

NFPA®

30A

**Code for Motor Fuel
Dispensing Facilities and
Repair Garages**

2021



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NFPA® 30A

Code for

Motor Fuel Dispensing Facilities and Repair Garages

2021 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. It was issued by the Standards Council on June 1, 2020, with an effective date of June 21, 2020, and supersedes all previous editions.

This document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See “Codes & Standards” at www.nfpa.org for more information.

This edition of NFPA 30A was approved as an American National Standard on June 21, 2020.

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 and prepared by the new Technical Committee on Automotive and Marine Service Stations, 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, which was based on a Tentative Interim Amendment to the 1990 edition.

Significant revisions for the 1996 (fifth) edition included a new chapter on marine motor fuel dispensing facilities, a new section on low-melting-point piping materials, and an increase in the maximum allowable aboveground fuel storage for Class II liquids (i.e., diesel fuel) at fleet refueling operations.

After the adoption of the 1996 edition, the Technical Committee on Automotive and Marine Service Stations was given responsibility for NFPA 88B, *Standard for Repair Garages*, and was also charged with developing fire safety requirements for alternative fuels, such as compressed natural gas (CNG), when they 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.

Major updates to the 2000 (sixth) edition included revisions to minimum separation distances for aboveground storage tanks; the addition of basic requirements for protected aboveground tanks; the addition of corrosion protection requirements for tanks and piping; the addition of requirements for the installation and testing of piping systems; and the addition of a new chapter that set requirements for CNG, liquefied natural gas (LNG), and liquefied petroleum gas (LP-Gas).

The 2003 (seventh) edition contained one major revision and several less significant changes. The major revision was the addition of a new chapter, Chapter 13, Farms and Remote Sites, which incorporated the requirements of NFPA 395, *Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites*, which had been withdrawn in 2002. Other changes included a revision of the definition of *fire-resistant tanks* in Chapter 3, a change in scope to reflect the incorporation of the requirements from NFPA 395, and the addition of material from TIA No. 733 containing requirements and annex material warning of electrostatic and other hazards that can accompany dispensing operations.

The 2008 (eighth) edition contained minor revisions. All the technical specifications for tanks were removed and replaced by references to NFPA 30, *Flammable and Combustible Liquids Code*. References to NFPA 52, *Vehicular Fuel Systems Code* (now the *Vehicular Natural Gas Fuel Systems Code*),

were added to Chapter 12 to address the storage and dispensing of hydrogen at facilities that dispense gaseous liquid fuels.

Significant changes to the 2012 (ninth) edition included new requirements to address inspection, maintenance, and repair of fuel dispensing equipment, leak detection equipment, and secondary containment equipment. Also added was a new requirement that the circuits of gas detection systems be monitored for integrity in accordance with NFPA 72®, *National Fire Alarm and Signaling Code*®. Extensive revisions were made to Chapter 8, Electrical Installations, including the addition of a new area classification table with Zone system criteria, the revision of a drawing depicting the extent of area classification around fuel dispensing units, and the addition of a new diagram depicting the extent of area classification around tank-mounted fuel dispensing units.

Revisions for the 2015 (tenth) edition clarified the code's scope statement, indicating that it applies to repair garages but not to aircraft fueling. Chapter 12 was revised to correlate the code with the source codes for the various alternative fuels (hydrogen, CNG, LNG, and LP-Gas).

Significant changes to the 2018 (eleventh) edition included a revision of the scope statement and the addition of a new chapter to include on-demand mobile fueling. In addition, a revision was made to change single-poppet type emergency shutoff valves to double-poppet-type emergency shutoff valves for pressurized liquid dispensing devices. The revisions also included the addition of a requirement for leak detection devices to restrict or shut off fuel flow in remote/submersible pumps; a requirement for the mechanical or electrical isolation of fluid handling systems — other than fuel — when the emergency shutoff device is actuated; a requirement that major repair garages servicing hydrogen-fueled vehicles meet the provisions of NFPA 2, *Hydrogen Technologies Code*; a requirement that sprinkler protection provisions apply to an entire building containing major repair garage operations; a requirement for vapor removal at the ceiling level for areas where vehicles using lighter-than-air fuels are repaired; and a new requirement prohibiting the storage or placement of merchandise within 6 m (20 ft) of any fuel dispenser.

Major changes to the 2021 (twelfth) edition include the revision of Chapters 7, 8, and 9 to include new requirements for repair garages and areas where CNG and LNG vehicles are serviced. These new and revised requirements cover the areas of building construction, electrical area classification, repair area classification for CNG and LNG vehicles, flammable gas detection, and purge ventilation. Requirements for mobile fueling on public streets have been added to Chapter 14. Fire extinguisher requirements in Chapter 9 have been revised to align with NFPA 10, *Standard for Portable Fire Extinguishers*, and to accommodate new provisions for alternate vehicle fuel protection.

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

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NFPA 30A

Code for

Motor Fuel Dispensing Facilities and Repair Garages

2021 Edition

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Information on referenced and extracted 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, motor fuel dispensing at farms and isolated construction sites, and on-demand mobile fueling.

1.1.2 This code shall apply to motor vehicle repair garages.

1.1.3* This code shall not apply to those motor fuel dispensing facilities where only liquefied petroleum gas (LP-Gas), liquefied natural gas (LNG), compressed natural gas (CNG), or hydrogen is dispensed as motor fuel, or where both gaseous fuel storage and dispensing equipment are at least 15 m (50 ft) from any other motor fuel storage or dispensing equipment of different chemical composition.

1.1.4 This code shall not apply to aircraft fueling.

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 3.3.9.

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, Quincy, MA 02169-7471.

NFPA 2, *Hydrogen Technologies Code*, 2020 edition.

NFPA 10, *Standard for Portable Fire Extinguishers*, 2018 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2019 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2019 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2021 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 2020 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 2021 edition.

NFPA 51, *Standard for the Design and Installation of Oxygen–Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 2018 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 2019 edition.

NFPA 52, *Vehicular Natural Gas Fuel Systems Code*, 2019 edition.

NFPA 54, *National Fuel Gas Code*, 2021 edition.

NFPA 55, *Compressed Gases and Cryogenic Fluids Code*, 2020 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2020 edition.

NFPA 70®, *National Electrical Code®*, 2020 edition.

NFPA 72®, *National Fire Alarm and Signaling Code®*, 2019 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2019 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 2019 edition.

NFPA 85, *Boiler and Combustion Systems Hazards Code*, 2019 edition.

NFPA 86, *Standard for Ovens and Furnaces*, 2019 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2021 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids*, 2020 edition.

NFPA 101®, *Life Safety Code®*, 2021 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2019 edition.

NFPA 220, *Standard on Types of Building Construction*, 2021 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 2019 edition.

NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair*, 2020 edition.

NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids*, 2017 edition.

2.3 Other Publications.

2.3.1 API Publications. American Petroleum Institute, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001-5571.

API 607, *Fire Test For Quarter-Turn Valves and Valves Equipped with Nonmetallic Seats*, 7th edition, 2016.

2.3.2 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D5/D5M, *Standard Test Method for Penetration of Bituminous Materials*, 2019.

ASTM D56, *Standard Test Method for Flash Point by Tag Closed Cup Tester*, 2016a.

ASTM D93, *Standard Test Methods for Flash Point by Pensky–Martens Closed Cup Tester*, 2018.

ASTM D323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*, 2015a.

ASTM D3278, *Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus*, 1996 (2011).

ASTM D3828, *Standard Test Methods for Flash Point of Liquids by Small Scale Closed Cup Tester*, 2016a.

ASTM D4359, *Standard Test for Determining Whether a Material Is a Liquid or a Solid*, 1990 (2019).

2.3.3 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 25, *Meters for Flammable and Combustible Liquids and LP-Gas*, 2016.

UL 79, *Power-Operated Pumps for Petroleum Dispensing Products*, 2016.

UL 79A, *Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*, 2015 (2016).

UL 87, *Power-Operated Dispensing Devices for Petroleum Products*, 2016.

UL 87A, *Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*, 2015 (2019).

UL 330A, *Outline of Investigation for Hose and Hose Assemblies for Use with Dispensing Devices Dispensing Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*, 2018.

UL 567A, *Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*, 2015 (2019).

UL 842, *Valves for Flammable Fluids*, 2015 (2017).

UL 842A, *Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*, 2015 (2019).

UL 2080, *Fire Resistant Tanks for Flammable and Combustible Liquids*, 2000.

UL 2085, *Protected Aboveground Tanks for Flammable and Combustible Liquids*, 1997 (2010).

UL 2245, *Below-Grade Vaults for Flammable Liquid Storage Tanks*, 2006.

UL 2586, *Hose Nozzle Valves*, 1st edition, 2011 (2018).

UL 2586A, *Hose Nozzle Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*, 2015 (2019).

2.3.4 Other Publications.

ASME, *Boiler and Pressure Vessel Code*, 2019.

ASME B31.3, *Process Piping*, 2019.

Title 49, Code of Federal Regulations, Part 571.108, *Lamps, Reflective Devices, and Associated Equipment*.

CSA B51, *Boiler, Pressure Vessel, and Pressure Piping Code*, 2019.

CSA B401, *Vehicle Maintenance Facilities Code*, Table 4, 2018.

Merriam-Webster's *Collegiate Dictionary*, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 30, *Flammable and Combustible Liquids Code*, 2021 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 defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

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. For the purposes of this code, any story of a building wholly or partly below grade that is not considered the first story above grade.

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. [30, 2021]

3.3.4 Combustible Liquid. See 3.3.9.1.

3.3.5* Container. A vessel of 119 gal (450 L) or less capacity used for transporting or storing liquids, excluding intermediate bulk containers. [30, 2021]

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 (1) has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D5/D5M, *Standard Method of Test for Penetration of Bituminous Materials*, or (2) is a viscous substance for which a specific melting point cannot be determined but that is determined to be a liquid in accordance with ASTM D4359, *Standard Test for Determining Whether a Material is a Liquid or a Solid*. [30, 2021]

Δ **3.3.9.1* Combustible Liquid.** An ignitable liquid that is classified as a Class II or Class III liquid. (See 3.4.2.2 and 3.4.2.3.) [30, 2021]

3.3.9.2* Flammable Liquid. An ignitable liquid that is classified as a Class I liquid. (See 3.4.2.1.) [30, 2021]

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 Attended Self-Service Motor Fuel Dispensing Facility. A motor fuel dispensing facility that has an attendant or employee on duty whenever the facility is open for business. The attendant or employee on duty does not typically dispense motor fuels into fuel tanks or containers. The customer or vehicle operator usually conducts the dispensing.

3.3.11.2 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.

3.3.11.3 Full-Service Motor Fuel Dispensing Facility. A motor fuel dispensing facility that has one or more attendants or supervisors on duty to dispense motor fuels into fuel tanks or containers whenever the facility is open for business.

3.3.11.4 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.

3.3.11.5* 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.

3.3.11.6 *Unattended Self-Service Motor Fuel Dispensing Facility.*

A motor fuel dispensing facility that has no attendant or employee on duty. The customer or vehicle operator conducts the dispensing operation. This includes coin, currency, membership card, and credit card dispensing operations.

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, welding or grinding, and repairs that require draining or emptying 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 the associated floor space used for offices, parking, or showrooms.

N 3.3.12.3 CNG/LNG Vehicle Major Repair Area. A space within a repair garage where major repairs are performed on CNG and LNG vehicles.

N 3.3.12.4 CNG/LNG Vehicle Minor Repair Area. A space within a repair garage where only minor repairs are performed on CNG and LNG vehicles.

3.3.13 Safety Can. A listed container of not more than 5.3 gal (20 L) 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.

Δ 3.3.15.2 Fire-Resistant Tank. An atmospheric aboveground storage tank with thermal insulation that has been evaluated for resistance to physical damage and for limiting the heat transferred to the primary tank when exposed to a hydrocarbon fuel fire and is listed in accordance with UL 2080, *Fire Resistant Tanks for Flammable and Combustible Liquids*, or an equivalent test procedure. [30:22.2.1]

Δ 3.3.15.3* Protected Aboveground Tank. An atmospheric aboveground storage tank with integral secondary containment and thermal insulation that has been evaluated for resistance to physical damage and for limiting the heat transferred to the primary tank when exposed to a hydrocarbon pool fire and is listed in accordance with UL 2085, *Protected Aboveground Tanks for Flammable and Combustible Liquids*, or an equivalent test procedure. [30:22.2.3]

3.3.16 Vapor Processing Equipment. Those components of a vapor processing system designed to process vapors or liquids captured during transfer or filling operations. [30, 2021]

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. [30, 2021]

3.3.18* Vapor Recovery System. A system designed to capture and retain, without processing, vapors displaced during transfer or filling operations. [30, 2021]

3.4 Definition and Classification of Liquids.

3.4.1 Scope. This chapter shall establish a uniform system of classifying ignitable (flammable or combustible) liquids for proper application of this code. [30:4.1]

• 3.4.2 Classification of Liquids. Any flammable liquid, as defined in 3.3.9.2, or combustible liquid, as defined in 3.3.9.1, that is within the scope of this code and subject to the requirements of this code shall be classified in accordance with this section.

Δ 3.4.2.1 Class I Liquids.

N 3.4.2.1.1 A liquid with a closed-cup flash point below 100°F (37.8°C) shall be designated as a Class I liquid (i.e., flammable liquid), as determined by the test procedures and apparatus set forth in Section 3.4.3 and a Reid vapor pressure that does not exceed an absolute pressure of 40 psi (276 kPa) at 100°F (37.8°C), as determined by ASTM D323, *Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)*. [30:4.2.1.1]

N 3.4.2.1.2 Class I liquids shall be further subclassified in accordance with the following: (1) *Class IA Liquid.* A liquid that has a flash point below 73°F (22.8°C) and a boiling point below 100°F (37.8°C); (2) *Class IB Liquid.* A liquid that has a flash point below 73°F (22.8°C) and a boiling point at or above 100°F (37.8°C); (3) *Class IC Liquid.* A liquid that has a flash point at or above 73°F (22.8°C), but below 100°F (37.8°C). [30:4.2.1.2]

Δ 3.4.2.2 Class II Liquids. A liquid with a closed-cup flash point at or above 100°F (37.8°C) but below 140°F (60°C) shall be designated as a Class II liquid (i.e., combustible liquid), as determined by the test procedures and apparatus set forth in Section 3.4.3. [30:4.2.2]

N 3.4.2.3 Class III Liquids.

N 3.4.2.3.1 A liquid with a closed-cup flash point at or above 140°F (60°C) shall be designated as a Class III liquid (i.e., combustible liquid), as determined by the test procedures and apparatus set forth in Section 3.4.3. [30:4.2.3.1]

N 3.4.2.3.2 Class III liquids shall be further subclassified in accordance with the following: (1) *Class IIIA Liquid.* A liquid that has a flash point at or above 140°F (60°C), but below 200°F (93°C); (2) *Class IIIB Liquid.* A liquid that has a flash point at or above 200°F (93°C). [30:4.2.3.2]

3.4.3 Determination of Flash Point (FP). The flash point of a liquid shall be determined according to the methods specified in 3.4.3.1 through 3.4.3.4. [30:4.4]

3.4.3.1 Except as specified in 3.4.3.1.1, the flash point of a liquid having a viscosity below 5.5 centiStokes at 104°F (40°C) or below 9.5 centiStokes at 77°F (25°C) shall be

determined in accordance with ASTM D56, *Standard Test Method for Flash Point by Tag Closed Cup Tester*. [30:4.4.1]

- △ 3.4.3.1.1 Cut-back asphalts, liquids that tend to form a surface film, and liquids that contain suspended solids shall not be tested in accordance with ASTM D56, *Standard Test Method for Flash Point by Tag Closed Cup Tester*, even if they otherwise meet the viscosity criteria. [30:4.4.1.1]

- N 3.4.3.1.2 Such liquids as stated in 3.4.3.1.1 shall be tested in accordance with 3.4.3.2. [30:4.4.1.2]

3.4.3.2 The flash point of a liquid having a viscosity of 5.5 centiStokes or more at 104°F (40°C) or 9.5 centiStokes or more at 77°F (25°C) or a flash point of 200°F (93.4°C) or higher shall be determined in accordance with ASTM D93, *Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester*. [30:4.4.2]

3.4.3.3 As an alternative, ASTM D3278, *Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus*, shall be permitted to be used for paints, enamels, lacquers, varnishes, and related products and their components that have flash points between 32°F (0°C) and 230°F (110°C) and viscosities below 150 Stokes at 77°F (25°C). [30:4.4.3]

3.4.3.4 As an alternative, ASTM D3828, *Standard Test Methods for Flash Point by Small Scale Closed Cup Tester*, shall be permitted to be used for materials other than those for which ASTM D3278 is specifically required. [30:4.4.4]

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 0.3 m³/min of exhaust per m² of floor area (1 cfm per ft²), but not less than 4 m³/min (150 ft³/min).

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 22.13.1 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 Chapters 21 and 23 of NFPA 30.

4.3.2* Aboveground Storage Tanks. Except as modified by the provisions of this chapter, aboveground storage tanks shall meet all applicable requirements of Chapters 21 and 22 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 Chapters 21, 22, and 27 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 liquid motor fuels 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 aboveground tank, or a fire-resistant tank.

4.3.2.7 The provisions of this subsection shall not prohibit the dispensing of liquid motor fuels 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 conditions are met:

- (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.

Table 4.3.2.4 Minimum Separation Requirements for Aboveground Tanks

Tank Type	Individual Tank Capacity (gal) ^a	Minimum Distance (ft)				Between Tanks
		From the Nearest Important Building on the Same Property	From Nearest Fuel Dispensing Device ^b	From Lot Line That Is or Can Be Built Upon ^c	From the Nearest Side of Any Public Way	
Tanks in vaults ^d	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
Fire-resistant tanks	6,001–12,000	15	0	25	15	3
Other tanks meeting the requirements of NFPA 30	0–12,000	25	25	50	25	3
	0–12,000	50	50	100	50	3

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

^aSee 4.3.2.3 and 4.3.2.5.

^bSee 4.3.2.6.

^cIncluding the opposite side of a public way.

^dThe separation distances given for vaults are measured from the outer perimeter of the vault.

- (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 22 of NFPA 30.

▲ 4.3.2.8 Spill Control.

■ 4.3.2.8.1 Aboveground tanks not installed in vaults shall be provided with spill control that meets the requirements of 21.7.1 and Section 22.11 of NFPA 30.

■ 4.3.2.8.2 Tank fill connections shall be provided with a noncombustible spill containment device.

4.3.3 Vaults for Aboveground Tanks.

4.3.3.1 Scope. Subsection 4.3.3 shall apply to installation of aboveground tanks in vaults and design and installation of such vaults.

▲ 4.3.3.2 **General.** Aboveground tanks shall be permitted to be installed in vaults that meet the requirements of 4.3.3. Except as modified by the provisions of 4.3.3, vaults shall meet all other applicable provisions of this code. Vaults shall be constructed and listed in accordance with UL 2245, *Below-Grade Vaults for Flammable Liquid Storage Tanks*. Vaults shall be permitted to be either above or below grade.

4.3.3.3* Construction and Installation of Storage Tank Vaults. [30:25.5]

4.3.3.3.1 Construction Requirements. Vaults shall be designed and constructed in accordance with 4.3.3.3.1.1 through 4.3.3.3.1.4. [30:25.5.1]

4.3.3.3.1.1 The top of an abovegrade vault that contains a tank storing Class I liquid or Class II or Class III liquid stored at a

temperature at or above its flash point 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 explosion occurring inside the vault is directed upward before destructive internal pressure develops within the vault.

4.3.3.3.1.2 The top of an at-grade or belowgrade vault that contains a tank storing Class I liquid or Class II or Class III liquid stored at a temperature at or above its flash point shall be designed to relieve or contain the force of any explosion occurring inside the vault.

4.3.3.3.1.3 Adjacent vaults shall be permitted to share a common wall. [30:25.5.1.3]

4.3.3.3.1.4 Where required, the vault shall be wind and earthquake resistant, in accordance with recognized engineering standards. [30:25.5.1.4]

4.3.3.3.2 Installation Requirements. Storage tank vaults shall be installed in accordance with the requirements of 4.3.3.3.2.1 and 4.3.3.3.2.2. [30:25.5.2]

4.3.3.3.2.1 Each vault and its tank shall be anchored to resist uplifting by groundwater or flooding, including when the tank is empty. [30:25.5.2.1]

4.3.3.3.2.2 Vaults that are not resistant to damage from the impact of a motor vehicle shall be protected by collision barriers. [30:25.5.2.2]

4.3.3.4 Tank Selection and Arrangement.

4.3.3.4.1 Tanks shall be listed for aboveground use.

4.3.3.4.2 Each tank shall be in its own vault and shall be completely enclosed by the vault. [30:25.3.1.5]

4.3.3.4.3 Sufficient clearance between the tank and the vault shall be provided to allow for visual inspection and maintenance of the tank and its appurtenances. [30:25.3.1.6]

4.3.3.4.4 Backfill shall not be permitted around the tank. [30:25.3.1.7]

4.3.3.5 Tank Appurtenances.

4.3.3.5.1 Vent pipes that are provided for normal tank venting shall terminate outside the vault and at least 3.6 m (12 ft) above ground level and shall meet the requirements of 27.8.1 of NFPA 30.

4.3.3.5.2 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.

4.3.3.5.3 An approved means of overfill protection shall be provided for tanks. The use of ball float valves shall be prohibited.

4.3.3.5.4 Fill connections for vaults installed inside buildings shall comply with 22.13.4 of NFPA 30.

4.3.3.6 Ventilation Systems for Storage Tank Vaults. [30:25.10]

4.3.3.6.1 Vaults that contain tanks storing Class I liquids shall be ventilated at a rate of not less than 1 cfm/ft² of floor area (0.3 m³/min/m²), but not less than 150 cfm (4 m³/min). [30:25.10.1]

4.3.3.6.2 Such ventilation shall operate continuously or shall be designed to operate upon activation of a vapor and liquid detection system. [30:25.10.2]

4.3.3.6.3 Failure of the exhaust airflow shall automatically shut down the dispensing system. [30:25.10.3]

4.3.3.6.4 The exhaust system shall be designed to provide air movement across all parts of the vault floor. [30:25.10.4]

4.3.3.6.5 Supply and exhaust ducts shall extend to within 3 in. (75 mm), but not more than 12 in. (300 mm) of the floor. [30:25.10.5]

4.3.3.6.6 The exhaust system shall be installed in accordance with the provisions of NFPA 91. [30:25.10.6]

4.3.3.7 Vapor and Liquid Detection Systems.

4.3.3.7.1 Each vault shall be provided with an approved vapor and liquid detection system that is equipped with on-site audible and visual warning devices with battery backup. [30:25.15.1]

4.3.3.7.2 The vapor detection system shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower flammable limit of the liquid stored. [30:25.15.2]

4.3.3.7.3 Vapor detectors shall be located no higher than 12 in. (300 mm) above the lowest point in the vault. [30:25.15.3]

4.3.3.7.4 The liquid detection system shall sound an alarm upon detection of any liquid, including water. [30:25.15.4]

4.3.3.7.5 Liquid detectors shall be located in accordance with the manufacturer's instructions. [30:25.15.5]

4.3.3.7.6 Activation of either the vapor detection system or the liquid detection system shall cause a signal to be sounded at an approved, constantly attended location within the facility serving the tanks or at an approved location. [30:25.15.6]

4.3.3.8 In lieu of the separation distance requirements given in Section 22.4 of NFPA 30, separation distances between the vault and any of the following shall be permitted to be reduced to 0 ft (0 m), as measured from the outer perimeter of the vault wall:

- (1) Any property line that is or can be built upon
- (2) The near and far sides of a public way
- (3) The nearest important building on the same property [30:25.4]

4.3.3.9 Vaults and their required equipment shall be maintained in accordance with the requirements of 4.3.3. [30:25.16]

Δ 4.3.4 Fire-Resistant Tanks. Fire-resistant tanks shall be tested and listed in accordance with UL 2080, *Fire Resistant Tanks for Flammable and Combustible Liquids*. Fire-resistant tanks shall also meet both of the following requirements:

- (1) The construction that provides the required fire-resistive protection shall reduce the heat transferred to the primary tank in order to limit the temperature of the primary tank to an average maximum rise of 800°F (430°C) and a single point maximum rise of 1000°F (540°C) and to 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 when tested using the fire exposure specified in UL 2080.
- (2) Reduction in sizing of the emergency vents in accordance with 22.7.3.5 of NFPA 30 shall not be permitted.

Δ 4.3.5 Protected Tanks. Protected aboveground tanks shall be tested and listed in accordance with UL 2085, *Protected Aboveground Tanks for Flammable and Combustible Liquids*. [30:22.10.1]

Δ 4.3.5.1 Protected tanks shall also meet both of the following requirements:

- (1) The construction that provides the required fire-resistive protection shall reduce the heat transferred to the primary tank in order to limit the temperature of the primary tank to an average maximum rise of 260°F (144°C) and a single point maximum rise of 400°F (204°C) and to 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 when tested using the fire exposure specified in UL 2085. [30:22.10.2]
- (2) Reduction in sizing of the emergency vents in accordance with 22.7.3.5 of NFPA 30 shall not be permitted. [30:22.10.2]

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.

4.3.6.7 Storage tank appurtenances shall be installed and calibrated in accordance with the manufacturer's instructions, published industry practices, or equivalent methods approved by the AHJ.

4.3.7 Physical Protection for All Outside Aboveground Tanks.

Δ 4.3.7.1 Security.

N 4.3.7.1.1 Tanks that are not enclosed in vaults shall be enclosed by a perimeter property security fence or a separate chain link fence, at least 1.8 m (6 ft) high.

N 4.3.7.1.2 The perimeter property security fence or separate chain link fence shall be separated from the tanks by at least 3 m (10 ft).

N 4.3.7.1.3 Gates in perimeter property security fences shall be secured against unauthorized entry.

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 Protection. 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 21.4.5 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.

4.3.9.1.2 Except as permitted under 4.3.9.1.3, the aggregate quantity of Class II and Class IIIA liquids stored in a tank that does not exceed 454 L (120 gal) capacity and in containers shall not exceed 908 L (240 gal). The quantity for each class 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.

4.3.9.1.3 Where there are no Class I liquids stored, the aggregate quantities of Class II liquids shall not exceed 908 L (240 gal).

4.3.9.2 Class I, II, and IIIA Liquids in Tanks Exceeding 454 L (120 Gal) Capacity. Where installation of a tank that exceeds 454 L (120 gal) capacity in accordance with 4.3.2 is not practical because of building or property limitations, the tank shall be permitted to be installed in a building if it is enclosed as described in 4.3.3 and if the installation is specifically approved by the authority having jurisdiction.

4.3.9.3 Class IIIB Liquids. The quantity of Class IIIB liquids in storage shall not be limited. Class IIIB liquids shall be permitted to be stored in and dispensed from tanks and containers that meet the requirements of Chapter 9 and Chapters 21 through 23 of NFPA 30, as applicable. Tanks storing Class IIIB liquids inside buildings shall be permitted to be located at, below, or above grade. Adequate drainage shall be provided. Tanks and containers that contain only crankcase drainings shall be considered as containing Class IIIB liquids.

4.3.10 Temporary Storage of Liquid Fuels. Aboveground tanks used for dispensing of motor fuels shall not be required to be permanently installed when located on premises not normally accessible to the public, provided that all of the following requirements are met:

- (1) Approval of the authority having jurisdiction shall be required prior to bringing the tank to a site in the jurisdiction. In reviewing a proposed installation, the condition of the tank, the site where the tank will be located, installation and testing procedures, and operational procedures shall be evaluated prior to approval.
- (2) The approval shall include a definite time limit after which the tank shall be removed from the site and relocated to an approved location.
- (3) The tank shall comply with Section 4.3 and all other applicable provisions of this code and NFPA 30.
- (4) A tank containing liquid shall not be moved unless it has been specifically investigated and approved for movement while full or partially full.

Chapter 5 Piping for Liquids

5.1 Scope. This chapter shall apply to piping systems consisting of pipe, tubing, flanges, bolting, gaskets, valves, fittings, flexible connectors, the pressure-containing parts of other components such as expansion joints and strainers, and devices that serve such purposes as mixing, separating, snubbing, distributing, metering, controlling flow, or secondary containment of liquids and associated vapors.

5.2 General Requirements for All Piping Systems.

Δ 5.2.1 The design, fabrication, assembly, test, and inspection of the piping system shall meet the requirements of Chapter 27 of NFPA 30.

5.2.2 Piping shall be located so that it is protected from physical damage. Piping that passes through a dike wall shall be designed to prevent excessive stresses that could result from settlement or fire exposure.

5.2.3 Any portion of a piping system that is in contact with the soil shall be protected from corrosion in accordance with good engineering practice.

5.2.4 All piping inside buildings but outside the motor fuel dispensing area shall be enclosed within a horizontal chase or a vertical shaft used only for this piping. Vertical shafts and horizontal chases shall be constructed of materials having a fire resistance rating of not less than 2 hours.

5.2.5 Each fill pipe shall be identified by color code or other marking to identify the product for which it is used. The color code or marking shall be maintained in legible condition throughout the life of the installation.

5.2.6 Shutoff and check valves shall be equipped with a pressure-relieving device that will relieve any pressure generated by thermal expansion of the contained liquid back to the storage tank.

▲ 5.2.7 Piping components made of low melting point materials shall be permitted to be used without backfill with the following sumps:

- (1) Belowgrade underground tank sumps that are fitted with a cover
- (2) Belowgrade piping connection sumps that are fitted with a cover
- (3) Containment sumps, under the following conditions:
 - (a) The sump is monitored to detect any leaks
 - (b) Any leaks can be controlled
 - (c) The components are either resistant to or shielded from damage by fire exposure
- (4) Containment sumps, provided the piping components can successfully pass the test procedures described in API 607, *Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats*.

5.3 Installation of Piping Systems. Piping shall be installed in accordance with the manufacturers' instructions.

5.3.1 Bends. The bending radius for piping and tubing that is bent shall not be less than recommended by the manufacturer.

5.3.2 Flexible Connections.

5.3.2.1 Flexible piping connections shall be provided at the following points in the piping system:

- (1) Where liquid, vapor return, and vent piping connect to underground tanks
- (2) At the base of any vent riser
- (3) Where required to relieve stress at points where the piping changes direction

5.3.2.2 Acceptable means for providing flexibility in piping systems shall include the following:

- (1) Listed flexible connectors that are approved for the purpose
- (2) Piping that is inherently flexible and is approved for the purpose
- (3) Other means acceptable to the piping manufacturer

5.4 Testing.

5.4.1 General. All piping and secondary containment piping shall be tested before being covered, enclosed, or placed in service in accordance with the requirements of Section 27.7 of NFPA 30.

5.4.2* Secondary Containment Piping. In addition to the test required in 5.4.1, secondary containment-type piping shall have the interstitial space (annulus) tested hydrostatically or with air pressure at minimum gauge pressure of 34.5 kPa (5 psi) or shall be tested in accordance with the listing or the manufacturer's instructions. The pressure source shall be closed from the system being tested to ensure that the test is being conducted on a closed system.

5.4.3 Maintenance Testing. Existing piping shall be tested in accordance with 5.4.1 when the authority having jurisdiction has reasonable cause to believe that a leak exists. Piping that could contain flammable or combustible liquids shall not be tested pneumatically. Such tests shall be at the expense of the owner or operator.

5.4.4 Leak Detection. On remote pressure pumping systems, each pump shall have installed, on the discharge side, a listed leak detection device that will provide an audible indication, a visible indication, or will restrict or shut off the flow of product if the piping and dispensing devices are not liquidtight.

5.5 Detector Maintenance. Each leak-detecting device shall be checked and tested at least annually according to the manufacturer's specifications to ensure proper installation and operation.

5.6 Vent Piping.

5.6.1 Vent piping shall meet the requirements of Section 27.8 of NFPA 30.

5.6.2 Vent pipes for all tanks storing Class I liquids shall discharge only in an upward direction in order to disperse vapors and shall terminate at least 3.6 m (12 ft) above grade.

5.6.3 Tank vents that are installed within or attached to a canopy shall extend a minimum of 1.5 m (5 ft) above the highest projection of the canopy.

5.7 Vapor Recovery Piping. A vapor return pipe inside the dispenser housing shall have a shear section or flexible connector so that the liquid emergency shutoff valve will function as described in 6.3.9.

Chapter 6 Fuel Dispensing Systems

6.1 Scope. This chapter shall apply to the system and components that dispense fuel into the tanks of motor vehicles and marine craft.

6.2 General Requirements.

6.2.1 Dispensing devices installed outside at motor fuel dispensing stations shall be located as follows:

- (1) 3 m (10 ft) or more from property lines
- (2) 3 m (10 ft) or more from buildings, other than canopies, having combustible exterior wall surfaces or buildings having noncombustible exterior wall surfaces that are not a part of a 1 hr fire-resistive assembly

- (3) Such that all parts of the vehicle being served will be on the premises of the service station
- (4) Such that the nozzle, when the hose is fully extended, will not reach within 1.5 m (5 ft) of building openings

6.2.2 Liquids shall not be dispensed by applying pressure to drums, barrels, and similar containers. Listed pumps taking suction through the top of the container or listed self-closing faucets shall be used.

▲ 6.2.3 Fuel dispensing systems, including dispensers, hoses, nozzles, breakaway fittings, swivels, flexible connectors, dispenser emergency shutoff valves, vapor recovery systems, and pumps that are used for alcohol-blended motor fuels shall be listed for the specific purpose and in accordance with the following:

- (1) UL 79A, *Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*
- (2) UL 87A, *Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*
- (3) UL 330A, *Outline of Investigation for Hose and Hose Assemblies for Use with Dispensing Devices Dispensing Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*
- (4) UL 567A, *Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*
- (5) UL 842A, *Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*
- (6) UL 2586A, *Hose Nozzle Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0–E85)*

6.3 Requirements for Dispensing Devices.

6.3.1 Class I and Class II liquids shall be transferred from tanks by means of fixed pumps designed and equipped to allow control of the flow and prevent leakage or accidental discharge.

6.3.2 Dispensing devices for Class I and Class II liquids shall be listed.

6.3.2.1 Existing listed or labeled dispensing devices shall be permitted to be modified provided that the modifications made are “Listed by Report” by an approved testing laboratory or as otherwise approved by the authority having jurisdiction. Modification proposals shall contain a description of the component parts used in the modification and the recommended methods of installation on specific dispensing devices. Modification proposals shall be made available to the authority having jurisdiction upon request.

6.3.3 A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket or normal position with respect to the dispensing device and the switch on this dispensing device is manually actuated. This control shall also stop the pump when all nozzles have been returned to their brackets or to their normal nondispensing position.

6.3.4 Dispensing devices shall be mounted on a concrete island or shall otherwise be protected against collision damage

by means acceptable to the authority having jurisdiction. Dispensing devices shall be securely bolted in place. If located indoors, dispensing devices shall also be located in a position where they cannot be struck by a vehicle that is out of control descending a ramp or other slope. Dispensing devices shall be installed in accordance with the manufacturer’s instructions.

6.3.5 Dispensing devices used to fill portable containers with home heating fuels shall be located at least 6 m (20 ft) from any dispensing devices for motor fuels.

6.3.6 Inspections. Dispensing equipment shall be periodically inspected by a person who is knowledgeable in the operation of the equipment to verify that it is in proper working order and is not leaking.

6.3.6.1* Exterior Inspection. A visual inspection of the fuel dispenser and its associated hanging hardware (hose nozzle valve, hose, breakaway valve, and hose swivel) shall be conducted at least weekly and shall be documented. Documentation shall be available for review by the authority having jurisdiction upon request.

6.3.6.2* Internal Dispenser Cabinet Inspection. An inspection of the fuel dispensing equipment that is located inside the dispenser cabinet shall be conducted. The interior of the fuel dispenser cabinet shall be inspected for signs of leaks, damage, corrosion, or weathering, with particular attention to the sump area and joints and castings of fluid handling components. The inspection shall be conducted at least monthly and shall be documented. Documentation shall be available for review by the authority having jurisdiction upon request.

6.3.6.3 Maintenance. When maintenance to dispensing devices is necessary and such maintenance is capable of causing accidental release or ignition of liquid, the following precautions shall be taken before such maintenance is begun:

- (1) Only persons knowledgeable in performing the required maintenance shall perform the work.
- (2) All electrical power to the dispensing devices, to the pump serving the dispensing devices, and to all associated control circuits shall be shut off at the main electrical disconnect panel.
- (3) The emergency shutoff valve at the dispenser, if installed, shall be closed.
- (4) All vehicular traffic and unauthorized persons shall be prevented from coming within 6 m (20 ft) of the dispensing device.

6.3.7 Motor vehicle traffic patterns at motor fuel dispensing facilities shall be designed to inhibit movement of vehicles that are not being fueled from passing through the dispensing area.

6.3.8 At unattended self-serve motor fuel dispensing facilities, coin- and currency-type devices shall be permitted only with the approval of the authority having jurisdiction.

▲ 6.3.9 Where liquid is supplied to the dispensing device under pressure, a listed, rigidly anchored, double-poppet type emergency shutoff valve incorporating a fusible link or other thermally actuated device designed to close automatically in the event of severe impact or fire exposure, shall be installed in the supply line at the base of each individual island-type dispenser or at the inlet of each overhead dispensing device.

■ 6.3.9.1 The emergency shutoff valve shall be installed in accordance with the manufacturer’s instructions.