NFPA 30A

Code for Motor Fuel Dispensing Facilities and Repair Garages

2000 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

2000 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 the National Fire Protection Association, Inc., at its World Fire Safety Congress and Exposition™ held May 14–17, 2000, in Denver, CO. It was issued by the Standards Council on July 20, 2000, with an effective date of August 18, 2000, and supersedes all previous editions.

This edition of NFPA 30A was approved as an American National Standard on August 18, 2000.

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.

This sixth edition of NFPA 30A includes 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 (LPG)

Foreword

This code, known as the *Code for Motor Fuel Dispensing Facilities and Repair Garages,* is recommended for use as the basis for legal regulations. Its provisions are intended to reduce the hazards of motor fuels to a degree consistent with reasonable public safety, without undue interference with public convenience and necessity. Thus, compliance with this code does not eliminate all hazards in the use of these fuels.

See the *Flammable and Combustible Liquids Code Handbook* for additional explanatory information.

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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 storage, handling, and dispensing of flammable and combustible liquids at automotive and marine service stations and with related activities such as lubrication, minor repairs, adjustments, and routine maintenance work.

Contents

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NOTICE: An asterisk(*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraph(s) has been deleted, the deletion is indicated by a bullet between the paragraphs that remain.

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

Information on referenced publications can be found in Chapter 2 and Appendix C.

Chapter 1 Administration

1.1 Scope.

1.1.1 This code shall apply to motor fuel dispensing facilities, marine/motor fuel dispensing facilities, motor fuel dispensing facilities located inside buildings, fleet vehicle motor fuel dispensing facilities, and repair garages.

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

1.1.3 This code shall not apply to fueling facilities at remote locations for large, off-the-road earthmoving and construction vehicles.

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.

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.

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.

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. Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency. The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.6 Code Adoption Requirements. Reserved

Chapter 2 Referenced Publications

2.1 The following documents or portions thereof are referenced within this code as mandatory requirements and shall be considered part of the requirements of this code. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this code. Some of these mandatory documents might also be referenced in this code for specific informational purposes and, therefore, are also listed in Appendix C.

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

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1999 edition.

NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*, 2000 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2000 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 1997 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 2000 edition.

NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 1997 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 1999 edition.

NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, 1998 edition.

NFPA 54, *National Fuel Gas Code*, 1999 edition.

NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*, 1998 edition.

NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code,* 1999 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 1998 edition.

NFPA 70, *National Electrical Code®*, 1999 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*, 1999 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 1999 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®*, 2000 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2000 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.

Flammable and Combustible Liquids Code Handbook, 1996.

2.1.2 Other Publications.

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

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

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

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

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

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

ANSI/UL 87, *Power Operated Dispensing Devices for Petroleum Products*, 10th edition.

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

UL 2080, *Standard for Fire Resistant Tanks for Flammable and Combustible Liquids*, 1st edition.

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

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

Chapter 3 Definitions

3.1 Definitions. For the purposes of this code, the following terms shall have the definitions given in this chapter.

3.1.1* Approved. Acceptable to the authority having jurisdiction.

3.1.2* Authority Having Jurisdiction. The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

3.1.3 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.

3.1.4 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.

3.1.5 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.

3.1.6 Combustible Liquid. See definition 3.1.12.1, Combustible Liquid.

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

3.1.8* 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.

3.1.9 Flammable Liquid. See definition 3.1.12.2, Flammable Liquid.

3.1.10 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).

3.1.11 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.

3.1.12 Liquid. Any material that has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D 5, *Standard Test Method for Penetration of Bituminous Materials*. For the purposes of this code, liquefied natural gas (LNG) and liquefied petroleum gas (LPG) are not considered liquids.

3.1.12.1* 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 NFPA 30, *Flammable and Combustible Liquids Code*, 1.7.4. Combustible liquids are classified as Class II or Class III as follows: (a) *Class II Liquid* — any liquid that has a flash point at or above 100°F (37.8°C) and below 140°F (60°C); (b) *Class IIIA* — any liquid that has a flash point at or above 140°F (60°C), but below 200°F (93°C); (c) *Class IIIB* — any liquid that has a flash point at or above 200°F (93°C).

3.1.12.2* 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 NFPA 30, *Flammable and Combustible Liquids Code*, 1.7.4. Flammable liquids are classified as Class I as follows: (a) *Class I Liquid* — any liquid that has a closed-up 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).

3.1.13* 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.

3.1.14 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.

3.1.15 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.

3.1.15.1 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.

3.1.15.2 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.

3.1.15.3* 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.

3.1.16 Repair Garages.

3.1.16.1 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.

3.1.16.2 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.

3.1.17 Safety Can. An approved container, of not more than 5 gal (18.9 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.

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

3.1.19 Tanks.

3.1.19.1 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.

3.1.19.2 Fire-Resistant Tank. A listed aboveground tank that provides fire-resistive protection from exposures to a high-intensity liquid pool fire *(see 4.3.4)*.

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

3.1.19.4 Protected Aboveground Tank. An aboveground storage tank that is listed in accordance with UL 2085, *Standard for Insulated Aboveground Tanks for Flammable and Combustible Liquids*, or an equivalent test procedure that consists of a primary tank provided with protection from physical damage and fire-resistive protection from exposure to a high-intensity liquid pool fire.

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

3.1.21* Vapor Processing System. A system designed to capture and process vapors displaced during filling operations at motor fuel dispensing facilities, bulk plants, or terminals by use of mechanical and/or chemical means.

3.1.22* 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 60 gal (227 L) 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 ft^2 of floor area (0.3 $m^3/min/m^2$), but not less than 150 cfm (4 m^3/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 2.3.2.5.1 of NFPA 30, *Flammable and Combustible*

Liquids Code, 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 2 and 3 of NFPA 30, *Flammable and Combustible Liquids Code.*

4.3.2* Aboveground Storage Tanks. Except as modified by the provisions of this subsection, aboveground storage tanks shall meet all applicable requirements of Chapters 2 and 3 of NFPA 30, *Flammable and Combustible Liquids Code.*

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 2 and 3 of NFPA 30, *Flammable and Combustible Liquids Code*, and 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 12,000 gal (45,400 L) and aggregate capacity of 48,000 gal (181,700 L) unless such tanks are installed in vaults complying with 4.3.3, in which case the maximum individual capacity shall be permitted to be 15,000 gal (57,000 L).

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

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 6000 gal (22,710 L), located at commercial, industrial, governmental, 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 granted by the authority having jurisdiction.
(2) The tank is safeguarded against collision, spillage, and overfill 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 NFPA 30, *Flammable and Combustible Liquids Code*, Chapter 2.

Table 4.3.2.4 Minimum Separation Requirements for Aboveground Tanks

Tank Type	Individual Tank Capacity (gal) *(see 4.3.2.3 and 4.3.2.5)*	Minimum Distance from the Nearest Important Building on the Same Property (ft)	Minimum Distance from Nearest Fuel Dispensing Device (ft) *(see 4.3.2.6)*	Minimum Distance from Lot Line That Is or Can Be Built Upon, Including the Opposite Side of a Public Way (ft)	Distance from the Nearest Side of Any Public Way (ft)	Minimum Distance Between Tanks (ft)
Tanks in vaults†	0–15,000	0	0	0	0	Separate compartments required for each tank
Protected aboveground tanks	Less than or equal to 6,000	5	25	15	5	3
	6,001–12,000	15	25	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

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

4.3.2.8 Aboveground tanks shall be provided with spill control that meets the requirements of 2.3.2.3 of NFPA 30, *Flammable and Combustible Liquids Code*. 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 Chapters 2 and 3 of NFPA 30, *Flammable and Combustible Liquids Code*. Vaults shall be constructed and listed in accordance with UL 2245, *Standard for Below-Grade Vaults for Flammable Liquid Storage Tanks*.

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:

(a) The walls and floor of the vault shall be constructed of reinforced concrete at least 6 in. (150 mm) thick.

(b) The top of an abovegrade vault 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. The top of an at-grade or belowgrade vault shall be designed to relieve or contain the force of any explosion occurring inside the vault.

(c) 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.

(d) The walls and floor of a belowgrade vault shall be designed to withstand anticipated soil and hydrostatic loading. The vault shall be liquidtight.

(e) Adjacent vaults shall be permitted to share a common wall.

(f) 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.

(g) When required, the vault shall be designed to be wind and earthquake resistant, in accordance with good engineering practice.

(h) The vault shall be provided with connections to permit ventilation to dilute, disperse, and remove any vapors prior to personnel entering the vault.

(i) The vault shall be provided with a means for personnel entry.

(j) 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 12 ft (3.6 m) above ground level.

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.

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

4.3.3.5 Exhaust Ventilation Systems. Vaults that contain tanks storing Class I liquids shall be ventilated at a rate of not less than 1 cfm/ft^2 of floor area (0.3 m^3/min/m^2) but not less than 150 cfm (4 m^3/min). 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.

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 3 in. (75 mm), but not more than 12 in. (305 mm), of the floor. The exhaust system shall be installed in accordance with the provisions of NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids*.

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.

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 12 in. (305 mm) above the lowest point in the vault.

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.

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:

(a) Each vault and its tank shall be anchored to withstand uplifting by groundwater or flooding, including when the tank is empty.

(b) Vaults that are not resistant to damage from the impact of a motor vehicle shall be protected by collision barriers.

(c) Dispensing devices shall be allowed to be installed on tops of vaults.

(d) 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, *National Electrical Code®*.

(e) 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. Fire-resistant tanks shall be listed for the use intended and shall meet all of the following requirements.

4.3.4.1 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 when

tested using a fire exposure that simulates a high-intensity pool fire, such as that described in UL 2080, *Standard for Fire Resistant Tanks for Flammable and Combustible Liquids*, or equivalent test procedure.

4.3.4.2 Subsection 2.2.5.2.5 of NFPA 30, *Flammable and Combustible Liquids Code*, shall not be used to reduce the size of the emergency vent.

4.3.5 Protected Tanks. Protected tanks shall be listed and shall be tested in accordance with UL 2085, *Standard for Insulated Aboveground Tanks for Flammable and Combustible Liquids*. Protected 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 Insulated Aboveground Tanks for Flammable and Combustible Liquids*.

4.3.5.2 Subsection 2.2.5.2.5 of NFPA 30, *Flammable and Combustible Liquids Code*, 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 2.5 gpm (9.5 L/min) 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 Where a tank is 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, that will prevent gravity flow from the tank to the dispenser. This device shall be located adjacent to and downstream of the outlet valve specified by 2.3.2.5.1 of NFPA 30, *Flammable and Combustible Liquids Code*. The device shall be installed and adjusted so that liquid cannot flow by gravity from the tank to the dispenser in the event of failure of the piping or hose when the dispenser is not in use.

4.3.6.6 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.

4.3.6.7 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 6 ft (1.8 m) high. The fence shall be separated from the tanks by at least 10 ft (3 m) 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 4 in. (100 mm) in diameter and shall be filled with concrete.
(2) They shall be spaced not more than 4 ft (1.2 m) on center.
(3) They shall be set not less than 3 ft (0.9 m) deep in a concrete footing of not less than 15-in. (380-mm) 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 2.2.6.1 of NFPA 30, *Flammable and Combustible Liquids Code*.

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 120 Gal (454 L) Capacity and in Containers.

4.3.9.1.1 The aggregate quantity of Class I liquids stored in a tank that does not exceed 120 gal (454 L) capacity and in containers shall not exceed 120 gal (454 L). 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 The aggregate quantity of Class II and Class IIIA liquids stored in a tank that does not exceed 120 gal (454 L) capacity and in containers shall not exceed 240 gal (908 L). The quantity for each class shall not exceed 120 gal (454 L). 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.

4.3.9.2 Class I, II, and IIIA Liquids in Tanks Exceeding 120 Gal (454 L) Capacity. Where installation of a tank that exceeds 120 gal (454 L) 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 Sections 2.2 and 4.2 of NFPA 30, *Flammable and Combustible Liquids Code*, 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:

(a) 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.

(b) The approval shall include a definite time limit after which the tank shall be removed from the site and relocated to an approved location.

(c) The tank shall comply with Section 4.3 and all other applicable provisions of this code and NFPA 30, *Flammable and Combustible Liquids Code.*

(d) 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.

5.2.1 The design, fabrication, assembly, test, and inspection of the piping system shall meet the requirements of Chapter 3 of NFPA 30, *Flammable and Combustible Liquids Code.*

Exception No. 1: Where dispensing is from a floating structure or pier, oil-resistant flexible hose shall be permitted to be used between shore piping and the piping on the floating structure or pier and between separate sections of the floating structure to accommodate changes in water level or shoreline, provided that the hose is either resistant to or shielded from damage by fire.

Exception No. 2: Low melting point rigid piping shall be permitted to be used between underground shore piping and a floating structure or pier and on the floating structure or pier itself, provided that the piping is protected from physical damage and stresses arising from impact, settlement, vibration, expansion, contraction, or tidal action and provided that the hose is either resistant to or shielded from damage by fire exposure.

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 in the following areas:

(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, provided that (1) the sump is monitored to detect any leaks, (2) any leaks can be controlled, and (3) 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 Soft-Seated Quarter-Turn Valves*

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

5.3.1 Bends. Bends in piping and tubing shall not exceed the bending radius 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 connects 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

5.3.3 Fiberglass Reinforced Plastic Piping. Fiberglass reinforced plastic (FRP) piping shall not be required to have flexible joints where otherwise would be required by 5.3.2 if both of the following conditions exist:

(1) The piping does not exceed 4 in. (100 mm) in diameter.
(2) The piping has a straight run of not less than 4 ft (1220 mm) on one side of the connection when the connection results in a change of direction.

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 3.6 of NFPA 30, *Flammable and Combustible Liquids Code.*

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 of 5 psig (gauge pressure of 34.5 kPa) 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 indication if the piping and dispensing devices are not liquidtight. Each leak-detecting device shall be checked and tested at least annually according to the manufacturer's specifications to ensure proper installation and operation.

5.5 Vent Piping.

5.5.1 Vent piping shall meet the requirements of 3.7.2.1, 3.7.2.2, 3.7.2.3 and 3.7.2.6 of NFPA 30, *Flammable and Combustible Liquids Code.*

5.5.2 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 12 ft (3.6 m) above grade.

5.6 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 shall be located so that all parts of the vehicle being served are on the premises of the motor fuel dispensing facility.

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.

6.3 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 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 manufacturers' instructions.

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

6.3.6 When maintenance to Class I 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 20 ft (6 m) 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 only be permitted 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 emergency shutoff valve, incorporating a fusible link or other thermally actuated device, designed to close automatically in 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. The emergency shutoff valve shall be installed in accordance with the manufacturer's instructions. The emergency shutoff valve shall not incorporate a slip-joint feature.

Exception: As provided for in 6.3.10.

6.3.9.1 The automatic-closing feature of this valve shall be tested at the time of installation and at least once a year thereafter by manually tripping the hold-open linkage. Records of such tests shall be kept at the premises or shall be made available for inspection by the authority having jurisdiction within 24 hours of a verbal or written request.

6.3.10 Where a suction-type dispensing system includes a booster pump or where a suction-type dispensing system is supplied by a tank in a manner that produces a gravity head

on the dispensing device, a listed, vacuum-actuated shutoff valve with a shear section or equivalent-type valve shall be installed directly under the dispensing device.

6.4 Requirements for Remote/Submersible Pumps. This section shall apply to systems for dispensing Class I and Class II liquids where the liquids are transferred from storage to individual or multiple dispensing devices by pumps located other than at the dispensing devices.

6.4.1 Pumps shall be listed and shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure.

6.4.2 Each pump shall have installed on the discharge side a listed leak detection device that will provide an indication if the piping or a dispenser is leaking. Each leak-detecting device shall be checked and tested at least annually according to the manufacturer's specifications to ensure proper installation and operation.

Exception: A leak detection device shall not be required if all piping is visible.

6.4.3 Pumps installed above grade outside of buildings shall be located not less than 10 ft (3 m) from lines of adjoining property that can be built upon and not less than 5 ft (1.5 m) from any building opening. Where an outside pump location is impractical, pumps shall be permitted to be installed inside buildings as provided for dispensers in 6.3.4 or in sumps as provided in 6.4.4. Pumps shall be anchored and protected against physical damage.

6.4.4 Sumps for subsurface pumps or piping manifolds of submersible pumps shall withstand the external forces to which they can be subjected without damage to the pump, tank, or piping. The sump shall be no larger than necessary for inspection and maintenance and shall be provided with a fitted cover.

6.5 Requirements for Dispensing Hoses.

6.5.1 Listed hose assemblies shall be used to dispense fuel. Hose length at automotive motor fuel dispensing facilities shall not exceed 18 ft (5.5 m). Where hose length at marine motor fuel dispensing facilities exceeds 18 ft (5.5 m), the hose shall be secured so as to protect it from damage.

6.5.2 A listed emergency breakaway device designed to retain liquid on both sides of the breakaway point shall be installed on each hose dispensing Class I liquids. Such devices shall be installed and maintained in accordance with the manufacturers' instructions.

6.5.3 Where hoses are attached to a hose-retrieving mechanism, the listed emergency breakaway device shall be installed between the point of attachment of the hose-retrieving mechanism to the hose and the hose nozzle valve.

Exception: Such devices shall not be required at marine motor fuel dispensing facilities.

6.6 Requirements for Fuel Delivery Nozzles.

6.6.1 A listed, automatic-closing-type hose nozzle valve, with or without latch-open device, shall be provided on island-type dispensing devices used to dispense Class I liquids.

6.6.2 If a hose nozzle valve is provided with a latch-open device other than the one recommended by the valve manufacturer, the latch-open device shall be an integral part of the valve assembly and such valve/latch-open device combination shall meet all applicable requirements of Section 19A of UL 842, *Standard for Valves for Flammable Fluids.*

6.6.3 At any installation where the normal flow of product can be stopped other than by the hose nozzle valve, such as at prepay facilities, either the system shall include listed equipment with a feature that causes or requires the closing of the hose nozzle valve before product flow can be resumed or before the hose nozzle valve can be replaced in its normal position in the dispenser, or the hose nozzle valve shall not be equipped with a latch-open device.

6.6.4 Overhead-type dispensing devices shall be provided with a listed, automatic-closing-type hose nozzle valve without a latch-open device.

Exception: A listed, automatic-closing-type hose nozzle valve with latch-open device shall be permitted to be used if the hose nozzle valve will close automatically in the event the valve is released from a fill opening or upon impact.

6.6.5 Dispensing nozzles used at marine motor fuel dispensing facilities shall be of the automatic-closing type without a latch-open device.

6.7 Emergency Electrical Disconnects. Fuel dispensing systems shall be provided with one or more clearly identified emergency shutoff devices or electrical disconnects. Such devices or disconnects shall be installed in approved locations but not less than 20 ft (7 m) or more than 100 ft (30 m) from the fuel dispensing devices that they serve. Emergency shutoff devices or electrical disconnects shall disconnect power to all dispensing devices, to all remote pumps serving the dispensing devices, to all associated power, control, and signal circuits, and to all other electrical equipment in the hazardous (classified) locations surrounding the fuel dispensing devices. When more than one emergency shutoff device or electrical disconnect is provided, all devices shall be interconnected. Resetting from an emergency shutoff condition shall require manual intervention and the manner of resetting shall be approved by the authority having jurisdiction.

Exception: Intrinsically safe electrical equipment need not meet this requirement.

6.7.1 At attended motor fuel dispensing facilities, the devices or disconnects shall be readily accessible to the attendant.

6.7.2 At unattended motor fuel dispensing facilities, the devices or disconnects shall be readily accessible to patrons and at least one device or disconnect shall be readily accessible to each group of dispensing devices on an individual island.

6.8 Vapor Recovery Systems.

6.8.1 Dispensing devices that incorporate vapor recovery shall be listed.

6.8.2 Hose nozzle valves used on vapor recovery systems shall be listed for the purpose.

6.8.3 Means shall be provided in the vapor return path from each dispensing outlet to prevent the discharge of vapors when the hose nozzle valve is in its normal nondispensing position.

Chapter 7 Building Construction Requirements

7.1 Scope. This chapter shall apply to the construction of buildings and portions of buildings that are motor fuel dispensing facilities or repair garages.

7.2 General Requirements. Reserved.

7.3 Motor Fuel Dispensing Facilities.

7.3.1 Occupancy Classification. The occupancy classification of a motor fuel dispensing facility that is located inside a building or structure shall be a low hazard industrial occupancy as defined in NFPA *101®, Life Safety Code®*.

7.3.2 General Construction Requirements. Reserved.

7.3.3 Means of Egress. In a motor fuel dispensing facility that is located inside a building or structure, the required number, location, and construction of means of egress shall meet all applicable requirements for special purpose industrial occupancies, as set forth in NFPA *101, Life Safety Code*.

7.3.4 Drainage. Where Class I or Class II liquids are dispensed, provisions shall be made to prevent spilled liquids from flowing into the interior of buildings. Such provisions shall be made by grading driveways, raising door sills, or other equally effective means.

7.3.5 Fixed Fire Protection.

7.3.5.1* For an unattended, self-serve, motor fuel dispensing facility, additional fire protection shall be provided where required by the authority having jurisdiction.

7.3.5.2 Where required, an automatic fire suppression system shall be installed in accordance with the appropriate NFPA standard, manufacturers' instructions, and the listing requirements of the systems.

7.3.6 Fuel Dispensing Areas Inside Buildings.

7.3.6.1 The fuel dispensing area shall be separated from all other portions of the building by walls, partitions, floors, and floor–ceiling assemblies having a fire resistance rating of not less than 2 hours.

7.3.6.2 Interior finish shall be of noncombustible materials or of approved limited-combustible materials, as defined in NFPA 220, *Standard on Types of Building Construction*.

7.3.6.3 Door and window openings in fire-rated interior walls shall be provided with listed fire doors having a fire protection rating of not less than $1^1/_2$ hours. Doors shall be self-closing. They shall be permitted to remain open during normal operations if they are designed to close automatically in a fire emergency by means of listed closure devices. Fire doors shall be installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*. They shall be kept unobstructed at all times.

7.3.6.4 Openings for ducts in fire-rated interior partitions and walls shall be protected by listed fire dampers. Openings for ducts in fire-rated floor or floor-ceiling assemblies shall be protected with enclosed shafts. Enclosure of shafts shall be with wall or partition assemblies having a fire resistance rating of not less than 2 hours. Openings for ducts into enclosed shafts shall be protected with listed fire dampers.

7.3.6.5 The fuel dispensing area shall be located at street level, with no dispenser located more than 50 ft (15 m) from the vehicle exit to, or entrance from, the outside of the building.

7.3.6.6 The fuel dispensing area shall be limited to that required to serve not more than four vehicles at one time.

Exception: At a fleet vehicle motor fuel dispensing facility inside a building, where only Class II and Class III liquids are dispensed, the number of vehicles serviced at any one time shall be permitted to be increased to 12.

7.3.6.7 A mechanical exhaust system that serves only the fuel dispensing area shall be provided. This system shall meet all of the following requirements:

(a) The system shall be interlocked with the dispensing system so that air flow is established before any dispensing device can operate. Failure of air flow shall automatically shut down the dispensing system.

(b) The exhaust system shall be designed to provide air movement across all portions of the floor of the fuel dispensing area and to prevent the flow of ignitable vapors beyond the dispensing area.

(c) Exhaust inlet ducts shall not be less than 3 in. (76 mm) or more than 12 in. (305 mm) above the floor. Exhaust ducts shall not be located in floors or penetrate the floor of the dispensing area. Exhaust ducts shall discharge to a safe location outside the building.

(d) The exhaust system shall provide ventilation at a rate of not less than 1 cfm/ft^2 (0.3 m^3/min/m^2) of floor area, based on the fuel dispensing area.

(e) The exhaust system shall meet all applicable requirements of NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids.*

Exception: The provisions of 7.3.6.7 shall not apply to a fuel dispensing area located inside a building if two or more sides of the dispensing area are open to the building exterior.*

7.3.6.8 The floor of the dispensing area shall be liquidtight. Where Class I liquids are dispensed, provisions shall be made to prevent spilled liquids from flowing out of the fuel dispensing area and into other areas of the building by means of curbs, scuppers, special drainage systems, or other means acceptable to the authority having jurisdiction.

7.3.6.9 Drainage systems shall be equipped with approved oil/water traps or separators, if they connect to public sewers or they discharge into public waterways.

7.4 Repair Garages.

7.4.1 Occupancy Classification. The occupancy classification of a repair garage shall be a special purpose industrial occupancy as defined in NFPA *101, Life Safety Code*.

7.4.2 General Construction Requirements. In major repair garages, where CNG-fueled vehicles, LNG-fueled vehicles, or LPG-fueled vehicles are repaired, all applicable requirements of NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code,* NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code,* or NFPA 58, *Liquefied Petroleum Gas Code,* whichever is applicable, shall be met.

7.4.3 Means of Egress. In a repair garage, the required number, location, and construction of means of egress shall meet all applicable requirements for special purpose industrial occupancies, as set forth in NFPA *101, Life Safety Code*.

7.4.4 Drainage. In areas of repair garages used for repair or servicing of vehicles, floor assemblies shall be constructed of noncombustible materials or, if combustible materials are used in the assembly, they shall be surfaced with approved, nonabsorbent, noncombustible material.

Exception: Slip-resistant, nonabsorbent, interior floor finishes having a critical radiant flux not more than 0.45 W/cm^2, as determined by NFPA 253, Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source, shall be permitted.

7.4.4.1 Floors shall be liquidtight to prevent the leakage or seepage of liquids and shall be sloped to facilitate the movement of water, fuel, or other liquids to floor drains.

7.4.4.2 In areas of repair garages where vehicles are serviced, any floor drains shall be properly trapped and shall discharge through an oil/water separator to the sewer or to an outside vented sump.

7.4.5 Pits, Belowgrade Work Areas, and Subfloor Work Areas.

7.4.5.1 Pits, belowgrade work areas, and subfloor work areas used for lubrication, inspection, and minor automotive maintenance work shall comply with the provisions of this chapter, in addition to other applicable requirements of this code.

7.4.5.2 Walls, floors, and structural supports shall be constructed of masonry, concrete, steel, or other approved noncombustible materials.

7.4.5.3 In pits, belowgrade work areas, and subfloor work areas, the required number, location, and construction of means of egress shall meet the requirements for special purpose industrial occupancies in Chapter 40 of NFPA *101, Life Safety Code.*

7.4.5.4 Pits, belowgrade work areas, and subfloor work areas shall be provided with exhaust ventilation at a rate of not less than 1 cfm/ft^2 (0.3 m^3/min/m^2) of floor area at all times that the building is occupied or when vehicles are parked in or over these areas. Exhaust air shall be taken from a point within 12 in. (0.3 m) of the floor.

7.4.6 Fixed Fire Protection. Automatic sprinkler protection installed in accordance with the requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems,* shall be provided in major repair garages, as herein defined, when any of the following conditions exist:

(1) The major repair garage is two or more stories in height, including basements, and any one floor exceeds 10,000 ft^2 (930 m^2).
(2) The major repair garage is one story and exceeds 15,000 ft^2 (1400 m^2) in floor area.
(3) The major repair garage is in the basement of a building.

7.5* Heating, Ventilating, and Air-Conditioning.

7.5.1* Forced air heating, air-conditioning, and ventilating systems serving a fuel dispensing area inside a building or a repair garage shall not be interconnected with any such systems serving other occupancies in the building. Such systems shall be installed in accordance with NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems.*

7.5.2 Return air openings in areas of repair garages used for the repair or servicing of vehicles or in a fuel dispensing area shall be not less than 18 in. (455 mm) above floor level measured to the bottom of the openings.

7.5.3 Combined ventilation and heating systems shall not recirculate air from areas that are below grade level.

7.5.4 Exhaust duct openings shall be located so that they effectively remove vapor accumulations at floor level from all parts of the floor area.

7.6 Heat-Producing Appliances.

7.6.1 Heat-producing appliances shall be installed in accordance with the requirements of Section 7.6. They shall be permitted to be installed in the conventional manner except as provided in Section 7.6.

7.6.2 Heat-producing appliances shall be of an approved type. Solid fuel stoves, improvised furnaces, salamanders, or space heaters shall not be permitted in areas of repair garages used for repairing or servicing of vehicles or in a fuel dispensing area.

Exception No. 1: Unit heaters, when installed in accordance with this chapter, need not meet this requirement.

Exception No. 2: Heat-producing equipment for any lubrication room or service room where there is no dispensing or transferring of Class I or Class II liquids or liquefied petroleum gas, when installed in accordance with this chapter, need not meet this requirement.

7.6.3 Heat-producing appliances shall be permitted to be installed in a special room that is separated from areas that are classified as Division 1 or Division 2, in accordance with Chapter 8, by walls that are constructed to prevent the transmission of vapors, that have a fire resistance rating of at least 1 hour, and that have no openings in the walls that lead to a classified area within 8 ft (2.4 m) of the floor. Specific small openings through the wall, such as for piping and electrical conduit, shall be permitted, provided the gaps and voids are filled with a fire-resistant material to resist transmission of vapors. All air for combustion purposes shall be taken from outside the building. This room shall not be used for storage of combustible materials, except for fuel storage as permitted by the standards referenced in 7.6.9.

7.6.4 Heat-producing appliances using gas or oil fuel shall be permitted to be installed in a lubrication or service room where there is no dispensing or transferring of Class I liquids, including the open draining of automotive gasoline tanks, provided the bottom of the combustion chamber is at least 18 in. (455 mm) above the floor and the appliances are protected from physical damage.

7.6.5 Heat-producing appliances using gas or oil fuel listed for use in garages shall be permitted to be installed in lubrication rooms, service rooms, or fuel dispensing areas where Class I liquids are dispensed or transferred, provided the equipment is installed at least 8 ft (2.4 m) above the floor.

7.6.6* Where major repairs are conducted on CNG-fueled vehicles or LNG-fueled vehicles, open flame heaters or heating equipment with exposed surfaces having a temperature in excess of 750°F (399°C) shall not be permitted.

7.6.7 Electrical heat-producing appliances shall meet the requirements of Chapter 8.

7.6.8 Fuels used shall be of the type and quality specified by the manufacturer of the heating appliance. Crankcase drainings shall not be used in oil-fired appliances, unless the appliances are specifically approved for such use.

7.6.9 Heat-producing appliances shall be installed to meet the requirements of NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems;* NFPA 31, *Standard for the Installation of Oil-Burning Equipment;* NFPA 54, *National Fuel Gas Code;* NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances;* and NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment;* as applicable, except as hereinafter specifically provided.

Chapter 8 Electrical Installations

8.1 Scope. This chapter shall apply to the installation of electrical wiring and electrical utilization equipment in areas where liquids are stored, handled, or dispensed.

8.2 General Requirements. Electrical wiring and electrical utilization equipment shall be of a type specified by and shall be installed in accordance with NFPA 70, *National Electrical Code.* Electrical wiring and electrical utilization equipment shall be approved for the locations in which they are installed.

8.2.1* In major repair garages where CNG vehicles are repaired or stored, the area within 18 in. (455 mm) of the ceiling shall be designated a Class I, Division 2 hazardous (classified) location.

Exception: In major repair garages, where ventilation equal to not less than four air changes per hour is provided, this requirement shall not apply.

8.3 Installation in Classified Locations.

8.3.1* Table 8.3.1 shall be used to delineate and classify areas for the purposes of installing electrical wiring and electrical utilization equipment.

Exception: The extent of the classified area around a vacuum-assist blower shall be permitted to be reduced if the blower is specifically listed for such reduced distances.

Table 8.3.1 Electrical Equipment Classified Areas — Motor Fuel Dispensing Facilities

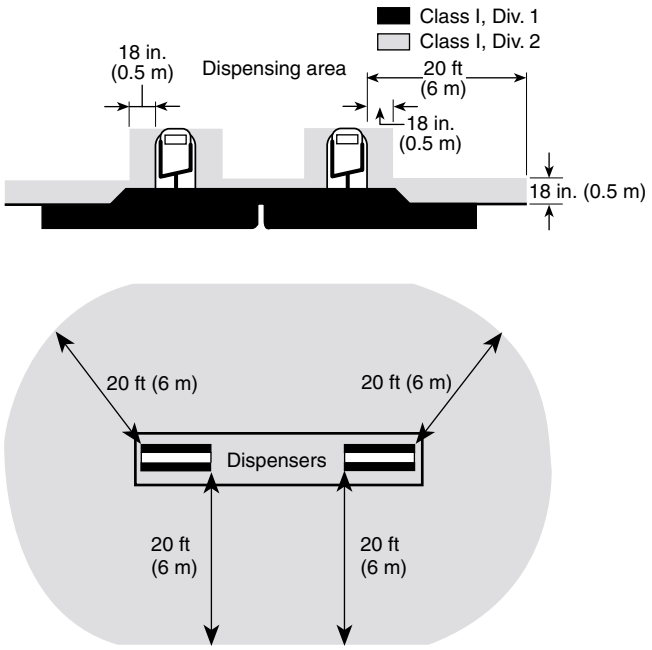
Location	*NEC* Class I, Group D Division	Extent of Classified Area[1]
Dispensing device[2,3]	(except Overhead Type)	*(see Figure 8.3.1)*
Pits	1	Any pit, box, or space below grade level, any part of which is within a Division 1 or 2 classified area
Dispenser	2	Within 18 in. horizontally in all directions extending to grade from the dispenser enclosure or that portion of the dispenser enclosure containing liquid handling components[3]
Outdoor	2	Up to 18 in. above grade level within 20 ft horizontally of any edge of enclosure
Indoor		
With mechanical ventilation	2	Up to 18 in. above grade or floor level within 20 ft horizontally of any edge of enclosure
With gravity ventilation	2	Up to 18 in. above grade or floor level within 25 ft horizontally of any edge of enclosure
Dispensing device — overhead[3,4]		The area within the dispenser enclosure and all electrical equipment integral with the dispensing hose or nozzle
	2	An area extending 18 in. horizontally in all directions beyond the enclosure and extending to grade
	2	Up to 18 in. above grade level within 20 ft horizontally measured from a point vertically below the edge of any dispenser enclosure
Remote pump — outdoor	1	Any pit, box, or space below grade level if any part is within a horizontal distance of 10 ft from any edge of pump
	2	Within 3 ft of any edge of pump, extending in all directions; also up to 18 in. above grade level within 10 ft horizontally from any edge of pump
Remote pump — indoor	1	Entire area within any pit
	2	Within 5 ft of any edge of pump, extending in all directions; also up to 3 ft above floor or grade level within 25 ft horizontally from any edge of pump
Lubrication or service room where Class I liquids are dispensed *(see 8.3.5)*	1	Any pit within any unventilated area
	2	Any pit with ventilation
	2	Area up to 18 in. above floor or grade level and 3 ft horizontally from a lubrication pit
Dispenser for Class I liquids[3]	2	Within 3 ft of any fill or dispensing point, extending in all directions

Table 8.3.1 Electrical Equipment Classified Areas — Motor Fuel Dispensing Facilities ***(Continued)***

Location	*NEC* Class I, Group D Division	Extent of Classified Area[1]
Lubrication or service room where Class I liquids are not dispensed *(see 8.3.5)*	2	Entire area within any pit used for lubrication or similar services where Class I liquids can be released
	2	Area up to 18 in. above any such pit and extending a distance of 3 ft horizontally from any edge of the pit
	2	Entire unventilated area within any pit, belowgrade area, or subfloor area
	2	Area up to 18 in. above any such unventilated pit, belowgrade work area, or subfloor work area and extending a distance of 3 ft horizontally from the edge of any such pit, belowgrade work area, or subfloor work area
	Nonclassified	Any pit, belowgrade work area, or subfloor work area that is ventilated in accordance with 7.4.5.4
Interior of special enclosure or vault	1	Entire interior volume, if Class I liquids are stored within
Sales, storage, and rest rooms	Nonclassified	If there is any opening to these rooms within the extent of a Division 1 area, the entire room is classified as Division 1
Tank, aboveground	1	Area inside dike where dike height is greater than the distance from the tank to the dike for more than 50 percent of the tank circumference
Shell, ends, or roof and dike area	2	Within 10 ft of shell, ends, or roof of tank; area within dike to level of top of dike
Vent	1	Within 5 ft of open end of vent, extending in all directions
	2	Between 5 ft and 10 ft from open end of vent, extending in all directions
Underground tank fill opening	1	Any pit, box, or space below grade level, any part of which is within a Division 1 or 2 classified area
	2	Up to 18 in. above grade level within a horizontal radius of 10 ft from a loose fill connection and within a horizontal radius of 5 ft from a tight fill connection
Vapor processing systems pits	1	Any pit, box, or space below grade level, any part of which is within Division 1 or 2 classified area or that houses any equipment used to transport or process vapors
Vapor processing equipment located within protective enclosures *(see 10.1.7)*	2	Within any protective enclosure housing vapor processing equipment
Vapor processing equipment not within protective enclosures (excluding piping and combustion devices)	2	The space within 18 in. in all directions of equipment containing flammable vapors or liquid extending to grade level; up to 18 in. above grade level within 10 ft horizontally of the vapor processing equipment
Equipment enclosures	1	Any area within the enclosure where vapor or liquid is present under normal operating conditions
	2	Entire area within the enclosure other than Division 1
Vacuum-assist blowers	2	The space within 18 in. in all directions extending to grade level; up to 18 in. above grade level within 10 ft horizontally
Vault	1	Entire interior volume if Class I liquids are stored within
Vent discharging upward	1	Within 3 ft of open end of vent, extending in all directions
	2	Area between 3 ft and 5 ft of open end of vent, extending in all directions

For SI units, 1 in. = 25 mm; 1 ft = 0.30 m.
[1]For marine application, grade level means the surface of a pier, extending down to water level.
[2]Refer to Figure 8.3.1 for an illustration of classified areas around dispensing devices.
[3]Area classification inside the dispenser enclosure is covered in ANSI/UL 87, *Power Operated Dispensing Devices for Petroleum Products.*
[4]Ceiling-mounted hose reel.

FIGURE 8.3.1 Classified areas adjacent to dispensers as detailed in Table 8.3.1.



8.3.2 A designated classified area, as specified in Table 8.3.1, shall not extend beyond a floor, wall, roof, or other solid partition that has no openings.

8.3.3 The area classifications given in Table 8.3.1 shall be based on the premise that the installation meets the applicable requirements of this code in all respects. Should this not be the case, the authority having jurisdiction shall be permitted to determine the extent of the classified area.

8.3.4 All electrical wiring and electrical utilization equipment that is integral with the dispensing hose or dispensing nozzle shall be approved for use in Class I, Division 1 classified locations.

8.3.5 Where Class I liquids are stored, handled, or dispensed, electrical wiring and electrical utilization equipment shall be designed and installed in accordance with the requirements for Class I, Division 1 or 2 classified locations, as set forth in Table 8.3.1 and in NFPA 70, *National Electrical Code.*

Exception: The storage, handling, and dispensing of methyl alcohol–based windshield washer fluids shall not cause an area to be designated as a hazardous (classified) location.

8.3.6 The storage, handling, and dispensing of Class II or Class III liquids shall not cause an area to be designated as a hazardous (classified) location.

8.4 Emergency Electrical Disconnects. Emergency electrical disconnects shall be installed at the locations required by Section 6.7.

8.5 Specific Requirements for Marine Fuel Facilities.

8.5.1 Where excessive stray currents are encountered, piping handling Class I and Class II liquids shall be electrically isolated from the shore piping.

8.5.2* Pipelines on piers shall be bonded and grounded. Bonding and grounding connections on all pipelines shall be located on the pier side of hose riser insulating flanges, if used, and shall be accessible for inspection.

8.5.3 The fuel delivery nozzle shall be put into contact with the vessel fill pipe before the flow of fuel commences and this bonding contact shall be continuously maintained until fuel flow has stopped to avoid possibility of electrostatic discharge.

Chapter 9 Operational Requirements

9.1 Scope. This chapter shall apply to those requirements that relate to the operation of motor fuel dispensing facilities and fuel dispensing systems.

9.2 Basic Requirements.

9.2.1* Inventory Control. Accurate daily inventory records shall be maintained and reconciled for all liquid fuel storage tanks for indication of possible leakage from tanks or piping. The records shall be kept on the premises or shall be made available to the authority having jurisdiction for inspection within 24 hours of a written or verbal request. The records shall include, as a minimum and by product, daily reconciliation between sales, use, receipts, and inventory on hand. If there is more than one storage system serving an individual pump or dispensing device for any product, the reconciliation shall be maintained separately for each system.

9.2.2 Tank Filling and Bulk Delivery.

9.2.2.1 Delivery operations shall meet all applicable requirements of NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids,* and the requirements of 9.2.2.2 through 9.2.2.4.

9.2.2.2 The delivery vehicle shall be separated from any aboveground tank by at least 25 ft (7.6 m).

Exception No. 1: No minimum separation distance shall be required for tanks that are filled by gravity.

Exception No. 2: The required minimum separation distance shall be permitted to be reduced to 15 ft (4.6 m) where the fuel being delivered is not a Class I liquid.

9.2.2.3 The delivery vehicle shall be located so that all parts of the vehicle are on the premises when delivery is made.

Exception: Existing fuel dispensing facilities and fuel dispensing facilities inside buildings shall not be required to meet this requirement.

9.2.2.4 Tank filling shall not begin until the delivery operator has determined that the tank has sufficient available capacity (ullage).

9.2.2.5 Tanks shall be filled through a liquidtight connection. Where an aboveground tank is filled by means of fixed piping, either a check valve and shutoff valve with a quick-connect coupling or a check valve with a dry-break coupling shall be installed in the piping at a point where connection and disconnection is made between the tank and the delivery vehicle. This device shall be protected from tampering and physical damage.

9.2.3 Dispensing into Containers.

9.2.3.1* Class I or Class II liquids shall not be dispensed into portable containers unless the container is constructed of metal or is approved by the authority having jurisdiction, has a tight closure, and is fitted with a spout or so designed that the contents can be poured without spilling. The hose nozzle

valve shall be manually held open during the dispensing operation.

9.2.3.2 No sale or purchase of any Class I, Class II, or Class III liquids shall be made in containers unless such containers are clearly marked with the name of the product contained therein.

9.2.3.3 Portable containers of 12 gal (45 L) capacity or less shall not be filled while they are in or on a motor vehicle or marine craft.

9.2.4 Dispensing from a Tank That Does Not Exceed 120 Gal (454 L) and from Containers Inside Buildings. Dispensing of flammable and combustible liquids from a tank not exceeding 120 gal (454 L) capacity and from containers in a motor fuel dispensing facility or in a repair garage building shall meet the requirements of 9.2.4.1 and 9.2.4.2. *(See 4.3.9 for storage quantity limitations.)*

9.2.4.1 Not more than one container of Class I liquid shall be permitted to be provided with a dispensing pump inside a building at any one time. The number of tanks or containers of Class II or Class IIIA liquids fitted for dispensing at any one time shall not be limited, except as provided for in 4.3.9.2. The number of tanks or containers of Class IIIB liquids fitted for dispensing at any one time shall not be limited.

9.2.4.2 Class I, Class II, and Class IIIA liquids shall not be dispensed by applying pressure to tanks or containers. Listed pumps that take suction through the top of the tank or container or listed self-closing faucets shall be used.

9.2.5 Basic Fire Control.

9.2.5.1 Sources of Ignition. Smoking materials, including matches and lighters, shall not be used within 20 ft (6 m) of areas used for fueling, servicing fuel systems of internal combustion engines, or receiving or dispensing of Class I liquids. The motors of all equipment being fueled shall be shut off during the fueling operation except for emergency generators, pumps, and so forth, where continuing operation is essential.

9.2.5.2 Fire Extinguishers. Each motor fuel dispensing facility shall be provided with one or more listed fire extinguishers that have a minimum capability of 40-B:C. They shall be located so that an extinguisher will be within 100 ft (30 m) of each pump, storage tank fill pipe opening, and lubrication or service room.

9.2.5.3 Fire Suppression Systems. Where required, automatic fire suppression systems shall be installed in accordance with the appropriate NFPA standard, manufacturers' instructions, and the listing requirements of the systems.

9.2.5.4 Signs. Warning signs shall be conspicuously posted in the dispensing area and shall incorporate the following or equivalent wording:

WARNING

It is unlawful and dangerous
to dispense gasoline into
unapproved containers.

No smoking.

Stop motor.

No filling of portable
containers in or on
a motor vehicle.

Place container on ground before filling.

9.2.6 Waste Handling.

9.2.6.1 Crankcase drainings and waste liquids shall not be dumped into sewers, into streams, or on the ground. They shall be stored in approved tanks or containers outside any building, or in tanks installed in accordance with Chapters 4 and 5, until removed from the premises.

Exception: As provided for in 4.3.9.3.

9.2.6.2 The contents of oil separators and traps of floor drainage systems shall be collected at sufficiently frequent intervals to prevent oil from being carried into sewers.

9.2.7 Housekeeping. The dispensing area and the area within any dike shall be kept free of vegetation, debris, and any other material that is not necessary to the proper operation of the motor fuel dispensing facility.

9.2.8 Fire Doors. Fire doors shall be kept unobstructed at all times. Appropriate signs and markings shall be used.

9.3 Operating Requirements for Full-Service Motor Fuel Dispensing Facilities. Each motor fuel dispensing facility shall have an attendant or supervisor on duty whenever the facility is open for business. The attendant or supervisor shall dispense liquids into fuel tanks or into containers, except as covered in Sections 9.4 and 9.5.

9.4 Operating Requirements for Attended Self-Service Motor Fuel Dispensing Facilities.

9.4.1 Self-service motor fuel dispensing facility shall mean that portion of a property where liquids used as motor fuels are stored and dispensed from fixed, approved dispensing equipment into the fuel tanks of motor vehicles by persons other than the facility attendant and shall also include, where provided, facilities for the sale of other retail products.

9.4.2 There shall be at least one attendant on duty while the self-service facility is open for business. The attendant's primary function shall be to supervise, observe, and control the dispensing of Class I liquids while said liquids are actually being dispensed.

9.4.3 The responsibility of the attendant shall be as follows:

(1) Prevent the dispensing of Class I liquids into portable containers not in compliance with 9.2.3.1
(2) Prevent the use of hose nozzle valve latch-open devices that do not comply with 6.6.2
(3) Control sources of ignition
(4) Immediately activate emergency controls and notify the fire department of any fire
(5) Handle accidental spills and fire extinguishers if needed

The attendant or supervisor on duty shall be mentally and physically capable of performing the functions and assuming the responsibility prescribed in Section 9.4.

9.4.4 Operating instructions shall be conspicuously posted in the dispensing area.

9.5 Operating Requirements for Unattended Self-Service Motor Fuel Dispensing Facilities.

9.5.1 Unattended self-service facilities shall be permitted, where approved by the authority having jurisdiction.

9.5.2 Operating instructions shall be conspicuously posted in the dispensing area. The instructions shall include location of emergency controls and a requirement that the user stay outside of his/her vehicle and in view of the fueling nozzle during dispensing.

9.5.3 In addition to the warning signs specified in 9.2.5.4, emergency instructions shall be conspicuously posted in the dispenser area. The instructions shall incorporate the following or equivalent wording:

Emergency Instructions

In case of fire or spill:

(1) Use emergency stop button.

(2) Report accident by calling
(specify local fire number)
on the phone. Report location.

9.5.4 A listed, automatic-closing-type hose nozzle valve with latch-open device shall be provided. The hose nozzle valve shall meet the requirements of 6.6.3.

9.5.5 A telephone or other approved, clearly identified means to notify the fire department shall be provided on the site in a location approved by the authority having jurisdiction.

9.5.6* Additional fire protection shall be provided where required by the authority having jurisdiction.

9.6 Refueling from Tank Vehicles. The dispensing of Class I and Class II liquids in the open from a tank vehicle to a motor vehicle located at commercial, industrial, governmental, or manufacturing establishments and intended for fueling vehicles used in connection with their businesses shall be permitted only if all of the requirements of 9.6.1 through 9.6.7 have been met.

9.6.1 An inspection of the premises and operations shall be made and approval shall be granted by the authority having jurisdiction.

9.6.2 The tank vehicle shall comply with the requirements of NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids.*

9.6.3 The dispensing hose shall not exceed 50 ft (15 m) in length.

9.6.4 The dispensing nozzle shall be a listed, automatic-closing type without a latch-open device.

9.6.5 Nighttime deliveries shall only be made in areas deemed adequately lighted by the authority having jurisdiction.

9.6.6 The tank vehicle flasher lights shall be in operation while dispensing operations are in progress.

9.6.7 Expansion space shall be left in each fuel tank to prevent overflow in the event of temperature increase.

9.7 Repair Areas.

9.7.1 General. Repairing of motor vehicles shall be restricted to areas specifically provided for such purposes.

9.7.2 Welding and Open Flame Operations.

9.7.2.1 Operations involving open flame or electric arcs, including fusion gas and electric welding, shall be restricted to areas specifically provided for such purposes. Cutting and welding and related fire prevention precautions shall be in accordance with the requirements of NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work.*

9.7.2.2 Electric arc welding generators or transformers shall conform to NFPA 70, *National Electrical Code.* Gas fusion welding apparatus and storage of compressed gas cylinders shall be in accordance with the provisions of NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes.*

9.7.2.3* The grounded side of an electric welding circuit shall be attached to the part being welded.

9.7.2.4 Compressed gases shall be stored in accordance with Chapter 2 of NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes.*

9.7.2.5 Gas fusion welding equipment shall be periodically inspected for worn or injured hoses and defective or damaged valves, gauges, and reducing devices.

9.7.2.6 Cylinders stored outside in the open shall have valves and safety devices protected against the accumulation of ice and snow.

9.7.3 Spray Painting and Undercoating.

9.7.3.1 Spray painting shall meet the requirements of NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials.*

9.7.3.2 Where only a small portion of a vehicle is spray painted and no accumulations of paint residue are allowed to form, such occasional painting shall be permitted in the open in the structure if located not less than 20 ft (6 m) horizontally from all open flame devices or spark-producing electrical equipment or appliances.

9.7.3.3 Undercoating spray operations conducted in any area having adequate natural or mechanical ventilation shall be exempt from the requirements pertaining to spray finishing operations where the undercoating materials are nonflammable or where the solvents used have a flash point in excess of 100°F (37.8°C) (closed cup). There shall be no open flame devices or spark-producing electrical equipment or appliances within 20 ft (6 m) horizontally while such operations are conducted. Undercoating materials shall be dry before starting the engine of the undercoated vehicle.

9.7.3.4 Undercoating spray operations that do not meet the requirements of 9.7.3.3 shall meet all requirements of NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials.*

9.7.4 Drying Apparatus. Drying and baking apparatus in connection with the spray application of flammable finishes shall conform to NFPA 86, *Standard for Ovens and Furnaces,* and NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials.*

9.7.5 Repair of Fuel Tanks.

9.7.5.1 Prior to repair work on fuel tanks of vehicles involving flame- or heat-producing devices, the tanks shall be drained and purged, or inerted, and tested in accordance

with applicable procedures outlined in NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair.*

9.7.5.2 In lieu of draining the fuel tank outside the building, an approved portable pump and storage tank shall be permitted to be used.

9.7.5.3 Fuel drained from vehicle tanks that is not to be disposed of shall be stored in approved safety cans or returned to standard underground storage tanks.

9.7.5.4 Fuel to be disposed of shall be stored in tanks or drums suitable for such purpose that shall be located outside of the building until removal from the premises. Such containers shall be identified as having flammable contents.

9.7.6 Parts Cleaning.

9.7.6.1 Cleaning of parts shall be performed with a nonflammable solvent.

Exception: A combustible liquid with a flash point above 100°F (37.8°C) (closed cup) shall be permitted to be used for this purpose provided adequate ventilation is supplied and no sources of ignition are present in the cleaning area.

9.7.6.2 Devices used to heat nonflammable solvent shall conform to the requirements of one or both of the following:

(1) NFPA 31, *Standard for the Installation of Oil-Burning Equipment*
(2) NFPA 54, *National Fuel Gas Code*

These heating devices shall be installed in accordance with the requirements of Section 7.6.

9.7.6.3 A device for heating solvents that give off flammable or toxic vapors when heated shall be provided with a limit control to prevent the solvent from exceeding a temperature 50°F (10°C) below the point at which flammable or toxic vapors are released.

9.7.6.4 Direct-fired parts cleaners shall not be installed or used below grade.

9.7.7 Chassis Cleaning.

9.7.7.1 Chassis cleaning shall not be performed with liquids having flash points below 140°F (60°C) (closed cup). If steam is used, it shall be supplied from a boiler located, installed, and safeguarded in accordance with the applicable requirements for heating equipment in Section 7.6 and in the following documents:

(1) NFPA 31, *Standard for the Installation of Oil-Burning Equipment*
(2) NFPA 54, *National Fuel Gas Code*
(3) NFPA 8501, *Standard for Single Burner Boiler Operation*
(4) NFPA 8502, *Standard for the Prevention of Furnace Explosions/Implosions in Multiple Burner Boilers*

9.7.7.2 Steam cleaning devices shall be of an approved type.

9.7.8 Storage and Handling of Flammable Liquids and Gases. The storage and handling of flammable liquids shall be in accordance with NFPA 30, *Flammable and Combustible Liquids Code.* The storage and handling of liquefied petroleum gas shall be in accordance with NFPA 58, *Liquefied Petroleum Gas Code.* The storage and handling of flammable compressed gas fuels shall be in accordance with NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders,* and NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code.*

9.7.9 Housekeeping.

9.7.9.1 An authorized employee, an officer of the firm, or the owner shall make daily inspections of the repair garage and shall be responsible for the prompt removal or repair of any hazardous condition, including proper maintenance of equipment and safety devices and the immediate removal of accumulations of combustible materials.

9.7.9.2 Clear aisle space shall be maintained to permit ready access to and the use of fire-fighting equipment.

9.7.9.3 Floors shall be kept clean and free of oil and grease. Only approved water solutions or detergents, floor-sweeping compounds, and grease absorbents shall be used for cleaning floors.

9.7.9.4 Metal lockers shall be provided for employees' clothes.

9.7.9.5 Approved metal receptacles with self-closing covers shall be provided for the storage or disposal of oil-soaked waste or cloths.

9.7.9.6 Combustible rubbish shall be placed in covered metal receptacles until removed to a safe place for disposal. Contents of such containers shall be removed daily.

9.7.9.7 Smoking shall be prohibited except in designated areas subject to the approval of the authority having jurisdiction.

Chapter 10 Vapor Processing and Vapor Recovery Systems for Liquid Motor Fuels

10.1 Vapor Processing Systems.

10.1.1 Vapor processing system components, including hose nozzle valves, blowers, vacuum pumps, flame arresters, or systems for preventing flame propagation, controls, and vapor processing equipment shall be individually listed for their intended use.

10.1.2 Dispensing devices used with a vapor processing system shall be listed. Existing listed or labeled dispensing devices shall be permitted to be modified for use with vapor processing systems provided they are "Listed by Report" as specified in 6.3.2.1.

10.1.3 Means shall be provided in the vapor return path from each dispensing outlet to prevent the discharge of vapors when the hose nozzle valve is in its normal nondispensing position.

10.1.4 Vapor processing systems that employ blower-assist shall not be used unless the system is designed to prevent flame propagation through system piping, processing equipment, and tanks.

10.1.5 If a component is likely to contain an ignitable vapor–air mixture under operating conditions and can fail in a manner to ignite the mixture, it shall be designed to withstand an internal explosion without failure to the outside.

10.1.6 Vapor processing equipment shall be located outside of buildings. In addition, they shall be located as follows:

(1) At least 10 ft (3 m) from adjacent property lines that can be built upon
(2) At least 20 ft (6 m) from dispensing devices

Exception: As provided for in 10.1.7.

10.1.7 Where the required distance to adjacent property lines that can be built upon cannot be achieved, means shall be provided to protect the vapor processing equipment against fire exposure. Acceptable means shall include the following:

(1) Protective enclosures constructed of fire-resistant or noncombustible materials that extend at least 18 in. (455 mm) above the equipment
(2) Installation in belowgrade spaces
(3) Protection with an approved water spray system

If protective enclosures or belowgrade spaces are used, positive means shall be provided to ventilate the enclosure to prevent pocketing of ignitible vapors. In no case shall vapor processing equipment so protected be located within 5 ft (1.5 m) of adjacent property lines that can be built upon.

10.1.8 Processing equipment shall be protected against physical damage with guardrails, curbs, or fencing.

10.1.9 Electrical equipment shall meet the requirements of Chapter 8.

10.1.10 Vent pipes on vapor processing systems shall discharge only in an upward direction in order to disperse vapors and shall terminate at least 12 ft (3.6 m) above grade. The outlets shall be directed and located so that ignitable vapors will not accumulate or travel to an unsafe location or enter buildings.

10.1.11 Combustion or open flame-type devices shall not be installed in classified areas, as described in Chapter 8.

10.2 Vapor Recovery Systems.

10.2.1 Dispensing devices that incorporate vapor recovery shall be listed.

10.2.2 Hose nozzle valves used on vapor recovery systems shall be listed for the purpose.

10.2.3 Means shall be provided in the vapor return path from each dispensing outlet to prevent the discharge of vapors when the hose nozzle valve is in its normal nondispensing position.

Chapter 11 Marine Fueling

11.1 Scope.

11.1.1 This chapter shall apply to that portion of a property where liquids used as fuels are stored, handled, and dispensed from equipment located on shore or from equipment located on piers, wharves, or floating docks into the fuel tanks of marine craft, including incidental activity, except as covered elsewhere in this code or in other NFPA standards.

11.1.2 This chapter shall not apply to the following:

(1) Bulk plant or terminal loading and unloading facilities
(2) Transfer of liquids utilizing a flange-to-flange closed transfer piping system
(3) Marine motor fuel dispensing facilities where liquids used as fuels are stored and dispensed into the fuel tanks of marine craft of 300 gross tons (272 metric tons) or more

11.1.3 For the purpose of this chapter, the word *pier* shall also mean dock, floating dock, and wharf.

11.2 Storage.

11.2.1 Liquids shall be stored in tanks or containers complying with Section 4.3.

11.2.2 Tanks that supply marine motor fuel dispensing facilities shall be located on shore or on a pier of the solid-fill type. Pumps that are not integral with the dispensing device shall also be located on shore or on a pier of the solid-fill type.

Exception: Where shore location would require excessively long supply lines to dispensing devices, tanks shall be permitted to be located on a pier, provided the installation meets all applicable requirements of Chapters 2 and 3 and 5.9.5 of NFPA 30, Flammable and Combustible Liquids Code, and the quantity stored does not exceed 1100 gal (4164 L) aggregate capacity.

11.2.3 Where a tank is 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, that will prevent gravity flow from the tank to the dispenser. This device shall be located adjacent to and downstream of the outlet valve specified by 2.3.2.5.1 of NFPA 30, *Flammable and Combustible Liquids Code*. The device shall be installed and adjusted so that liquid cannot flow by gravity from the tank to the dispenser if the piping or hose fails when the dispenser is not in use.

11.3 Piping Systems.

11.3.1 Piping shall be installed in accordance with all applicable requirements of Chapter 5.

11.3.2 Piping systems shall be supported and protected against physical damage and stresses arising from impact, settlement, vibration, expansion, contraction, and tidal action.

11.3.3 Means shall be provided to ensure flexibility of the piping system in event of motion of the pier. Flexible piping shall be of a type designed to withstand the forces and pressures exerted upon the piping.

11.3.4 Where dispensing is from a floating structure or pier, oil-resistant flexible hose shall be permitted to be used between shore piping and the piping on a floating structure or pier and between separate sections of the floating structure to accommodate changes in water level or shoreline, provided that the hose is either resistant to or shielded from damage by fire.

11.3.5 A valve to shut off the liquid supply from shore shall be provided in each pipeline at or near the approach to the pier and at the shore end of each marine pipeline adjacent to the point where each flexible hose is attached.

11.4 Fuel Dispensing System.

11.4.1 All hose shall be listed. Where hose length exceeds 18 ft (5.5 m), the hose shall be secured so as to protect it from damage.

11.4.2 Dispensing nozzles shall be of the automatic-closing type without a latch-open device.

11.4.3 Dispensing devices shall be permitted to be located on open piers, on shore, or on piers of the solid-fill type and shall be located apart from other structures so as to provide room for safe ingress to and egress from marine craft.

11.4.4 Dispensing devices shall be located so that exposure to all other operational marina or pleasure boat berthing area facilities is minimized. Where tide and weather conditions

permit, liquid fuel handling shall be outside the main berthing areas. Where located inside marina or pleasure craft berthing areas, fueling facilities shall be located so that, in case of fire aboard a marine craft alongside, the danger to other craft near the facility is minimized. No vessel or marine craft shall be made fast to or berthed at any fuel dispensing location except during fueling operations.

11.4.5 No vessel or marine craft shall be made fast to any other vessel or marine craft occupying a berth at a fuel dispensing location during fueling operations.

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

11.4.7 Each marine motor fuel dispensing facility shall have an attendant or supervisor on duty whenever the facility is open for business. The attendant's primary function shall be to supervise, observe, and control the dispensing of liquids.

11.5 Sources of Ignition.

11.5.1 All electrical components for dispensing liquids shall be installed in accordance with Chapter 8.

11.5.2 All electrical equipment shall be installed and used in accordance with the requirements of NFPA 70, *National Electrical Code,* as it applies to wet, damp, and hazardous locations.

11.5.3 Clearly identified emergency electrical disconnects that are readily accessible in case of fire or physical damage at any dispensing unit shall be provided on each marine wharf. The disconnects shall be interlocked to shut off power to all pump motors from any individual location and shall be manually reset only from a master switch. Each such disconnect shall be identified by an approved sign stating "EMERGENCY PUMP SHUTOFF" in 2-in. (50 mm) red capital letters.

11.5.4 All electrical wiring for power and lighting shall be installed on the side of the wharf opposite from the liquid piping system.

11.5.5 Smoking materials, including matches and lighters, shall not be used within 20 ft (6 m) of areas used for fueling, servicing fuel systems for internal combustion engines, or receiving or dispensing of Class I liquids. Conspicuous "No Smoking" signs shall be posted within sight of the customer being served.

11.5.6 The motors of all equipment being fueled shall be shut off during the fueling operation, except for emergency generators, pumps, and so forth, where continuing operation is essential.

11.6 Bonding and Grounding.

11.6.1 Where excessive stray currents are encountered, piping handling Class I and Class II liquids shall be electrically isolated from the shore piping.

11.6.2* Pipelines on piers shall be bonded and grounded. Bonding and grounding connections on all pipelines shall be located on the pier side of hose riser insulating flanges, if used, and shall be accessible for inspection.

11.6.3 The fuel delivery nozzle shall be put into contact with the vessel fill pipe before the flow of fuel commences and this bonding contact shall be continuously maintained until fuel flow has stopped to avoid possibility of electrostatic discharge.

11.7 Fire Control.

11.7.1 Each marine motor fuel dispensing facility shall be provided with one or more listed fire extinguishers having a minimum classification of 40-B:C. They shall be located so that an extinguisher will be within 100 ft (30 m) of each pump, each dispensing device, and each pier-mounted liquid storage tank.

11.7.2 Piers that extend more than 500 ft (152 m) in travel distance from shore shall be provided with a Class III standpipe that is installed in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems.*

11.7.3 Materials shall not be placed on a pier in such a manner that they obstruct access to fire-fighting equipment or important piping system control valves. Where the pier is accessible to vehicular traffic, an unobstructed roadway to the shore end of the wharf shall be maintained for access by fire-fighting apparatus.

11.8 Containers and Movable Tanks.

11.8.1 The temporary use of movable tanks in conjunction with the dispensing of liquids into the fuel tanks of marine craft on premises not normally accessible to the public shall be permitted. Such installations shall only be made with the approval of the authority having jurisdiction.

11.8.2* Class I or Class II liquids shall not be dispensed into a portable container unless the container is constructed of metal or is approved by the authority having jurisdiction, has a tight closure, and is fitted with a spout or is so designed that the contents can be dispensed without spilling.

11.8.3 Portable containers of 12 gal (45 L) capacity or less shall not be filled while they are in or on a marine craft.

11.9 Cargo Tank Fueling Facilities. The provisions of Section 11.2 shall not prohibit the dispensing of Class II liquids in the open from a tank vehicle to a marine craft located at commercial, industrial, governmental, or manufacturing establishments when the liquid is intended for fueling marine craft used in connection with their businesses if the requirements of 11.9.1 through 11.9.7 are met.

11.9.1 An inspection of the premises and operations shall be made and approval granted by the authority having jurisdiction.

11.9.2 The tank vehicle shall comply with the requirements of NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids.*

11.9.3 The dispensing hose shall not exceed 50 ft (15 m) in length.

11.9.4 The dispensing nozzle shall be a listed, automatic-closing type without a latch-open device.

11.9.5 Nighttime deliveries shall only be made in areas deemed adequately lighted by the authority having jurisdiction.

11.9.6 The tank vehicle flasher lights shall be in operation while dispensing.

11.9.7 Fuel expansion space shall be left in each fuel tank to prevent overflow in the event of temperature increase.

11.10 Operating Requirements.

11.10.1 The following shall be the responsibilities of the attendant:

(1) Prevent the dispensing of Class I liquids into portable containers that do not comply with 11.8.2
(2) Be familiar with the dispensing system and emergency shutoff controls
(3) Ensure that the vessel is properly moored and that all connections are made
(4) Be within 15 ft (4.6 m) of the dispensing controls during the fueling operation and maintain a direct, clear, unobstructed view of both the vessel fuel filler neck and the emergency fuel shutoff control

11.10.2 Fueling shall not be undertaken at night except under well-lighted conditions.

11.10.3 During fueling operations, smoking shall be forbidden on board the vessel or marine craft and in the dispensing area.

11.10.4 Before opening the tanks of the vessel to be fueled, the following precautions shall be taken:

(1) All engines, motors, fans, and bilge blowers shall be shut down.
(2) All open flames and smoking material shall be extinguished and all exposed heating elements shall be turned off.
(3) Galley stoves shall be extinguished.
(4) All ports, windows, doors, and hatches shall be closed.

11.10.5 After the flow of fuel has stopped, the following shall occur:

(1) The fill cap shall be tightly secured.
(2) Any spillage shall be wiped up immediately.
(3) If Class I liquid has been delivered, the entire vessel or marine craft shall remain open.
(4) Bilge blowers shall be turned on and allowed to run for at least 5 minutes before starting any engines or lighting galley fires. If bilge blowers are not available, 10 minutes of ventilation shall be required.

11.10.6 No Class I liquids shall be delivered to any vessel having its tanks located below deck unless each tank is equipped with a separate fill pipe, the receiving end of which shall be securely connected to a deck plate and fitted with a screw cap. Such pipe shall extend into the tank. Vessels receiving Class II or Class IIIA liquids shall have the receiving end of the fill pipe securely connected to a deck plate and fitted with a screw cap. Such pipe shall be permitted to connect to a manifold system that extends into each separate tank. Each tank shall be provided with a suitable vent pipe that shall extend from the tank to the outside of the coaming or enclosed rails so that the vapors will dissipate out board.

11.10.7 Owners or operators shall not offer their vessel or marine craft for fueling unless the following occurs:

(1) The tanks being filled are properly vented to dissipate vapors to the outside atmosphere and the fuel systems are liquidtight and vaportight with respect to all interiors.
(2) All fuel systems are designed, installed, and maintained in compliance with the specifications of the manufacturer of the vessel or marine craft.
(3) Communication has been established between the fueling attendant and the person in control of the vessel or craft receiving the fuel so as to determine the vessel's fuel capacity, the amount of fuel on board, and the amount of fuel to be taken on board.
(4) The electrical bonding and grounding systems of the vessel or craft have been maintained in accordance with the manufacturers' specifications.

11.10.8 A sign with the following legends printed in 2-in. (50-mm) red capital letters on a white background shall be conspicuously posted at the dispensing area:

Before Fueling:

(1) Stop all engines and auxiliaries.
(2) Shut off all electricity, open flames, and heat sources.
(3) Check all bilges for fuel vapors.
(4) Extinguish all smoking materials.
(5) Close access fittings and openings that could allow fuel vapors to enter enclosed spaces of the vessel.

During Fueling:

(1) Maintain nozzle contact with fill pipe.
(2) Wipe up spills immediately.
(3) Avoid overfilling.
(4) Fuel filling nozzle must be attended at all times.

After Fueling:

(1) Inspect bilges for leakage and fuel odors.
(2) Ventilate until odors are removed.

Chapter 12 Additional Requirements for CNG, LNG, and LPG

12.1 Scope. This chapter shall apply where CNG, LNG, or LPG, or combinations of these, are dispensed as motor vehicle fuels along with Class I or Class II liquids that are also dispensed as motor vehicle fuels.

12.2 General Requirements.

12.2.1 The installation and use of CNG systems shall meet the requirements of NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code,* except as modified by this chapter. The installation and use of LNG systems shall meet the requirements of NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code,* except as modified by this chapter. The installation and use of LPG systems shall meet the requirements of NFPA 58, *Liquefied Petroleum Gas Code,* except as modified by this chapter.

12.2.2 A means shall be provided that connects to the dispenser supply piping and that prevents flow in the event that the dispenser is displaced from its mounting.

12.2.3 Dispensing devices for CNG, LNG, and LPG shall be listed.

12.2.4 Listed hose assemblies shall be used to dispense fuel. Hose length at automotive motor fuel dispensing facilities shall not exceed 18 ft (5.5 m).

12.3 Fuel Storage.

12.3.1 Aboveground tanks storing CNG or LNG shall be separated from any adjacent property line that is or can be built upon, any public way, and the nearest important building on

the same property by not less than the distances given in Section 4-4 of NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code.*

12.3.2 Aboveground tanks storing LPG shall be separated from any adjacent property line that is or can be built upon, any public way, and the nearest important building on the same property by not less than the distances given in 3-2.2 of NFPA 58, *Liquefied Petroleum Gas Code.*

12.3.3* Aboveground tanks storing CNG, LNG, or LPG shall be separated from each other by at least 20 ft (6 m) and from dispensing devices that dispense liquid or gaseous motor vehicle fuels by at least 50 ft (15 m).

Exception No. 1: This required separation shall not apply to tanks storing fuels that have the same chemical composition.

Exception No. 2: When both the gaseous fuel storage and dispensing equipment are at least 50 ft (15 m) from any other aboveground motor fuel storage or dispensing equipment, the requirements of NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel Systems Code; NFPA 57, Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code; or NFPA 58, Liquefied Petroleum Gas Code, whichever is applicable, shall apply.

12.3.4 Aboveground storage tanks for the storage of CNG, LNG, or LPG shall be provided with physical protection in accordance with 4.3.7.

12.3.5 Horizontal separation shall not be required between aboveground tanks storing CNG, LNG, or LPG and underground tanks containing Class I or Class II liquids, provided the structural limitations of the underground tanks are not exceeded.

12.4 Dispenser Installations Beneath Canopies. Where CNG or LNG dispensers are installed beneath a canopy or enclosure, either the canopy or enclosure shall be designed to prevent accumulation or entrapment of ignitable vapors or all electrical equipment installed beneath the canopy or enclosure shall be suitable for Class I, Division 2 hazardous (classified) locations.

12.5 Specific Requirements for LPG Dispensing Devices.

12.5.1 Dispensing devices for LPG shall meet all applicable requirements of NFPA 58, *Liquefied Petroleum Gas Code*, and shall incorporate a dispensing nozzle that releases not more than 2 cm^3 of liquid LPG upon disconnection.

12.5.2 Dispensing devices for LPG shall be located not less than 5 ft (1.5 m) from any dispensing device for Class I liquids.

12.6 Electrical Equipment.

12.6.1 All electrical wiring and electrical utilization equipment shall be of a type specified by and shall be installed in accordance with NFPA 70, *National Electrical Code.*

12.6.2* Table 12.6.2 shall be used to delineate and classify areas for the purpose of installation of electrical wiring and electrical utilization equipment.

Table 12.6.2 Electrical Equipment Classified Areas for Dispensing Devices

Dispensing Device	Extent of Classified Area	
	Class I, Division 1	Class I, Division 2
Compressed natural gas	Entire space within the dispenser enclosure	5 ft in all directions from dispenser enclosure
Liquefied natural gas	Entire space within the dispenser enclosure and 5 ft in all directions from the dispenser enclosure	From 5 ft to 10 ft in all directions from the dispenser enclosure
Liquefied petroleum gas	Entire space within the dispenser enclosure; 18 in. from the exterior surface of the dispenser enclosure to an elevation of 4 ft above the base of the dispenser; the entire pit or open space beneath the dispenser and within 20 ft horizontally from any edge of the dispenser when the pit or trench is not mechanically ventilated	Up to 18 in. above ground and within 20 ft horizontally from any edge of the dispenser enclosure, including pits or trenches within this area when provided with adequate mechanical ventilation

For SI units, 1 in. = 25 mm; 1 ft = 0.3 m.

Chapter 13 Reserved

Appendix A Explanatory Material

Appendix A is not a part of the requirements of this NFPA document but is included for informational purposes only. This appendix contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.1.2 See NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code;* NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code;* and NFPA 58, *Liquefied Petroleum Gas Code,* for requirements for facilities where only these fuels are dispensed.

A.1.2 See NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft,* for safety precautions while fueling at marine motor fuel dispensing facilities; NFPA 303, *Fire Protection Standard for Marinas and Boatyards,* for additional requirements applicable to marine motor fuel dispensing facilities; and NFPA 88B, *Standard for Repair Garages,* for additional requirements for automotive repair facilities.

A.3.1.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.1.2 Authority Having Jurisdiction. The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.1.8 Dispensing Device, Overhead Type. This definition applies to an overhead dispenser that uses a retractable hose on an overhead reel, as distinguished from the now-common dispensing device that has one or more hose outlets located in a canopy at the top of the dispensing device. These latter, also called high-hose units or *multi-product dispensers,* are treated by NFPA 30A as conventional dispensing devices.

A.3.1.12.1 Combustible Liquid. See Appendix B for information about typical liquids found at motor fuel dispensing facilities.

A.3.1.12.2 Flammable Liquid. See Appendix B for information about typical liquids found at motor fuel dispensing facilities.

A.3.1.13 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.1.15.3 Motor Fuel Dispensing Facility Located Inside a Building. The motor fuel dispensing facility can be either enclosed or partially enclosed by the building walls, floors, ceilings, or partitions or can be open to the outside. The motor fuel dispensing area is that area required for dispensing of fuels to motor vehicles. Dispensing of fuel at manufacturing, assembly, and testing operations is not included within this definition.

A.3.1.21 Vapor Processing System. Examples are systems using blower-assist for capturing vapors and refrigeration, absorption, and combustion systems for processing vapors.

A.3.1.22 Vapor Recovery System. Examples are balanced-pressure vapor displacement systems and vacuum-assist systems without vapor processing.

A.4.3.2 PEI RP200, *Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling,* also provides information on this subject.

A.4.3.7.2 The top of the posts should be set not less than 3 ft (0.9 m) above ground and should be located not less than 5 ft (1.5 m) from the tank. Other approved means to protect tanks subject to vehicular damage include vehicle impact resistance testing such as that prescribed in UL 2085, *Standard for Insulated Aboveground Tanks for Flammable and Combustible Liquids,* for protected aboveground tanks.

A.4.3.8 Appropriate corrosion control standards include the following:

(1) STI RP 892-91, *Recommended Practice for Corrosion Protection of Underground Piping Networks Associated with Liquid Storage and Dispensing Systems*
(2) STI RP-01-69, *Recommended Practice for Control of External Corrosion of Underground or Submerged Metallic Piping Systems*
(3) STI RP 1632, *Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems*

A.5.4.2 When testing with air, the pressure should be maintained at the initial pressure setting or within a range that can be accounted for by temperature changes held for a minimum of 1 hour.

A.7.3.5.1 Additional fire protection considerations can include items such as fixed suppression systems, automatic fire detection, manual fire alarm stations, transmission of alarms to off-site locations, and limiting gallonage delivered per transaction.

A.7.3.6.7 Exception Natural ventilation can normally be expected to dissipate any fuel vapors before they reach ignitable concentrations if at least two sides of the dispensing area are open to the building exterior.

A.7.5 The ventilation requirements contained in this section do not consider exhaust emissions from motor vehicle engines. An appropriate professional should be consulted to determine precautions necessary to protect against this health hazard.

A.7.5.1 Manual control switches for supply and exhaust ventilating systems should be located close to the entrance to the area served. In buildings protected by automatic sprinklers or fire alarm systems, it is recommended that the necessary interlocks be provided to shut down supply and exhaust fans when the sprinklers or fire alarms operate. For service facilities for CNG-fueled vehicles and LNG-fueled vehicles, see NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code,* or NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code,* whichever is appropriate.

A.7.6.6 Enclosed rooms or spaces should prohibit the transmission of gases from the room or space repairing or storing CNG- or LNG-fueled vehicles to other areas of the building. Other areas outside of the enclosure, if not repairing or storing CNG- or LNG-fueled vehicles, can use other heating methods. Note that, according to A-1-1 of NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code,* CNG weighs about two-thirds that of air and, therefore, as a gas, will rise in a room. According to A-1-6 of NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code,* LNG at a temperature of less than or

equal to –170°F (–112°C) is heavier than ambient air [at 60°F (15°C)], but as the LNG's temperature rises, it becomes lighter than air.

A.8.2.1 The intent is that the electrical utilization equipment be placed below a volume located at the highest area of the building that is equal to 150 percent of the released volume of the largest CNG tank.

A.8.3.1 The designation of classes and divisions of classified locations is defined in Chapter 5, Article 500, of NFPA 70, *National Electrical Code®*.

A.8.5.2 NFPA 77, *Recommended Practice on Static Electricity,* contains information on this subject.

A.9.2.1 API RP 1621, *Recommended Practice for Bulk Liquid Stock Control at Retail Outlets,* provides information on this subject.

A.9.2.3.1 See Section 4.2 of NFPA 30, *Flammable and Combustible Liquids Code,* for further information.

A.9.5.6 Additional fire protection considerations can include fixed suppression systems, automatic fire detection, manual fire alarm stations, transmission of alarms to off-site locations, and limitation of the quantity of motor fuel delivered per transaction.

A.9.7.2.3 The ground wire should never be attached to the chassis if welding a fender, as the electrical resistance between the two could be sufficient to cause a fire or personal injury. The monorail and hoist should not be used as the ground side for the same reason.

A.11.6.2 NFPA 77, *Recommended Practice on Static Electricity,* contains information on this subject.

A.11.8.2 See NFPA 30, *Flammable and Combustible Liquids Code,* 4.2.1, for further information.

A.12.3.3 The selection of the 50-ft (15-m) separation distance for gaseous fuels is based on the existing separation requirements prescribed in NFPA 30A. No technical data were available to support different separation distances and the 50-ft (15-m) distance was considered reasonable and conservative, based on the information available to the technical committee at the time.

A.12.6.2 The designation of classes and divisions of classified locations is defined in Chapter 5, Article 500, of NFPA 70, *National Electrical Code.*

Appendix B Typical Flammable and Combustible Liquids Found at Motor Fuel Dispensing Facilities

This appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Fire Hazard Properties of Typical Flammable and Combustible Liquids Found at Motor Fuel Dispensing Facilities. Table B.1 lists common liquids typically found at motor fuel dispensing facilities and repair garages and their relevant fire hazard properties.

Table B.1 Typical Flammable and Combustible Liquids Found at Motor Fuel Dispensing Facilities

Liquid	Flash Point (°F)	NFPA 30 Class	Boiling Point (°F)	Min. Ignition Temp. in Air (°F)
Antifreeze	230	IIIB	300	—
Brake fluid	300	IIIB	540	—
Chassis grease	400	IIIB	>800	>800
Crankcase drainings	—	IIIB	—	—
Diesel fuel #1	100	II	—	—
Diesel fuel #2	125	II	—	—
Diesel fuel #4	130	II	—	—
Gasoline	–40 to –50	IB	100 to 400	~825
Gear lubricant	395	IIIB	>800	>800
Kerosene (fuel oil #1)	100	II	304 to 574	440
Lithium-moly grease	380	IIIB	>800	>900
Lubricating oils	300 to 450	IIIB		
Power steering fluid	350	IIIB	>550	—
Transmission fluid				
Dexron II	395	IIIB	>800	>800
Type F	380	IIIB	>800	>800
White grease	465	IIIB	>800	>800
Windshield washer fluid (methanol/ water mixtures)				
100% methanol	54	IB	148	725
50% methanol/ 50% water	80	IB	—	
20% methanol/ 80% water	118	II	—	
5% methanol/ 95% water	206	IIIB	—	

Appendix C Referenced Publications

C.1 The following documents or portions thereof are referenced within this code for informational purposes only and are thus not considered part of the requirements of this code unless also listed in Chapter 2. The edition indicated here for each reference is the current edition as of the date of the NFPA issuance of this code.

C.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 30, *Flammable and Combustible Liquids Code*, 2000 edition.

NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, 1998 edition.

NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code*, 1999 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 1998 edition.

NFPA 70, *National Electrical Code®*, 1999 edition.

NFPA 77, *Recommended Practice on Static Electricity*, 2000 edition.

NFPA 88B, *Standard for Repair Garages*, 1997 edition.

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, 1998 edition.

NFPA 303, *Fire Protection Standard for Marinas and Boatyards*, 2000 edition.

C.1.2 Other Publications.

C.1.2.1 API Publication. American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005.

API RP1621, *Recommended Practice for Bulk Liquid Stock Control at Retail Outlets*, 1993.

C.1.2.2 IFCI Publication. International Fire Code Institute, 5360 Workman Mill Road, Whittier, CA 90601-2298.

Uniform Fire Code Standard 79-7, *Testing Requirements for Protected Aboveground Tanks.*

C.1.2.3 PEI Publication. Petroleum Equipment Institute, P.O. Box 2380, Tulsa, OK 74101.

PEI RP200, *Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling*, 1996.

C.1.2.4 STI Publications. Steel Tank Institute, 570 Oak Wood Road, Lake Zurich, IL 60047.

STI RP 01-69, *Recommended Practice for Control of External Corrosion of Underground or Submerged Metallic Piping Systems.*

STI RP 892-91, *Recommended Practice for Corrosion Protection of Underground Piping Networks Associated with Liquid Storage and Dispensing Systems.*

STI RP 1632, *Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems.*

C.1.2.5 SWRI Publication. Southwest Research Institute, 6220 Culebra Road, San Antonio, TX 78284.

SWRI 93-01, *Testing Requirements for Protected Aboveground Flammable Liquid Fuel Storage Tanks.*

C.1.2.6 UL Publication. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

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

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1996 edition to 2000 edition

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