard for Portable Fire Extinguishers*, 2002 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2002 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2003 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2003 edition.

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

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 2003 edition.

NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 2002 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 2003 edition.

NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, 2002 edition.

NFPA 54, *National Fuel Gas Code*, 2002 edition.

NFPA 55, *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks*, 2003 edition.

NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code*, 2002 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2001 edition.

NFPA 70, *National Electrical Code*®, 2002 edition.

NFPA 80, *Standard for Fire Doors and Fire Windows*, 1999 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 1999 edition.

NFPA 86, *Standard for Ovens and Furnaces*, 2003 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2002 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids*, 1999 edition.

NFPA 101®, *Life Safety Code*®, 2003 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2003 edition.

NFPA 220, *Standard on Types of Building Construction*, 1999 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 2000 edition.

NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair*, 1999 edition.

NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids*, 2000 edition.

NFPA 8501, *Standard for Single Burner Boiler Operation*, 1997 edition.

NFPA 8502, *Standard for the Prevention of Furnace Explosions/Implosions in Multiple Burner Boilers*, 1999 edition.

2.3 Other Publications.

2.3.1 API Publication. American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005.

API 607, *Fire Test for Soft-Seated Quarter-Turn Valves*, 4th edition.

2.3.2 ASTM Publications. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 5, *Standard Method of Test for Penetration of Bituminous Materials*, 1997.

ASTM D 323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*, 1999.

2.3.3 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

UL 842, *Standard for Valves for Flammable Fluids*, 8th edition.

UL 2085, *Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids*, 2nd edition.

UL 2245, *Standard for Below-Grade Vaults for Flammable Liquid Storage Tanks*, 1st edition.

ANSI/UL 87, *Standard for Power-Operated Dispensing Devices for Petroleum Products*, 11th edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this code. Where terms are not included, common usage of the terms shall apply.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Code. A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

3.2.4 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.5* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.3 General Definitions.

3.3.1 Basement. A story of a building or structure having one-half or more of its height below ground level and to which access for fire-fighting purposes is unduly restricted.

3.3.2 Bulk Plant or Terminal. That portion of a property where liquids are received by tank vessel, pipeline, tank car, or tank vehicle and are stored or blended in bulk for the purpose

of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank, or container.

3.3.3 Closed Container. A container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

3.3.4 Combustible Liquid. See 3.3.9.1.

3.3.5 Container. Any vessel of 60 U.S. gal (227 L) or less capacity used for transporting or storing liquids.

3.3.6* Dispensing Device, Overhead Type. A dispensing device that consists of one or more individual units intended for installation in conjunction with each other, mounted above a dispensing area typically within the service station canopy structure, and characterized by the use of an overhead hose reel.

3.3.7 Flammable Liquid. See 3.3.9.2.

3.3.8 Gas. A material that has a vapor pressure greater than 300 kPa absolute (43.5 psia) at 50°C (122°F) or is completely gaseous at 20°C (68°F) at a standard pressure of 101.3 kPa absolute (14.7 psia).

3.3.9* Liquid. Any material that has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D 5, *Standard Method of Test for Penetration of Bituminous Materials*. [30:3.3]

3.3.9.1* Combustible Liquid. Any liquid that has a closed-cup flash point at or above 100°F (37.8°C), as determined by the test procedures and apparatus set forth in 1.7.4. Combustible liquids are classified as Class II or Class III as follows: (1) Class II Liquid — any liquid that has a flash point at or above 100°F (37.8°C) and below 140°F (60°C); (2) Class IIIA — any liquid that has a flash point at or above 140°F (60°C), but below 200°F (93°C); (3) Class IIIB — any liquid that has a flash point at or above 200°F (93°C). [30:1.7]

3.3.9.2* Flammable Liquid. Any liquid that has a closed-cup flash point below 100°F (37.8°C), as determined by the test procedures and apparatus set forth in 1.7.4. Flammable liquids are classified as Class I as follows: Class I Liquid — any liquid that has a closed-cup flash point below 100°F (37.8°C) and a Reid vapor pressure not exceeding 40 psia (2068.6 mm Hg) at 100°F (37.8°C), as determined by ASTM D 323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*. Class I liquids are further classified as follows: (1) Class IA liquids — those liquids that have flash points below 73°F (22.8°C) and boiling points below 100°F (37.8°C); (2) Class IB liquids — those liquids that have flash points below 73°F (22.8°C) and boiling points at or above 100°F (37.8°C); (3) Class IC liquids — those liquids that have flash points at or above 73°F (22.8°C), but below 100°F (37.8°C). [30:1.7]

3.3.10 Low Melting Point Materials. Ductile materials such as aluminum, copper, and brass, nonductile materials such as cast iron, and rigid and nonrigid polymeric materials such as plastic and fiberglass-reinforced plastic that soften on exposure to fire and that are partially or completely consumed by fire.

3.3.11 Motor Fuel Dispensing Facility. That portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith.

3.3.11.1 Fleet Vehicle Motor Fuel Dispensing Facility. A motor fuel dispensing facility at a commercial, industrial, governmental, or manufacturing property where motor fuels are dispensed into the fuel tanks of motor vehicles that are used in connection with the business or operation of that property by persons within the employ of such business or operation.

3.3.11.2 Marine Motor Fuel Dispensing Facility. A motor fuel dispensing facility at or adjacent to shore, a pier, a wharf, or a floating dock where motor fuels are dispensed into the fuel tanks of marine craft.

3.3.11.3* Motor Fuel Dispensing Facility Located Inside a Building. That portion of a motor fuel dispensing facility located within the perimeter of a building or building structure that also contains other occupancies.

3.3.12 Repair Garages.

3.3.12.1 Major Repair Garage. A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, and repairs that require draining of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms.

3.3.12.2 Minor Repair Garage. A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air conditioning refrigerants, etc.), brake system repairs, tire rotation, and similar routine maintenance work, including associated floor space used for offices, parking, or showrooms.

3.3.13 Safety Can. An approved container, of not more than 18.9 L (5 gal) capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

3.3.14 Submersible Pump. A pump that is located inside a storage tank and positioned near the bottom of the tank, below the liquid level.

3.3.15 Tanks.

3.3.15.1 Aboveground Storage Tank. A horizontal or vertical tank that is listed and intended for fixed installation, without backfill, above or below grade and is used within the scope of its approval or listing.

3.3.15.2 Fire-Resistant Tank. An atmospheric aboveground tank provided with fire-resistive protection for the tank structure and its supports from exposures to a high intensity liquid pool fire, which is listed in accordance with the provisions contained in UL 2080, *Standard for Fire Resistant Tanks for Flammable and Combustible Liquids*, or an equivalent standard.

3.3.15.3 Portable Tank. Any closed vessel having a liquid capacity over 227 L (60 U.S. gal) and not intended for fixed installation, including intermediate bulk containers (IBCs), as defined and regulated by the U.S. Department of Transportation.

3.3.15.4* Protected Aboveground Tank. An atmospheric aboveground tank provided with integral secondary containment, protection from physical damage, and an insulation system intended to reduce the heat transferred to the primary tank when the tank is exposed to a high intensity liquid pool fire, which is listed in accordance with UL 2085, *Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids*, or an equivalent standard.

3.3.16 Vapor Processing Equipment. Those components of a vapor processing system that are designed to process vapors or liquids captured during transfer or filling operations.

3.3.17* Vapor Processing System. A system designed to capture and process vapors displaced during transfer or filling operations by use of mechanical or chemical means. Examples are systems using blower-assist for capturing vapors and refrigeration, absorption, and combustion systems for processing vapors. [30:3.3]

3.3.18* Vapor Recovery System. A system designed to capture and retain, without processing, vapors displaced during transfer or filling operations.

Chapter 4 Storage of Liquids

4.1 Scope. This chapter shall apply to the storage of liquid fuels and to the storage of related materials, such as lubricating oils and greases, cleaning solvents, and windshield washer solvents.

4.2 General Requirements.

4.2.1 Liquids shall be stored in the following:

- (1) Approved closed containers that do not exceed 227 L (60 gal) capacity and are located outside buildings
- (2) Tanks or approved closed containers located inside motor fuel dispensing facilities or repair garages
- (3) Aboveground tanks, underground tanks, and containers in accordance with the requirements of Section 4.3
- (4) Tanks supplying marine service stations in accordance with Section 11.2

4.2.2 A motor fuel dispensing facility located at a bulk plant shall be separated from areas in which bulk plant operations are conducted by a fence or other approved barrier. Dispensing devices at the motor fuel dispensing facility shall not be supplied by aboveground tanks located in the bulk plant. Storage tanks at motor fuel dispensing facilities shall not be connected by piping to aboveground tanks located in the bulk plant.

4.2.3 Class I liquids shall not be stored or handled in a building that has a basement or pit into which ignitable vapors can travel, unless the basement or pit is provided with ventilation that will prevent the accumulation of vapors. The ventilation system shall be capable of providing at least 1 cfm of exhaust per ft² of floor area (0.3 m³/min/m²), but not less than 4 m³/min (150 cfm).

4.2.4 Where tanks are at an elevation that produces a gravity head on the dispensing device, the tank outlet shall be equipped with a device, such as a normally closed solenoid valve, positioned adjacent to and downstream from the valve specified in 4.3.2.5.1 of NFPA 30 that is installed and adjusted so that liquid cannot flow by gravity from the tank if the piping or hose fails when the dispenser is not in use.

4.3 Storage of Liquids.

4.3.1 Underground Tanks. Underground storage tanks shall meet all applicable requirements of Chapter 4 and Chapter 5 of NFPA 30.

4.3.2* Aboveground Storage Tanks. Except as modified by the provisions of this subsection, aboveground storage tanks shall meet all applicable requirements of Chapter 4 and Chapter 5 of NFPA 30.

4.3.2.1 The use of aboveground storage tanks at motor fuel dispensing facilities, fleet vehicle motor fuel dispensing facilities, and marine motor fuel dispensing facilities shall be permitted when installed in accordance with the requirements of this subsection and with all applicable requirements of Chapter 4 and Chapter 5 of NFPA 30 and, for tanks other than tanks in vaults, when the specific installation has been approved by the authority having jurisdiction.

4.3.2.2 Tanks designed and built for underground use shall not be installed for aboveground use.

4.3.2.3 Tanks storing Class I and Class II liquids at an individual site shall be limited to a maximum individual capacity of 45,400 L (12,000 gal) and aggregate capacity of 181,700 L (48,000 gal) unless such tanks are installed in vaults complying with 4.3.3, in which case the maximum individual capacity shall be permitted to be 57,000 L (15,000 gal).

4.3.2.4 Tanks shall be located in accordance with Table 4.3.2.4.

4.3.2.5 The maximum individual tank capacity of 45,400 L (12,000 gal), where indicated in Table 4.3.2.4, shall be permitted to be increased to 75,700 L (20,000 gal) for Class II and Class III liquids at a fleet vehicle motor fuel dispensing facility and an aggregate capacity of 304,000 L (80,000 gal).

4.3.2.6 At fleet vehicle motor fuel dispensing facilities, no minimum separation shall be required between the dispensing device and a tank in a vault, a protected tank, or a fire-resistant tank.

4.3.2.7 The provisions of this subsection shall not prohibit the dispensing of Class I and Class II liquids in the open from a fuel dispensing system supplied by an existing aboveground tank, not to exceed 22,710 L (6000 gal), located at commercial, industrial, government, or manufacturing establishments, and intended for fueling vehicles used in connection with their business. Such dispensing shall be permitted provided the following:

- (1) An inspection of the premises and operations has been made and approval has been granted by the authority having jurisdiction.
- (2) The tank is safeguarded against collision, spillage, and overflow to the satisfaction of the authority having jurisdiction.
- (3) The tank system is listed or approved for such aboveground use.
- (4) The tank complies with requirements for emergency relief venting, the tank and dispensing system meet the electrical classification requirements of this code, and the tank complies with the provisions of 4.2.4.
- (5) The tank storage complies with Chapter 2 of NFPA 30.

4.3.2.8 Aboveground tanks shall be provided with spill control that meets the requirements of 4.3.2.3 of NFPA 30. Tank fill connections shall be provided with a noncombustible spill containment device.

Exception: Tanks installed in vaults that meet the requirements of 4.3.3 need not meet this requirement.

4.3.3 Vaults.

4.3.3.1 General. Aboveground tanks shall be permitted to be installed in vaults that meet the requirements of this subsection. Except as modified by the provisions of this subsection, aboveground storage tanks in vaults shall meet all applicable requirements of Chapter 4 and Chapter 5 of NFPA 30. Vaults shall be constructed and listed in accordance with UL 2245, *Standard for Below-Grade Vaults for Flammable Liquid Storage Tanks*.

Table 4.3.2.4 Minimum Separation Requirements for Aboveground Tanks

Tank Type	Individual Tank Capacity (gal) ¹	Minimum Distance (ft)				Minimum Distance Between Tanks (ft)
		From the Nearest Important Building on the Same Property	From Nearest Fuel Dispensing Device ²	From Lot Line That Is or Can Be Built Upon, Including the Opposite Side of a Public Way	Distance from the Nearest Side of Any Public Way (ft)	
Tanks in vaults ³	0–15,000	0	0	0	0	Separate compartments required for each tank
Protected aboveground tanks	Less than or equal to 6,000	5	0	15	5	3
	6,001–12,000	15	0	25	15	3
Fire-resistant tanks	0–12,000	25	25	50	25	3
Other tanks meeting the requirements of NFPA 30	0–12,000	50	50	100	50	3

Note: For SI units, 1 ft = 0.30 m; 1 gal = 3.8 L.

¹See 4.3.2.3 and 4.3.2.5.

²See 4.3.2.6.

³The separation distances given for vaults are measured from the outer perimeter of the vault.

4.3.3.1.1 Vaults shall be permitted to be either above or below grade.

4.3.3.2 Vault Design and Construction. Vaults shall be designed and constructed to meet the following requirements:

- (1) The walls and floor of the vault shall be constructed of reinforced concrete at least 150 mm (6 in.) thick.
- (2) The top of an abovegrade vault that contains tanks storing Class I flammable liquids shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault to ensure that the thrust of any explosions occurring inside the vault is directed upward before destructive internal pressure develops within the vault. The top of an at-grade or belowgrade vault that contains tanks storing Class I flammable liquids shall be designed to relieve or contain the force of any explosion occurring inside the vault.
- (3) The top and floor of the vault and the tank foundation shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable.
- (4) The walls and floor of a belowgrade vault shall be designed to withstand anticipated soil and hydrostatic loading. The vault shall be liquidtight.
- (5) Adjacent vaults shall be permitted to share a common wall.
- (6) There shall be no openings in the vault enclosure except those necessary for access to; inspection of; and filling, emptying, and venting of the tank.
- (7) Where required, the vault shall be designed to be wind and earthquake resistant, in accordance with good engineering practice.
- (8) The vault shall be provided with connections to permit ventilation to dilute, disperse, and remove any vapors prior to personnel entering the vault.
- (9) The vault shall be provided with a means for personnel entry.
- (10) The vault shall be provided with an approved means to admit a fire suppression agent.

4.3.3.3 Tank Selection and Arrangement. Tanks shall be listed for aboveground use. Each tank shall be in its own vault and shall be completely enclosed by the vault. There shall be sufficient clearance between the tank and the vault to allow for visual inspection and maintenance of the tank and its appurtenances. There shall be no backfill around the tank.

4.3.3.4 Tank Appurtenances. Vent pipes that are provided for normal tank venting shall terminate outside and at least 3.6 m (12 ft) above ground level.

4.3.3.4.1 Emergency vents shall be vaportight and shall be permitted to discharge inside the vault. Long-bolt manhole covers shall not be permitted for this purpose.

4.3.3.4.2 An approved means of overfill protection shall be provided for tanks. The use of ball float valves shall be prohibited. Fill connections for vaults installed inside of buildings shall comply with 4.3.2.5.5 of NFPA 30.

4.3.3.5 Exhaust Ventilation Systems.

4.3.3.5.1 Vaults that contain tanks storing Class I liquids shall be ventilated at a rate of not less than 0.3 m³/min/m² (1 cfm/ft² of floor area) but not less than 4 m³/min (150 cfm). Such ventilation shall operate continuously or shall be designed to operate upon activation of a vapor and liquid detection system. Failure of the exhaust airflow shall automatically shut down the dispensing system.

4.3.3.5.2 The exhaust system shall be designed to provide air movement across all parts of the vault floor. Supply and exhaust ducts shall extend to within 75 mm (3 in.), but not more than 305 mm (12 in.), of the floor. The exhaust system shall be installed in accordance with the provisions of NFPA 91.

4.3.3.6 Vapor and Liquid Detection Systems. Vaults shall be provided with approved vapor and liquid detection systems and equipped with on-site audible and visual warning devices with battery backup.

4.3.3.6.1 Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower flammable limit of the liquid stored. Vapor detectors shall be located no higher than 305 mm (12 in.) above the lowest point in the vault.

4.3.3.6.2 Liquid detection systems shall sound an alarm upon detection of any liquid, including water. Liquid detectors shall be located in accordance with the manufacturer's instructions.

4.3.3.6.3 Activation of either vapor or liquid detection systems shall cause a signal to be sounded at an approved, constantly attended location within the facility serving the tanks or at an approved location. Activation of vapor detection systems shall also shut off dispenser pumps.

4.3.3.7 Vault and Dispenser Installation. Vaults shall be installed in accordance with the following:

- (1) Each vault and its tank shall be anchored to withstand uplifting by groundwater or flooding, including when the tank is empty.
- (2) Vaults that are not resistant to damage from the impact of a motor vehicle shall be protected by collision barriers.
- (3) Dispensing devices shall be allowed to be installed on tops of vaults.
- (4) Means shall be provided to recover liquid from the vault. If a pump is used to meet this requirement, the pump shall not be permanently installed in the vault. Electric-powered portable pumps shall be approved for use in Class I, Division 1 locations, as defined in NFPA 70.
- (5) At each entry point, a warning sign indicating the need for procedures for safe entry into confined spaces shall be posted. Each entry point shall be secured against unauthorized entry and vandalism.

4.3.4 Fire-Resistant Tanks.

4.3.4.1 Fire-resistant tanks shall be listed for the use intended and shall meet 4.3.4.2.

4.3.4.2 Subparagraph 4.2.5.2.5 of NFPA 30 shall not be used to reduce the size of the emergency vent.

4.3.5 Protected Aboveground Tanks. Protected aboveground tanks shall be listed and shall be tested in accordance with UL 2085, *Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids*. Protected aboveground tanks shall also meet the requirements of 4.3.5.1 and 4.3.5.2.

4.3.5.1 The construction that provides the required fire-resistive protection shall prevent release of liquid, failure of the primary tank, failure of the supporting structure, and impairment of venting for a period of not less than 2 hours and shall limit the increase in temperature of the liquid inside the tank when tested using the fire exposure specified in UL 2085, *Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids*.

4.3.5.2 Subparagraph 4.2.5.2.5 of NFPA 30 shall not be used to reduce the size of the emergency vent.

4.3.6 Additional Requirements for All Aboveground Tanks.

4.3.6.1 All openings shall be located above the maximum liquid level.

4.3.6.2 Means shall be provided for determining the liquid level in each tank, and this means shall be accessible to the delivery operator.

4.3.6.3 Means shall be provided to sound an audible alarm when the liquid level in the tank reaches 90 percent of capacity. Means shall also be provided either to automatically stop the flow of liquid into the tank when the liquid level in the tank reaches 98 percent capacity or to restrict the flow of liquid into the tank to a maximum flow rate of 9.5 L/min (2.5 gpm) when the liquid in the tank reaches 95 percent capacity. These provisions shall not restrict or interfere with the operation of either the normal vent or the emergency vent.

4.3.6.4 Means shall be provided to prevent the release of liquid by siphon flow.

4.3.6.5 Shutoff and check valves shall be equipped with a pressure-relieving device that will relieve the pressure generated by thermal expansion back to the tank.

4.3.6.6 Fuel shall not be dispensed from the tank by either gravity flow or pressurization of the tank.

4.3.7 Physical Protection for All Outside Aboveground Tanks.

4.3.7.1 Tanks that are not enclosed in vaults shall be enclosed with a chain link fence at least 1.8 m (6 ft) high. The fence shall be separated from the tanks by at least 3 m (10 ft) and shall have a gate that is secured against unauthorized entry.

Exception: Tanks are not required to be enclosed with a fence if the property on which the tanks are located has a perimeter security fence.

4.3.7.2* Guard posts or other approved means shall be provided to protect tanks that are subject to vehicular damage. When guard posts are installed, the following design shall be acceptable:

- (1) They shall be constructed of steel not less than 100 mm (4 in.) in diameter and shall be filled with concrete.
- (2) They shall be spaced not more than 1.2 m (4 ft) on center.
- (3) They shall be set not less than 0.9 m (3 ft) deep in a concrete footing of not less than 380 mm (15 in.) diameter.

4.3.8* Corrosion Control. Any portion of a tank or its piping that is in contact with the soil shall have properly engineered, installed, and maintained corrosion protection that meets the requirements of 4.2.6.1 of NFPA 30.

4.3.9 Storage of Liquids Inside Buildings. Storage of flammable and combustible liquids in motor fuel dispensing facility buildings and in repair garage buildings shall meet the requirements of this subsection.

4.3.9.1 Class I, II, and IIIA Liquids in Tanks Not Exceeding 454 L (120 Gal) Capacity and in Containers.

4.3.9.1.1 The aggregate quantity of Class I liquids stored in a tank that does not exceed 454 L (120 gal) capacity and in containers shall not exceed 454 L (120 gal). Liquids in storage shall be maintained in tanks or in approved containers that are closed or are fitted with an approved dispensing device that meets the requirements of 9.2.4.1.