**Chapter 42 Refueling**

42.1 General

42.1.1 Scope

Chapter 42 shall apply to refueling of automotive vehicles, marine vessels, and aircraft.

42.1.2 Permits

Permits, where required, shall comply with Section 1.12.

42.2 Automotive Fuel Servicing

42.2.1 Applicability

42.2.1.1

Fueling processes at automotive service stations, service stations located inside buildings, and fleet vehicle service stations shall comply with NFPA 30A and Sections 42.2 through 42.8.

42.2.1.2

If approved by the AHJ, mobile fleet fueling at commercial, industrial, and governmental sites shall be conducted in accordance with 42.7.6.

42.2.1.3\*

Sections 42.2 through 42.8 shall not apply to those motor fuel dispensing facilities where only liquefied petroleum gas (LP-Gas), liquefied natural gas (LNG), or compressed natural gas (CNG) is dispensed as motor fuel, or where both gaseous fuel storage and dispensing equipment are at least 50 ft (15 m) from any other motor fuel storage or dispensing equipment of different chemical composition. [30A:1.1.3]

42.2.2 General Requirements

42.2.2.1 Plans and Specifications

Plans and specifications shall be submitted for review and approval prior to the installation or construction of a motor vehicle fuel dispensing station.

42.2.2.1.1

A site plan shall be submitted that illustrates the location of flammable and combustible liquids, LP-Gas or CNG storage vessels, and their spatial relation to each other, property lines, and building openings.

42.2.2.1.2

Aboveground and underground storage vessels shall be shown on plans.

42.2.2.1.3

For each type of fuel dispensing facility, plans and specifications shall also include, but not be limited to, the following:

Type and design of underground and aboveground liquid storage tanks

Quantity and types of liquids to be stored

Location and design of the fuel dispensers and dispenser nozzles

Distances from dispensers to tanks, property lines, and buildings

Vehicle access

Fire appliances

Vehicle impact protection

Method of storage and dispensing

Overfill prevention

Spill containment

Vents

Vapor recovery

Other equipment and accessories

Seismic design in accordance with the building code

Secondary containment

Design and specifications for related piping, valves, and fittings

Location and classification of electrical equipment, including emergency fuel shutdown devices

Specifications for fuel storage and venting components

Other information as required by the AHJ

42.3 Storage of Liquids

42.3.1 Scope

Section 42.3 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. [30A:4.1]

42.3.2 General Requirements

42.3.2.1

Liquids shall be stored in the following:

Approved closed containers that do not exceed 60 gal (227 L) capacity and are located outside buildings

Tanks or approved closed containers located inside motor fuel dispensing facilities or repair garages

Aboveground tanks, underground tanks, and containers in accordance with the requirements of 42.3.2.3

Tanks supplying marine service stations in accordance with 42.9.2.

[30A:4.2.1]

42.3.2.2

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. [30A:4.2.2]

42.3.2.3

Class I liquids shall not be stored or handled in a building that has a basement or pit into which ignitible 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 ft3/min of exhaust per ft2 of floor area (0.3 m3/min/m2), but not less than 150 ft3/min (4 m3/min). [30A:4.2.3]

42.3.2.4

Where tanks are at an elevation that produces a gravity head on the dispensing device, the tank outlet shall be equipped with a device, such as a normally closed solenoid valve, positioned adjacent to and downstream from the valve specified in 22.13.1 of NFPA 30 that is installed and adjusted so that liquid cannot flow by gravity from the tank if the piping or hose fails when the dispenser is not in use. [30A:4.2.4]

42.3.3 Storage of Liquids

42.3.3.1\* Aboveground Storage Tanks

42.3.3.1.1

Tanks designed and built for underground use shall not be installed for aboveground use. [30A:4.3.2.2]

42.3.3.1.2

Tanks storing liquid motor fuels 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 42.3.3.2, in which case the maximum individual capacity shall be permitted to be 15,000 gal (57,000 L). [30A:4.3.2.3]

42.3.3.1.3

Tanks shall be located in accordance with Table 42.3.3.1.3. [30A:4.3.2.4]

Table 42.3.3.1.3 Minimum Separation Requirements for Aboveground Tanks

Tank Type

Individual Tank

Capacity

(gal)a

Minimum Distance (ft)

From the

Nearest Important

Building on the

Same Property

From

Nearest

Fuel

Dispensing Deviceb

From Lot Line

That Is or Can

Be Built Uponc

From the

Nearest Side

of Any Public

Way

Between Tanks

Tanks in vaultsd 0—15,000

0

0

0

0

Separate

compartments

required for

each tank

Protected aboveground tanks Less than or

equal to

6,000

5

0

15

5

3

6,001-12,000

15

0

25

15

3

Fire-resistant tanks 0—12,000

25

25

50

25

3

Other tanks meeting the

requirements of NFPA 30

0—12,000

50

50

100

50

3

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

aSee 42.3.3.1.2 and 42.3.3.1.4.

bSee 42.3.3.1.5.

cIncluding the opposite side of a public way.

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

[30A: Table 4.3.2.4]

42.3.3.1.4

The maximum individual tank capacity of 12,000 gal (45,400 L), where indicated in Table 42.3.3.1.3, 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 gal (304,000 L). [30A:4.3.2.5]

42.3.3.1.5

At fleet vehicle motor fuel dispensing facilities, no minimum separation shall be required between the dispensing device and a tank in a vault, a protected aboveground tank, or a fire-resistant tank. [30A:4.3.2.6]

42.3.3.1.6

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

An inspection of the premises and operations has been made and approval has been granted by the AHJ.

The tank is safeguarded against collision, spillage, and overfill to the satisfaction of the AHJ.

The tank system is listed or approved for such aboveground use.

The tank complies with requirements for emergency relief venting, the tank and dispensing system meet the electrical classification requirements of NFPA 30A, and the tank complies with the provisions of 42.3.2.4.

The tank storage complies with Chapter 22 of NFPA 30.

[30A:4.3.2.7]

42.3.3.1.7 Spill Control

42.3.3.1.7.1

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

42.3.3.1.7.2

Tank fill connections shall be provided with a noncombustible spill containment device. [30A:4.3.2.8.2]

42.3.3.2 Vaults for Aboveground Tanks

42.3.3.2.1 Scope

Paragraph 42.3.3.2 shall apply to installation of aboveground tanks in vaults and design and installation of such vaults. [30A:4.3.3.1]

42.3.3.2.2 General

Aboveground tanks shall be permitted to be installed in vaults that meet the requirements of 42.3.3.2. Except as modified by the provisions of 42.3.3.2, vaults shall meet all other applicable provisions of NFPA 30A. Vaults shall be constructed and listed in accordance with UL 2245, Below-Grade Vaults for Flammable Liquid Storage Tanks. Vaults shall be permitted to be either above or below grade. [30A:4.3.3.2]

42.3.3.2.3 Construction and Installation of Storage Tank Vaults

42.3.3.2.3.1 Construction Requirements

42.3.3.2.3.1.1

The top of an abovegrade vault that contains a tank storing Class I liquid or Class II or Class III liquid stored at a temperature at or above its flash point shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault to ensure that the thrust of any explosion occurring inside the vault is directed upward before destructive internal pressure develops within the vault. [30A:4.3.3.3.1.1]

42.3.3.2.3.1.2

The top of an at-grade or belowgrade vault that contains a tank storing Class I liquid or Class II or Class III liquid stored at a temperature at or above its flash point shall be designed to relieve or contain the force of any explosion occurring inside the vault. [30A:4.3.3.3.1.2]

42.3.3.2.3.1.3

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

42.3.3.2.3.2 Installation Requirements

Storage tank vaults shall be installed in accordance with the requirements of 42.3.3.2.3.2.1 and 42.3.3.2.3.2.2. [30:25.5.2]

42.3.3.2.3.2.1

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

42.3.3.2.3.2.2

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

42.3.3.2.4 Storage Tank Selection and Arrangement

42.3.3.2.4.1

Tanks installed in storage tank vaults shall be listed for aboveground use. [30:25.3.1.4]

42.3.3.2.4.2

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

42.3.3.2.4.3

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

42.3.3.2.4.4

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

42.3.3.2.5 Tank Appurtenances

42.3.3.2.5.1

Vent pipes that are provided for normal tank venting shall terminate outside the vault and at least 12 ft (3.6 m) above ground level and shall meet the requirements of 66.27.7.1. [30A:4.3.3.5.1]

42.3.3.2.5.2

Emergency vents shall be vaportight and shall be permitted to discharge inside the vault. Long-bolt manhole covers shall not be permitted for this purpose. [30A:4.3.3.5.2]

42.3.3.2.5.3

An approved means of overfill protection shall be provided for tanks. The use of ball float valves shall be prohibited. [30A:4.3.3.5.3]

42.3.3.2.5.4

Fill connections for vaults installed inside buildings shall comply with 66.22.13.4. [30A:4.3.3.5.4]

42.3.3.2.6 Ventilation Systems for Storage Tank Vaults

42.3.3.2.6.1

Vaults that contain tanks storing Class I liquids [FP < 100°F (37.8°C)] shall be ventilated at a rate of not less than 1 cfm/ft2 of floor area (0.3 m3/min/m2), but not less than 150 cfm (4 m3/min). [30:25.10.1]

42.3.3.2.6.2

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

42.3.3.2.6.3

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

42.3.3.2.6.4

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

42.3.3.2.6.5

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

42.3.3.2.6.6

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

42.3.3.2.7 Detection and Alarm Systems for Storage Tank Vaults

42.3.3.2.7.1

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

42.3.3.2.7.2

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

42.3.3.2.7.3

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

42.3.3.2.7.4

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

42.3.3.2.7.5

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

42.3.3.2.7.6

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

42.3.3.2.8 Location of Storage Tank Vaults

In lieu of the separation distance requirements given in 66.22.4, separation distances between the vault and any of the following shall be permitted to be reduced to 0 ft (0 m), as measured from the outer perimeter of the vault wall:

Any property line that is or can be built upon

The near and far sides of a public way

The nearest important building on the same property

[30:25.4]

42.3.3.2.9 Inspection and Maintenance of Storage Tank Vaults and Equipment

Vaults and their required equipment shall be maintained in accordance with the requirements of Chapter 25 of NFPA 30. [30:25.16]

42.3.3.3 Additional Requirements for Fire-Resistant Aboveground Storage Tanks

42.3.3.3.1

Fire-resistant tanks shall be tested and listed in accordance with UL 2080, Fire Resistant Tanks for Flammable and Combustible Liquids. [30:22.9.1]

42.3.3.3.2

Fire-resistant tanks shall also meet both of the following requirements:

The construction that provides the required fire-resistive protection shall reduce the heat transferred to the primary tank in order to limit the temperature of the primary tank to an average maximum rise of 800°F (430°C) and a single point maximum rise of 1000°F (540°C) and to prevent release of liquid, failure of the primary tank, failure of the supporting structure, and impairment of venting for a period of not less than 2 hours when tested using the fire exposure specified in UL 2080.

Reduction in sizing of the emergency vents in accordance with 22.7.3.5 of NFPA 30 shall not be permitted.

[30:22.9.2]

42.3.3.4 Additional Requirements for Protected Aboveground Storage Tanks

42.3.3.4.1

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

42.3.3.4.2

Protected aboveground tanks shall also meet both of the following requirements:

The construction that provides the required fire-resistive protection shall reduce the heat transferred to the primary tank in order to limit the temperature of the primary tank to an average maximum rise of 260°F (144°C) and a single point maximum rise of 400°F (204°C) and to prevent release of ignitible (flammable or combustible) liquid, failure of the primary tank, failure of the supporting structure, and impairment of venting for a period of not less than 2 hours when tested using the fire exposure specified in UL 2085, Protected Aboveground Tanks for Flammable and Combustible Liquids.

Reduction in sizing of the emergency vents in accordance with 22.7.3.5 of NFPA 30 shall not be permitted.

[30:22.10.2]

42.3.3.5 Additional Requirements for All Aboveground Tanks

42.3.3.5.1

All openings shall be located above the maximum liquid level. [30A:4.3.6.1]

42.3.3.5.2

Means shall be provided for determining the liquid level in each tank, and this means shall be accessible to the delivery operator. [30A:4.3.6.2]

42.3.3.5.3

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. [30A:4.3.6.3]

42.3.3.5.4

Means shall be provided to prevent the release of liquid by siphon flow. [30A:4.3.6.4]

42.3.3.5.5

Shutoff and check valves shall be equipped with a pressure-relieving device that will relieve the pressure generated by thermal expansion back to the tank. [30A:4.3.6.5]

42.3.3.5.6

Fuel shall not be dispensed from the tank by either gravity flow or pressurization of the tank. [30A:4.3.6.6]

42.3.3.5.7

Storage tank appurtenances shall be installed and calibrated in accordance with the manufacturer's instructions, published industry practices, or equivalent methods approved by the AHJ. [30A:4.3.6.7]

42.3.3.6 Physical Protection for All Outside Aboveground Tanks

42.3.3.6.1 Security

42.3.3.6.1.1

Tanks that are not enclosed in vaults shall be enclosed by a perimeter property security fence or a separate chain link fence, at least 6 ft (1.8 m) high. [30A:4.3.7.1.1]

42.3.3.6.1.2

The perimeter property security or separate chain link fence shall be separated from the tanks by at least 10 ft (3 m). [30A:4.3.7.1.2]

42.3.3.6.1.3

Gates in perimeter property security fences shall be secured against unauthorized entry. [30A:4.3.7.1.3]

42.3.3.6.2\*

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:

They shall be constructed of steel not less than 4 in. (100 mm) in diameter and shall be filled with concrete.

They shall be spaced not more than 4 ft (1.2 m) on center.

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.

[30A:4.3.7.2]

42.3.3.7 Corrosion Protection

Any portion of a tank or its piping that is in contact with the soil shall have properly engineered, installed, and maintained corrosion protection that meets the requirements of 66.21.4.5. [30A:4.3.8]

42.3.3.8 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 42.3.3.8. [30A:4.3.9]

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

42.3.3.8.1.1

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 42.7.2.4.1. [30A:4.3.9.1.1]

42.3.3.8.1.2

Except as permitted under 42.3.3.8.1.3, 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 42.7.2.4.1. [30A:4.3.9.1.2]

42.3.3.8.1.3

Where there are no Class I liquids stored, the aggregate quantities of Class II liquids shall not exceed 240 gal (908L). [30A:4.3.9.1.3]

42.3.3.8.2 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 42.3.3.1 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 42.3.3.2 and if the installation is specifically approved by the AHJ. [30A:4.3.9.2]

42.3.3.8.3 Class IIIB Liquids

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

42.3.3.9 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:

Approval of the AHJ 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.

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

The tank shall comply with 42.3.3 and all other applicable provisions of NFPA 30A and NFPA 30.

A tank containing liquid shall not be moved unless it has been specifically investigated and approved for movement while full or partially full.

[30A:4.3.10]

42.4 Piping for Liquids

42.4.1 Scope

Section 42.4 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. [30A:5.1]

42.4.2 General Requirements for All Piping Systems

42.4.2.1

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

42.4.2.2

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. [30A:5.2.2]

42.4.2.3

Any portion of a piping system that is in contact with the soil shall be protected from corrosion in accordance with good engineering practice. [30A:5.2.3]

42.4.2.4

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. [30A:5.2.4]

42.4.2.5

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. [30A:5.2.5]

42.4.2.6

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. [30A:5.2.6]

42.4.2.7

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

Belowgrade underground tank sumps that are fitted with a cover

Belowgrade piping connection sumps that are fitted with a cover

Containment sumps, under the following conditions:

The sump is monitored to detect any leaks.

Any leaks can be controlled.

The components are either resistant to or shielded from damage by fire exposure.

Containment sumps, provided the piping components can successfully pass the test procedures described in API 607, Fire Test for Quarter-Turn Valves and Valves Equipped with Nonmetallic Seats

[30A:5.2.7]

42.5 Fuel Dispensing Systems

42.5.1 Scope

Section 42.5 shall apply to the system and components that dispense fuel into the tanks of motor vehicles and marine craft. [30A:6.1]

42.5.2 General Requirements

42.5.2.1

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

10 ft (3 m) or more from property lines

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

Such that all parts of the vehicle being served will be on the premises of the service station

Such that the nozzle, when the hose is fully extended, will not reach within 5 ft (1.5 m) of building openings

[30A:6.2.1]

42.5.2.2

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. [30A:6.2.2]

42.5.2.3

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

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

UL 87A, Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0-E85)

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

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

UL 842A, Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0-E85)

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

[30A:6.2.3]

42.5.3 Requirements for Dispensing Devices

42.5.3.1

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. [30A:6.3.1]

42.5.3.2

Dispensing devices for Class I and Class II liquids shall be listed. [30A:6.3.2]

42.5.3.2.1

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 AHJ. 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 AHJ upon request. [30A:6.3.2.1]

42.5.3.3

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. [30A:6.3.3]

42.5.3.4

Dispensing devices shall be mounted on a concrete island or shall otherwise be protected against collision damage by means acceptable to the AHJ. Dispensing devices shall be securely bolted in place. If located indoors, dispensing devices shall also be located in a position where they cannot be struck by a vehicle that is out of control descending a ramp or other slope. Dispensing devices shall be installed in accordance with the manufacturer's instructions. [30A:6.3.4]

42.5.3.5

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 motor fuels. [30A:6.3.5]

42.5.3.6 Inspections

42.5.3.6.1\* Exterior Inspection

A visual inspection of the fuel dispenser and its associated hanging hardware (hose nozzle valve, hose, breakaway valve, and hose swivel) shall be conducted at least weekly and shall be documented. Documentation shall be available for review by the AHJ upon request. [30A:6.3.6.1]

42.5.3.6.2\* Internal Dispenser Cabinet Inspection

An inspection of the fuel dispensing equipment that is located inside the dispenser cabinet shall be conducted. The interior of the fuel dispenser cabinet shall be inspected for signs of leaks, damage, corrosion, or weathering, with particular attention to the sump area and joints and castings of fluid handling components. The inspection shall be conducted at least monthly and shall be documented. Documentation shall be available for review by the AHJ upon request. [30A:6.3.6.2]

42.5.3.6.3 Maintenance

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

Only persons knowledgeable in performing the required maintenance shall perform the work.

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.

The emergency shutoff valve at the dispenser, if installed, shall be closed.

All vehicular traffic and unauthorized persons shall be prevented from coming within 20 ft (6 m) of the dispensing device.

[30A:6.3.6.3]

42.5.3.7

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. [30A:6.3.7]

42.5.3.8

At unattended self-serve motor fuel dispensing facilities, coin- and currency-type devices shall be permitted only with the approval of the AHJ. [30A:6.3.8]

42.5.3.9

Where liquid is supplied to the dispensing device under pressure, a listed, rigidly anchored, double-poppet type emergency shutoff valve incorporating a fusible link or other thermally actuated device, designed to close automatically in the event of severe impact or fire exposure, shall be installed in the supply line at the base of each individual island-type dispenser or at the inlet of each overhead dispensing device. [30A:6.3.9]

42.5.3.9.1

The emergency shutoff valve shall be installed in accordance with the manufacturer's instructions. [30A:6.3.9.1]

42.5.3.9.2

The emergency shutoff valve shall not incorporate a slip-joint feature. [30A:6.3.9.2]

42.5.3.9.3

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 AHJ within 24 hours of a verbal or written request. [30A:6.3.9.3]

42.5.3.10

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 vacuum-actuated shutoff valve with a shear section or equivalent-type valve listed and labeled in accordance with UL 842, Valves for Flammable Fluids, shall be installed directly under the dispensing device. [30A:6.3.10]

42.5.4 Requirements for Remote/Submersible Pumps

Subsection 42.5.4 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. [30A:6.4]

42.5.4.1

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. [30A:6.4.1]

42.5.4.2 Leak Detection

42.5.4.2.1

Where all discharge piping is not visible, each pump shall have installed on the discharge side a listed leak detection device that will provide an audible indication or a visible indication or that will restrict or shut off the flow of product if the piping or a dispenser is leaking. [30A:6.4.2.1]

42.5.4.2.2

Each leak-detecting device shall be checked and tested at least annually according to the manufacturers' specifications to ensure proper installation and operation. [30A:6.4.2.2]

42.5.4.3

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 42.5.3.4 or in sumps as provided in 42.5.4.4. Pumps shall be anchored and protected against physical damage. [30A:6.4.3]

42.5.4.4

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. [30A:6.4.4]

42.5.5 Requirements for Dispensing Hose

42.5.5.1

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. [30A:6.5.1]

42.5.5.2

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 and II liquids. Such devices shall be installed and maintained in accordance with the manufacturer's instructions. [30A:6.5.2]

42.5.5.3

Where hose 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. [30A:6.5.3]

42.5.6 Requirements for Fuel Delivery Nozzles

42.5.6.1

An automatic closing-type hose nozzle valve, with a latch-open device and listed and labeled in accordance with UL 842, Valves for Flammable Fluids, or UL 2586, Hose Nozzle Valves, shall be provided on island-type dispensing devices used to dispense Class I or Class II liquids. [30A:6.6.1]

42.5.6.1.1

Any modification of the dispensing nozzle shall be listed or approved by the manufacturer of the nozzle. [30A:6.6.1.1]

42.5.6.2\*

At any installation where an automatic closing-type dispensing nozzle is used, the nozzle valve shall include 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. [30A:6.6.2]

42.5.6.3 Automatic Closing Valve

42.5.6.3.1

Overhead-type dispensing devices shall be provided with a listed, automatic closing-type hose nozzle valve without a latch-open device. [30A:6.6.3.1]

42.5.6.3.2

A listed, automatic closing-type hose nozzle valve with a 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. [30A:6.6.3.2]

42.5.6.4

Dispensing nozzles used at marine motor fuel dispensing facilities shall be of the listed automatic closing-type hose nozzle valve without a latch-open device. [30A:6.6.4]

42.5.7 Emergency Electrical Disconnects

42.5.7.1

Fuel dispensing systems shall be provided with one or more clearly identified emergency shutoff devices or electrical disconnects. [30A:6.7.1]

42.5.7.2

Emergency shutoff devices or electrical disconnects shall be installed in approved locations, but not less than 20 ft (6 m) or more than 100 ft (30 m) from the fuel dispensing devices that they serve. [30A:6.7.2]

42.5.7.3

Emergency shutoff devices or electrical disconnects shall disconnect power to all dispensing devices not supplied by circuits that are identified to be intrinsically safe; 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. [30A:6.7.3]

42.5.7.4

Emergency shutoff devices or electrical disconnects shall mechanically or electrically isolate other fluid transfer systems serving the fuel dispensing area. [30A:6.7.4]

42.5.7.5

Intrinsically safe electrical equipment shall not be required to be disconnected by the emergency shutoff device or the electrical disconnect. [30A:6.7.5]

42.5.7.6

When more than one emergency shutoff device or electrical disconnect is provided, all devices shall be interconnected. [30A:6.7.6]

42.5.7.7

Resetting from an emergency shutoff condition shall require manual intervention. [30A:6.7.7]

42.5.7.8

The manner of resetting shall be approved. [30A:6.7.8]

42.5.7.9

At attended motor fuel dispensing facilities, the devices or disconnects shall be readily accessible to the attendant and labeled with an approved sign stating "EMERGENCY FUEL SHUTOFF" or equivalent language. [30A:6.7.9]

42.5.7.10 Unattended Motor Fuel Dispensing Facilities

42.5.7.10.1

At unattended motor fuel dispensing facilities, the devices or disconnects shall be readily accessible to patrons. [30A:6.7.10.1]

42.5.7.10.2

At least one additional device or disconnect shall be readily accessible to each group of dispensing devices on an individual island. [30A:6.7.10.2]

42.5.7.10.3

The device(s) or disconnect(s) shall be labeled with an approved sign stating "EMERGENCY FUEL SHUTOFF" or equivalent language. [30A:6.7.10.3]

42.5.8 Vapor Recovery Systems

42.5.8.1

Dispensing devices that incorporate vapor recovery shall be listed. [30A:6.8.1]

42.5.8.2

Hose nozzle valves used on vapor recovery systems shall be listed for the purpose. [30A:6.8.2]

42.5.8.3

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. [30A:6.8.3]

42.6 Building Construction Requirements

The construction of buildings and portions of buildings that are motor fuel dispensing facilities or repair garages shall comply with Chapter 30.

42.7 Operational Requirements

42.7.1 Scope

Section 42.7 applies to those requirements that relate to the operation of motor fuel dispensing facilities, fuel dispensing systems, repair garages, and repair areas. [30A:9.1]

42.7.2 Basic Requirements

42.7.2.1\* 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 AHJ 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. [30A:9.2.1]

42.7.2.2 Tank Filling and Bulk Delivery

42.7.2.2.1

Delivery operations shall meet all applicable requirements of NFPA 385 and the requirements of 42.7.2.2.2 through 42.7.2.2.6. [30A:9.2.2.1]

42.7.2.2.2

No separation shall be required between the delivery vehicle and the fill connection of an underground storage tank. [30A:9.2.2.2]

42.7.2.2.3

The delivery vehicle shall be separated from any aboveground tank in accordance with Table 42.7.2.2.3. [30A:9.2.2.3]

Table 42.7.2.2.3 Minimum Separation Distances Between Delivery Vehicles and Aboveground Tanks

Aboveground Tank Type

Separation Distance Between

Delivery Vehicle and

Aboveground Tank

(ft)

Protected aboveground tanks

0

Tanks in abovegrade vaults

(measured from vault wall)

0

Tanks filled by gravity

0

Fire-resistant tanks

15

Other tanks meeting the

requirements of NFPA 30

storing Class II or Class III liquids

15

Other tanks meeting the

requirements of NFPA 30

storing Class I liquids

25

[30A:Table 9.2.2.3]

42.7.2.2.3.1

Separation distances shall be imposed by the use of curbing, guard posts, or other approved methods. [30A:9.2.2.3.1]

42.7.2.2.3.2\*

Means shall be provided to prevent an accidental release originating from the delivery vehicle from flowing under the aboveground tank. [30A:9.2.2.3.2]

42.7.2.2.4 Delivery Vehicle Location

42.7.2.2.4.1

The delivery vehicle shall be located so that all parts of the vehicle are on the premises when delivery is made. [30A:9.2.2.4.1]

42.7.2.2.4.2

Where fuel dispensing facilities are located inside buildings, the fuel delivery vehicle shall be permitted to be located off premises at approved locations. [30A:9.2.2.4.2]

42.7.2.2.4.3

Existing fuel dispensing facilities shall not be required to meet 42.7.2.2.4.1. [30A:9.2.2.4.3]

42.7.2.2.5

Tank filling shall not begin until the delivery operator has determined that the tank has sufficient available capacity (i.e., ullage). [30A:9.2.2.5]

42.7.2.2.6

Tanks shall be filled through a liquidtight connection. [30A:9.2.2.6]

42.7.2.2.6.1

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. [30A:9.2.2.6.1]

42.7.2.2.6.2

Underground tanks and tanks in belowgrade vaults shall be filled through a liquidtight connection within a spill container. [30A:9.2.2.6.2]

42.7.2.3 Dispensing Into Containers

42.7.2.3.1\*

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 AHJ, 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. [30A:9.2.3.1]

42.7.2.3.2

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. [30A:9.2.3.2]

42.7.2.3.3

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. [30A:9.2.3.3]

42.7.2.4 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 42.7.2.4.1 and 42.7.2.4.2. (See 42.3.3.8 for storage quantity limitations.) [30A:9.2.4]

42.7.2.4.1

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 42.3.3.8.2. The number of tanks or containers of Class IIIB liquids fitted for dispensing at any one time shall not be limited. [30A:9.2.4.1]

42.7.2.4.2

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. [30A:9.2.4.2]

42.7.2.5\* Display of Materials

The storage or placement for display or sale of products shall be prohibited within 20 ft of any fuel dispenser. [30A:9.2.5.5]

42.7.2.6 Basic Fire Control

42.7.2.6.1 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 and Class II 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. [30A:9.2.5.1]

42.7.2.6.2\* Fire Extinguishers

42.7.2.6.2.1

Portable fire extinguishers shall be selected, installed, inspected, and maintained in accordance with Section 13.6 and 42.7.2.6.2.2 through 42.7.2.6.2.8. [30A:9.2.5.2.1]

42.7.2.6.2.2

All portable fire extinguishers installed to achieve compliance with this Code shall be a minimum of 10 lb (4.54 kg) ABC dry chemical having an agent discharge rate of 1 lb/sec (0.45 kg/sec) or greater. [30A:9.2.5.2.2]

42.7.2.6.2.3

The maximum travel distance from a minimum 20 lb (9.1 kg) ABC dry chemical extinguisher having an agent discharge rate of 1 lb/sec (0.45 kg/sec) or greater shall be permitted to be 100 ft (30.5 m). [30A:9.2.5.2.3]

42.7.2.6.2.4 New Fire Extinguishers

Newly installed fire extinguishers, including replacements or exchanges, shall meet the requirements of 42.7.2.6.2. [30A:9.2.5.2.4]

42.7.2.6.2.5 Repair Garages

42.7.2.6.2.5.1

At least one portable fire extinguisher shall be provided in any repair garage. [30A:9.2.5.2.5.1]

42.7.2.6.2.5.2

The maximum travel distance from any point in the vehicle service area to a portable fire extinguisher shall not exceed 50 ft (15 m). [30A:9.2.5.2.5.2]

42.7.2.6.2.6 Indoor Liquid Motor Fuel Dispensing Areas

42.7.2.6.2.6.1

At least one portable fire extinguisher shall be provided at a position no less than 15 ft (4.6 m) but no more than 50 ft (15 m) from the fuel dispenser and within the identified path of egress from the fuel dispensing area. [30A:9.2.5.2.6.1]

42.7.2.6.2.6.2

An additional compliant extinguisher shall be provided within the egress path in cases where the travel distance and the egress requirements cannot be simultaneously met. [30A:9.2.5.2.6.2]

42.7.2.6.2.7 Outdoor Liquid Motor Fuel Dispensing Areas

At least one portable fire extinguisher shall be provided at all fuel dispensing islands, or group of islands, so as not to exceed a maximum travel distance of 75 ft (23 m) to any single portable fire extinguisher. [30A:9.2.5.2.7]

42.7.2.6.2.8 Gaseous Fuel Dispensing Areas

At least one portable fire extinguisher shall be provided for each gaseous fuel dispenser or group of dispensers so as not to exceed a maximum travel distance of 50 ft (15 m) but not less than 15 ft (4.6 m) to any single portable fire extinguisher. [30A:9.2.5.2.8]

42.7.2.6.3 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. [30A:9.2.5.3]

42.7.2.6.4\* 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.

Discharge your static electricity before fueling by touching a metal surface away from the nozzle.

Do not re-enter your vehicle while gasoline is pumping.

If a fire starts, do not remove nozzle — back away immediately.

Do not allow individuals under licensed age to use the pump.

[30A:9.2.5.4]

42.7.2.7 Waste Handling

42.7.2.7.1

Crankcase drainings and waste liquids shall not be dumped into sewers, into streams, or on the ground. [30A:9.2.6.1]

42.7.2.7.2

Crankcase drainings and waste liquids shall be stored in approved tanks or containers outside any building, or in tanks installed in accordance with Chapters 4 and 5 of NFPA 30A until they can be removed from the premises. [30A:9.2.6.2]

42.7.2.7.3

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. [30A:9.2.6.3]

42.7.2.8 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. [30A:9.2.7]

42.7.2.9 Fire Doors

Fire doors shall be kept unobstructed at all times. Appropriate signs and markings shall be used. [30A:9.2.8]

42.7.2.10 Maintenance of Aboveground Storage Tank Appurtenances

Storage tank appurtenances shall be maintained and operated in accordance with manufacturer's instructions, published industry practices, or equivalent methods approved by the AHJ. [30A:9.2.9]

42.7.3 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 42.7.4 and 42.7.5. [30A:9.3]

42.7.4 Operating Requirements for Attended Self-Service Motor Fuel Dispensing Facilities

42.7.4.1

"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. [30A:9.4.1]

42.7.4.2

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 motor fuels. [30A:9.4.2]

42.7.4.3

The responsibility of the attendant shall be as follows:

Prevent the dispensing of Class I liquids into portable containers not in compliance with 42.7.2.3.1

Prevent the use of hose nozzle valve latch-open devices that do not comply with 42.5.6.1

Control sources of ignition

Immediately activate emergency controls and notify the fire department of any fire or other emergency

Handle accidental spills and fire extinguishers if needed

[30A:9.4.3]

42.7.4.3.1

The attendant or supervisor on duty shall be mentally and physically capable of performing the functions and assuming the responsibility prescribed in 42.7.4. [30A:9.4.3.1]

42.7.4.4

Operating instructions shall be conspicuously posted in the dispensing area. [30A:9.4.4]

42.7.5 Operating Requirements for Unattended Self-Service Motor Fuel Dispensing Facilities

42.7.5.1

Unattended self-service facilities shall be permitted, where approved by the AHJ. [30A:9.5.1]

42.7.5.2

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. [30A:9.5.2]

42.7.5.3

In addition to the warning signs specified in 42.7.2.6.4, 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).

Report location.

[30A:9.5.3]

42.7.5.4

A listed, automatic closing-type hose nozzle valve with latch-open device shall be provided. The hose nozzle valve shall meet the requirements of 42.5.6.2. [30A:9.5.4]

42.7.5.5

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 AHJ. [30A:9.5.5]

42.7.5.6\*

Additional fire protection shall be provided where required by the AHJ. [30A:9.5.6]

42.7.6 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 42.7.6.1 through 42.7.6.9 have been met. [30A:9.6]

42.7.6.1

An inspection of the premises and operations shall be made and operations shall not be conducted unless approved by the AHJ. [30A:9.6.1]

42.7.6.2

The tank vehicle shall comply with the requirements of NFPA 385. [30A:9.6.2]

42.7.6.3

The dispensing hose shall not exceed 50 ft (15 m) in length. [30A:9.6.3]

42.7.6.4

The dispensing nozzle shall be a listed, automatic closing-type without a latch-open device. [30A:9.6.4]

42.7.6.5

Nighttime deliveries shall only be made in areas deemed adequately lighted by the AHJ. [30A:9.6.5]

42.7.6.6

The tank vehicle flasher lights shall be in operation while dispensing operations are in progress. [30A:9.6.6]

42.7.6.7

Expansion space shall be left in each fuel tank to prevent overflow in the event of temperature increase. [30A:9.6.7]

42.7.6.8

A means for bonding the tank vehicle to the motor vehicle shall be provided. Such bonding means shall be employed during fueling operations. [30A:9.6.8]

42.7.6.9

A spill kit designed for motor vehicle fuels shall be carried on the tank vehicle and employed in case of a fuel spill. [30A:9.6.9]

42.7.7 LNG Vehicle Fueling System Monitoring and Management

42.7.7.1\*

Repairs to LNG vehicles lasting 8 hours or more shall require pressure monitoring and management of the LNG tank. [30A:9.8.1]

42.8 Additional Requirements for CNG, LNG, Hydrogen, and LP-Gas

42.8.1 Scope

Section 42.8 shall apply where CNG, LNG, compressed or liquefied hydrogen, LP-Gas, 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. [30A:12.1]

42.8.2 General Requirements

42.8.2.1

The installation and use of CNG and LNG systems shall meet the requirements of NFPA 52, except as modified by Section 42.8. The installation and use of hydrogen systems shall meet the requirements of NFPA 2, except as modified by Section 42.8. The installation and use of LP-Gas systems shall meet the requirements of NFPA 58, except as modified by Section 42.8. [30A:12.2.1]

42.8.2.2

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. [30A:12.2.2]

42.8.2.3\*

Dispensing devices for CNG, LNG, hydrogen, and LP-Gas shall be listed or approved. [30A:12.2.3]

42.8.2.4\*

Listed or approved hose assemblies shall be used to dispense fuel. Hose length at automotive motor fuel dispensing facilities shall not exceed 18 ft (5.5 m). [30A:12.2.4]

42.8.3 Fuel Storage

42.8.3.1

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 8.4 of NFPA 52. [30A:12.3.1]

42.8.3.2

Aboveground tanks storing hydrogen 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 NFPA 2. [30A:12.3.2]

42.8.3.3

Aboveground tanks storing LP-Gas 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 6.4 of NFPA 58. [30A:12.3.3]

42.8.3.4\*

Aboveground tanks storing CNG, LNG, or LP-Gas 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 20 ft (6 m). [30A:12.3.4]

42.8.3.4.1

Dispensers and aboveground tanks storing CNG, LNG, or LP-Gas shall not require separation if handling fuels of the same chemical composition. [30A:12.3.4.1]

42.8.3.4.2

Where dispensers and aboveground tanks storing CNG, LNG, or LP-Gas are at least 50 ft (15 m) from any other aboveground motor fuel storage or dispensing equipment, the requirements of NFPA 52 or NFPA 58 shall apply. [30A:12.3.4.2]

42.8.3.5

Aboveground storage tanks for the storage of CNG, LNG, or LP-Gas shall be provided with physical protection in accordance with 42.3.3.6. [30A:12.3.5]

42.8.3.6

Horizontal separation shall not be required between aboveground tanks storing CNG, LNG, or LP-Gas and underground tanks containing Class I or Class II liquids, provided the structural limitations of the underground tanks are not exceeded. [30A:12.3.6]

42.8.4 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 ignitible vapors or all electrical equipment installed beneath the canopy or enclosure shall be suitable for Class I, Division 2 hazardous (classified) locations. [30A:12.4]

42.8.5 Specific Requirements for LP-Gas Dispensing Devices

42.8.5.1

Dispensing devices for LP-Gas shall meet all applicable requirements of Chapter 69 and NFPA 58. [30A:12.5.1]

42.8.5.2

Dispensing devices for LP-Gas shall be located as follows:

At least 10 ft (3 m) from any dispensing device for Class I liquids

At least 5 ft (1.5 m) from any dispensing device for Class I liquids where the following conditions exist:

The LP-Gas deliver nozzle and filler valve release no more than 0.1 oz (4 cm3) of liquid upon disconnection.

The fixed maximum liquid level gauge remains closed during the entire refueling process.

[30A:12.5.2]

42.8.6 Electrical Equipment

42.8.6.1

All electrical wiring and electrical utilization equipment shall be of a type specified by, and shall be installed in accordance with, Section 11.1. [30A:12.6.1]

42.8.6.2\*

Table 42.8.6.2 shall be used to delineate and classify areas for the purpose of installation of electrical wiring and electrical utilization equipment. [30A:12.6.2]

Table 42.8.6.2 Electrical Equipment Classified Areas for Dispensing Devices

Dispensing Device

Extent of Classified Area

Class I,

Division 1

Class I,

Division 2

Compressed natural gas (CNG) Entire space within the dispenser enclosure 5 ft (1.5 m) in all directions from dispenser

enclosure

Liquefied natural gas (LNG) Entire space within the dispenser enclosure 10 ft (3 m) in all directions from the

dispenser enclosure

Liquefied petroleum gas (LP-Gas) Entire space within the dispenser enclosure;

18 in. (46 cm) from the exterior surface of the

dispenser enclosure to an elevation of 4 ft

(1.22 m) above the base of the dispenser; the

entire pit or open space beneath the dispenser

and within 20 ft (6 m) horizontally from any

edge of the dispenser when the pit or trench is

not mechanically ventilated

Up to 18 in. (46 cm) above ground and

within 20 ft (6 m) horizontally from any

edge of the dispenser enclosure,

including pits or trenches within this

area when provided with adequate

mechanical ventilation

[30A: Table 12.6.2]

42.9 Marine Fueling

42.9.1 Scope

42.9.1.1

Section 42.9 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 NFPA 30A or in other NFPA standards. [30A:11.1.1]

42.9.1.2

Section 42.9 shall not apply to the following:

Bulk plant or terminal loading and unloading facilities

Transfer of liquids utilizing a flange-to-flange closed transfer piping system

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

[30A:11.1.2]

42.9.1.3

For the purpose of Section 42.9, the word pier shall also mean dock, floating dock, and wharf. [30A:11.1.3]

42.9.2 Storage

42.9.2.1

Liquids shall be stored in tanks or containers complying with 42.3.3. [30A:11.2.1]

42.9.2.2\*

Tanks that supply marine motor fuel dispensing facilities shall be located on shore or on a pier of the solid-fill type. [30A:11.2.2]

42.9.2.3

Pumps that are not integral with the dispensing device shall also be located on shore or on a pier of the solidfill type. [30A:11.2.3]

42.9.2.4

Where tanks are located on a pier not of the solid-fill type, tanks shall be permitted with AHJ approval, provided the tank does not exceed 1100 gal (4164 L) aggregate capacity and meets Chapters 4 and 5 of NFPA 30. [30A:11.2.4]

42.9.2.5 Tanks at Elevation

42.9.2.5.1

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. [30A:11.2.5.1]

42.9.2.5.2

This device shall be located adjacent to and downstream of the outlet valve specified by 66.22.13.1. [30A:11.2.5.2]

42.9.2.5.3

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. [30A:11.2.5.3]

42.9.3 Piping Systems

42.9.3.1

Piping shall be installed in accordance with all applicable requirements of Chapter 5 of NFPA 30A. [30A:11.3.1]

42.9.3.2

Piping systems shall be supported and protected against physical damage and stresses arising from impact, settlement, vibration, expansion, contraction, and tidal action. [30A:11.3.2]

42.9.3.3

Means shall be provided to ensure flexibility of the piping system in the event of motion of the pier. Flexible piping shall be of a type designed to withstand the forces and pressures exerted upon the piping. [30A:11.3.3]

42.9.3.4

Where dispensing is from a floating structure or pier, approved 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. [30A:11.3.4]

42.9.3.5

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. [30A:11.3.5]

42.9.3.6

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. [30A:11.3.6]

42.9.4 Fuel Dispensing System

42.9.4.1

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. [30A:11.4.1]

42.9.4.1.1

Where hoses are attached to a hose-retrieving mechanism in a marine motor fuel dispensing facility, a listed emergency breakaway device shall not be required between the point of attachment of the hose-retrieving mechanism to the hose and the hose nozzle valve. [30A:11.4.1.1]

42.9.4.2

Dispensing nozzles shall be of the automatic-closing type without a latch-open device. [30A:11.4.2]

42.9.4.3

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. [30A:11.4.3]

42.9.4.4

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. [30A:11.4.4]

42.9.4.5

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. [30A:11.4.5]

42.9.4.6

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. [30A:11.4.6]

42.9.4.7

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. [30A:11.4.7]

42.9.5 Sources of Ignition

42.9.5.1

All electrical components for dispensing liquids shall be installed in accordance with Chapter 8 of NFPA 30A. [30A:11.5.1]

42.9.5.2

All electrical equipment shall be installed and used in accordance with the requirements of Section 11.1 as it applies to wet, damp, and hazardous locations. [30A:11.5.2]

42.9.5.3

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. [30A:11.5.3]

42.9.5.4\*

All electrical wiring for power and lighting shall be installed on the side of the wharf opposite from the liquid piping system. [30A:11.5.4]

42.9.5.5

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. [30A:11.5.5]

42.9.5.6

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. [30A:11.5.6]

42.9.6 Electrical Installations

42.9.6.1

Where excessive stray currents are encountered, piping handling Class I and Class II liquids shall be electrically isolated from the shore piping. [30A:8.5.1]

42.9.6.2\*

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. [30A:8.5.2]

42.9.6.3

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 the possibility of electrostatic discharge. [30A:8.5.3]

42.9.6.4\* Bonding and Grounding

42.9.6.4.1\*

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. [30A:11.6.1]

42.9.6.4.2

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. [30A:11.6.2]

42.9.7 Fire Control

42.9.7.1

Each marine motor fuel dispensing facility shall be provided with fire extinguishers installed, inspected, and maintained as required by Section 13.6. Extinguishers for marine motor fuel dispensing areas shall be provided according to the extra (high) hazard requirements for Class B hazards, except that the maximum travel distance to an 80 B:C extinguisher shall be permitted to be 100 ft (31 m). [30A:11.7.1]

42.9.7.2

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 Section 13.2. [30A:11.7.2]

42.9.7.3

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. [30A:11.7.3]

42.9.8 Containers and Movable Tanks

42.9.8.1

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 AHJ. [30A:11.8.1]

42.9.8.2\*

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 AHJ, has a tight closure, and is fitted with a spout or is so designed that the contents can be dispensed without spilling. [30A:11.8.2]

42.9.8.3

Portable containers of 12 gal (45 L) capacity or less shall not be filled while they are in or on a marine craft. [30A:11.8.3]

42.9.9 Cargo Tank Fueling Facilities

The provisions of 42.9.2 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 those establishments' businesses if the requirements of 42.9.9.1 through 42.9.9.7 are met. [30A:11.9]

42.9.9.1

An inspection of the premises and operations shall be made and approval granted by the AHJ. [30A:11.9.1]

42.9.9.2

The tank vehicle shall comply with the requirements of NFPA 385. [30A:11.9.2]

42.9.9.3

The dispensing hose shall not exceed 50 ft (15 m) in length. [30A:11.9.3]

42.9.9.4

The dispensing nozzle shall be a listed, automatic-closing type without a latch-open device. [30A:11.9.4]

42.9.9.5

Nighttime deliveries shall only be made in areas deemed adequately lighted by the AHJ. [30A:11.9.5]

42.9.9.6

The tank vehicle flasher lights shall be in operation while dispensing. [30A:11.9.6]

42.9.9.7

Fuel expansion space shall be left in each fuel tank to prevent overflow in the event of temperature increase. [30A:11.9.7]

42.9.10 Operating Requirements

42.9.10.1

The following shall be the responsibilities of the attendant:

Prevent the dispensing of Class I liquids into portable containers that do not comply with 42.9.8.2

Be familiar with the dispensing system and emergency shutoff controls

Ensure that the vessel is properly moored and that all connections are made

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

[30A:11.10.1]

42.9.10.2

Fueling shall not be undertaken at night except under well-lighted conditions. [30A:11.10.2]

42.9.10.3

During fueling operations, smoking shall be forbidden on board the vessel or marine craft and in the dispensing area. [30A:11.10.3]

42.9.10.4

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

All engines, motors, fans, and bilge blowers shall be shut down.

All open flames and smoking material shall be extinguished and all exposed heating elements shall be turned off.

Galley stoves shall be extinguished.

All ports, windows, doors, and hatches shall be closed.

[30A:11.10.4]

42.9.10.5

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

The fill cap shall be tightly secured.

Any spillage shall be wiped up immediately.

If Class I liquid has been delivered, the entire vessel or marine craft shall remain open.

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.

[30A:11.10.5]

42.9.10.6

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 away from the vessel. [30A:11.10.6]

42.9.10.7

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

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.

All fuel systems are designed, installed, and maintained in compliance with the specifications of the manufacturer of the vessel or marine craft.

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.

The electrical bonding and grounding systems of the vessel or craft have been maintained in accordance with the manufacturer's specifications.

[30A:11.10.7]

42.9.10.8

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.

[30A:11.10.8]

42.10 Aircraft Fuel Servicing

42.10.1 Application

Section 42.10 applies to the fuel servicing of all types of aircraft using liquid petroleum fuel in accordance with NFPA 407.

42.10.1.1

Section 42.10 does not apply to any of the following:

In-flight fueling

Fuel servicing of flying boats or amphibious aircraft on water

Draining or filling of aircraft fuel tanks incidental to aircraft fuel system maintenance operations or manufacturing

[407:1.1.1]

42.10.2 General Requirements

42.10.2.1 Design and Construction

42.10.2.1.1 General Requirements

42.10.2.1.1.1

The requirements of 42.10.2 shall apply to all aviation fueling facilities, aircraft fueling vehicles, rooftop heliport fueling facilities, and self-service aviation fueling facilities. [407:4.1.1.1]

42.10.2.1.1.2

Aviation fueling facilities shall also comply with the requirements of 42.10.3. [407:4.1.1.2]

42.10.2.1.1.3

Aircraft fueling vehicles and carts shall also comply with the requirements of 42.10.4. [407:4.1.1.3]

42.10.2.1.1.4

Rooftop heliport fueling facilities shall also comply with the requirements of 42.10.3 and 42.10.5. [407:4.1.1.4]

42.10.2.1.1.5

Self-service aviation fueling facilities shall also comply with the requirements of 42.10.3 and 42.10.6. [407:4.1.1.5]

42.10.2.1.2 Fuel Storage Tanks. (Reserved)

42.10.2.1.3 Fuel Dispensing Systems

42.10.2.1.3.1

Any valve that controls the flow of fuel into or from an aircraft fuel servicing vehicle or cart, or into or from an aircraft shall have a deadman control(s). [407:4.1.3.1]

42.10.2.1.3.2

The deadman flow control in the nozzle shall be permitted for overwing fueling. [407:4.1.3.2]

42.10.2.1.3.3

Notches or latches in the handle of an overwing nozzle that could allow the valve to be locked open shall be prohibited. [407:4.1.3.3]

42.10.2.1.3.4

Nozzles for underwing fueling shall be designed to be attached securely to the aircraft adapter before the nozzle can be opened. [407:4.1.3.4]

42.10.2.1.3.5

Disengaging the nozzle from the aircraft adapter shall not be possible until the nozzle is fully closed. [407:4.1.3.5]

42.10.2.1.3.6

Fuel servicing pump mechanisms shall be designed and arranged so that failure or seizure does not cause rupture of the pump housing, of a tank, or of any component containing fuel. [407:4.1.3.6]

42.10.2.1.3.7

Fuel pressure shall be controlled within the stress limits of the hose and plumbing by means of either an inline pressure controller or, a system pressure relief valve, or other suitable means. [407:4.1.3.7]

42.10.2.1.3.8

The working pressure of any system component shall equal or exceed any pressure to which it could be subjected. [407:4.1.3.8]

42.10.2.1.4\* Fueling Hose

42.10.2.1.4.1 Performance Requirements

Hose and couplings shall comply with the requirements of EI 1529. [407:4.1.4.1]

42.10.2.1.4.2 Fueling Hose Apparatus

Nozzle receptacles and hose storage shall be arranged to avoid kinks and maintain the hose bend radius within the requirements of EI 1529 and EI 1540. [407:4.1.4.2]

42.10.2.1.4.3 Additional Requirements

42.10.2.1.4.3.1

Each coupled length of hose shall be tested at the same minimum proof pressure rating for that grade of hose as defined in EI 1529. [407:4.1.4.3.1]

42.10.2.1.4.3.2

A test certificate shall be provided for each coupled length of hose and shall state the following:

Manufacturer's name of hose

Manufacturer's name of couplings

Hose type

Hose grade

Size and length of hose

Serial number or reference number of hose

Quarter and year of manufacture of hose

Model number of couplings

Sizes of coupling ferrules

Hydrostatic test pressures

Coupled length serial number

Identification of individual responsible for coupling the hose

Name and address of company responsible for coupling the hose

Date of certification

[407:4.1.4.3.2]

42.10.2.1.4.3.3

The coupling tests as specified in EI 1529 shall be performed for each hose grade, type, and manufacturer. [407:4.1.4.3.3]

42.10.2.1.4.3.4

Each coupling of a coupled length of hose shall be permanently marked with a serial number corresponding to its hydrostatic test certificate. [407:4.1.4.3.4]

42.10.2.1.4.3.5

The hose at the end of each coupling ferrule shall be permanently marked prior to hydrostatic testing to serve as a reference to determine whether a coupling has slip ped during testing or while in service. [407:4.1.4.3.5]

42.10.2.1.4.3.6

Lengths of hose shall not be spliced together. [407:4.1.4.3.6]

42.10.2.1.4.3.7 Hydrostatic Testing

Hydrostatic testing shall be in accordance with ASTM D380. [407:4.1.4.3.7]

42.10.2.1.4.3.7.1

Following a hydrostatic test, all the water shall be drained and the hose shall be dried internally. [407:4.1.4.3.7.1]

42.10.2.1.4.3.7.2

Following a hydrostatic test, the open ends of the hose, including the threads of the couplings, shall be suitably covered to protect the threads and to prevent contamination. [407:4.1.4.3.7.2]

42.10.2.1.4.3.7.3

A hose that is recoupled for any reason shall be hydrostatically tested and recertified to the same criteria as a newly coupled hose. [407:4.1.4.3.7.3]

42.10.2.1.4.3.8

Hose shall be connected to rigid piping or coupled to a hose reel in a manner that prevents kinks or undue bending action or mechanical stress on the hose or hose couplings. [407:4.1.4.3.8]

42.10.2.1.5 Electrostatic Hazards and Bonding

42.10.2.1.5.1

A provision for bonding shall be incorporated in the design of fuel servicing vehicles or carts and airport fueling systems to prevent differences in electrostatic potential. [407:4.1.5.1]

42.10.2.1.5.2

The maximum resistance between the bonding cable clip and the fueling system framework shall not exceed 25 ohms. [407:4.1.5.2]

42.10.2.1.5.3

Bonding cables shall be constructed of conductive, durable, and flexible material. [407:4.1.5.3]

42.10.2.1.5.4

Bonding connections shall be electrically and mechanically firm. [407:4.1.5.4]

42.10.2.1.5.5

Jacks, plugs, clamps, and connecting points shall be clean, unpainted metal to provide a positive electrical connection. [407:4.1.5.5]

42.10.2.1.5.6

EI 1529 Type C hose (semiconductive) shall be used to prevent electrostatic discharges but shall not be used to accomplish required bonding. [407:4.1.5.6]

42.10.2.1.5.7

EI 1529 Type A hose that does not have a semiconductive cover shall not be used. [407:4.1.5.7]

42.10.2.1.5.8

EI 1529 Type F hose (hard wall) and EI 1529 Type CT hose (cold temperature) shall be permitted because they have semiconductive covers. [407:4.1.5.8]

42.10.2.1.5.9\*

The design of airport fueling systems shall incorporate the provision of a 30-second relaxation period following the filter separator, monitors, or other filtration devices discharging into tanks. [407:4.1.5.9]

42.10.2.1.5.9.1

The relaxation period required by 42.10.2.1.5.9 shall not apply to the actual refueling of an aircraft. [407:4.1.5.9.1]

42.10.2.1.5.9.2

The relaxation period required by 42.10.2.1.5.9 shall not apply to fuels with static dissipater additives. [407:4.1.5.9.2]

42.10.2.1.6 Electrical Systems. (Reserved)

42.10.2.1.7 Control of Fuel Flow. (Reserved)

42.10.2.1.8 Filters and Ancillary Equipment

42.10.2.1.8.1

Filter vessels used in aviation fuel service shall have a functional automatic air vent (AAV) or automatic air eliminator (AAE). [407:4.1.8.1]

42.10.2.1.8.2

The AAV or AAE shall discharge to a closed system. [407:4.1.8.2]

42.10.2.1.9 Emergency Fuel Shutoff Systems. (Reserved)

42.10.2.1.10 Fire Extinguishers

42.10.2.1.10.1\*

During fueling operations, fire extinguishers shall be available on aircraft servicing ramps or aprons, in accordance with NFPA 410. [407:4.1.10.1]

42.10.2.1.10.2

All fire extinguishers shall conform to the requirements of NFPA 10. [407:4.1.10.2]

42.10.2.1.10.3\*

ABC multipurpose dry chemical fire extinguishers (ammonium phosphate) shall not be placed on aircraft fueling vehicles, airport fuel servicing ramps or aprons, or at airport fuel facilities that are located within 150 m (500 ft) of aircraft operating areas. [407:4.1.10.3]

42.10.2.1.11 Marking and Labeling

42.10.2.1.11.1

Each emergency fuel shutoff station location shall be placarded EMERGENCY FUEL SHUTOFF in letters at least 50 mm (2 in.) high. [407:4.1.11.1]

42.10.2.1.11.2

The method of operation shall be indicated by an arrow or by the word PUSH or PULL, as appropriate. [407:4.1.11.2]

42.10.2.1.11.3

Any action necessary to gain access to the shutoff device (e.g., BREAK GLASS) shall be shown clearly. [407:4.1.11.3]

42.10.2.1.11.4

Lettering shall be of a color contrasting sharply with the placard background for visibility. [407:4.1.11.4]

42.10.2.1.11.5

Placards shall be weather resistant. [407:4.1.11.5]

42.10.2.1.12 Aircraft Fueling Ramps

42.10.2.1.12.1 Aircraft Radar Equipment

42.10.2.1.12.1.1

Surveillance radar equipment in aircraft shall not be operated within 90 m (300 ft) of any fueling, servicing, or other operation in which flammable liquids, vapors, or mist could be present. [407:4.1.12.1.1]

42.10.2.1.12.1.2

Weather-mapping radar equipment in aircraft shall not be operated while the aircraft in which it is mounted is undergoing fuel servicing. [407:4.1.12.1.2]

42.10.2.1.12.2\* Ground Radar Equipment

42.10.2.1.12.2.1

Antennas of airport flight traffic surveillance radar equipment shall be located so that the beam will not be directed toward any fuel storage or loading racks within 90 m (300 ft). [407:4.1.12.2.1]

42.10.2.1.12.2.2

Aircraft fuel servicing shall not be conducted within the 90 m (300 ft) distance established by 42.10.2.1.12.2.1. [407:4.1.12.2.2]

42.10.2.1.12.2.3

Antennas of airport ground traffic surveillance radar equipment shall be located so that the beam will not be directed toward any fuel storage or loading racks within 30 m (100 ft). [407:4.1.12.2.3]

42.10.2.1.12.2.4

Aircraft fuel servicing or any other operations involving flammable liquids or vapors shall not be conducted within 30 m (100 ft) of antennas of airport ground traffic surveillance radar equipment. [407:4.1.12.2.4]

42.10.2.1.12.3 Emergency Fire Equipment Accessibility

Accessibility to aircraft by emergency fire equipment shall be considered in establishing aircraft fuel servicing positions. [407:4.1.12.3]

42.10.2.1.12.4 Ramp and Apron Drainage

Aircraft servicing ramps or aprons shall be sloped and drained in accordance with NFPA 415. [407:4.1.12.4]

42.10.2.1.12.4.1

The ramp or apron shall slope away from the rim or edge of fueling hydrants or fueling pits to prevent flooding. [407:4.1.12.4.1]

42.10.2.1.12.4.2

Fueling hydrant boxes or fueling pits that are connected to a ramp drainage system shall be fitted with vaporsealing traps. [407:4.1.12.4.2]

42.10.2.2 Operations

42.10.2.2.1 Security. (Reserved)

42.10.2.2.2 Training

42.10.2.2.2.1\*

Only personnel trained in the safe operation of the equipment and the fuels they use, the operation of emergency controls, and the procedures to be followed in an emergency shall be permitted to handle fuel. [407:4.2.2.1]

42.10.2.2.2.2\*

Fuel servicing personnel shall be trained in the use of the available fire-extinguishing equipment they could be expected to use. [407:4.2.2.2]

42.10.2.2.3\* Prevention and Control of Spills

42.10.2.2.3.1

Following fueling of an aircraft or fuel servicing vehicle, all hoses shall be removed, including those from hydrant systems if applicable. [407:4.2.3.1]

42.10.2.2.3.2

All hoses shall also be properly stowed. [407:4.2.3.2]

42.10.2.2.3.3

Fuel nozzles shall not be dragged along the ground. [407:4.2.3.3]

42.10.2.2.3.4

Approved pumps, either hand operated or power operated, shall be used where aircraft are fueled from drums. [407:4.2.3.4]

42.10.2.2.3.4.1

Pouring or gravity flow shall not be permitted from a container with a capacity of more than 19 L (5 gal). [407:4.2.3.4.1]

42.10.2.2.3.5 Fuel Spill Procedures

42.10.2.2.3.5.1

Where a spill is observed, the fuel servicing shall be stopped immediately by release of the deadman controls. [407:4.2.3.5.1]

42.10.2.2.3.5.2

In the event that a spill continues, the equipment emergency fuel shutoff shall be actuated. [407:4.2.3.5.2]

42.10.2.2.3.5.3

In the event that a spill continues from a hydrant system, the system emergency fuel shutoff shall be actuated. [407:4.2.3.5.3]

42.10.2.2.3.5.4

The supervisor shall be notified immediately. [407:4.2.3.5.4]

42.10.2.2.3.5.5

Cleaning operations shall be performed by personnel trained in accordance with 42.10.2.2.2.1. [407:4.2.3.5.5]

42.10.2.2.3.5.6

Operation shall not be resumed until the spill has been cleared and conditions are determined to be safe. [407:4.2.3.5.6]

42.10.2.2.3.5.7

The airport fire crew, if established, or the local fire department serving the airport shall be notified if a spill covers over 3 m (10 ft) in any direction or is over 5 m2 (50 ft2) in area, continues to flow, or is otherwise a hazard to persons or property. [407:4.2.3.5.7]

42.10.2.2.3.5.8

The spill shall be investigated to determine the cause, to determine whether emergency procedures were properly carried out, and to determine the necessary corrective measures. [407:4.2.3.5.8]

42.10.2.2.3.5.9

Corrective measures identified by the spill investigation shall be implemented as required by the authority having jurisdiction. [407:4.2.3.5.9]

42.10.2.2.3.6

Transferring fuel by pumping from one tank vehicle to another tank vehicle within 61 m (200 ft) of an aircraft shall not be permitted. [407:4.2.3.6]

42.10.2.2.3.7

Not more than one tank vehicle shall be permitted to be connected to the same aircraft fueling manifold, unless means are provided to prevent fuel from flowing back into a tank vehicle due to a difference in pumping pressure. [407:4.2.3.7]

42.10.2.2.4 Emergency Fuel Shutoff

42.10.2.2.4.1

Emergency fuel shutoff control stations shall be accessible at all times. [407:4.2.4.1]

42.10.2.2.4.2

A procedure shall be established to notify the fire department serving the airport in the event of a control station activation. [407:4.2.4.2]

42.10.2.2.4.3

If the fuel flow stops for an unknown reason, the emergency fuel shutoff system shall be checked first. [407:4.2.4.3]

42.10.2.2.4.4

The cause of the shutoff shall be identified and corrected before fuel flow is resumed. [407:4.2.4.4]

42.10.2.2.4.5

Emergency fuel shutoff systems shall be operationally checked at intervals not exceeding 6 months. [407:4.2.4.5]

42.10.2.2.4.6

Each individual device shall be checked at least once during every 12-month period. [407:4.2.4.6]

42.10.2.2.4.7

Suitable records shall be kept of tests required by this section. [407:4.2.4.7]

42.10.2.2.5 Bonding

42.10.2.2.5.1

Prior to making any fueling connection to an aircraft or fuel servicing vehicle, the fueling equipment shall be bonded to the aircraft or fuel servicing vehicle by use of a cable, thus providing a conductive path to equalize the potential between the fueling equipment and the aircraft. [407:4.2.5.1]

42.10.2.2.5.1.1

The electrical bond shall be maintained until fueling connections have been removed, thus allowing separated charges that could be generated during the fueling operation to reunite. [407:4.2.5.1.1]

42.10.2.2.5.1.2

Grounding for the sole purpose of aircraft fueling shall not be permitted. [407:4.2.5.1.2]

42.10.2.2.5.2 Bonding for Overwing Fueling

In addition to the requirements in 42.10.2.2.5.1, where fueling overwing, the nozzle shall be bonded to a metallic component of the aircraft that is metallically connected to the tank filler port. [407:4.2.5.2]

42.10.2.2.5.2.1

The bond connection shall be made before the filler cap is removed. [407:4.2.5.2.1]

42.10.2.2.5.2.2

If a nozzle bond cable and plug receptacle or means for attaching a clip is available, the operator shall attach the nozzle bond cable before removing the cap in order to equalize the potential between the nozzle and the filler port. [407:4.2.5.2.2]

42.10.2.2.5.2.3

If no plug receptacle or means for attaching a clip is available, the operator shall touch the filler cap with the nozzle spout before removing the cap in order to equalize the potential between the nozzle and the filler port. [407:4.2.5.2.3]

42.10.2.2.5.2.4

The nozzle spout shall be kept in contact with the filler neck until the fueling is completed. [407:4.2.5.2.4]

42.10.2.2.5.3

Where a funnel is used in aircraft fueling, it shall be kept in contact with the filler neck as well as the fueling nozzle spout or the supply container to avoid the possibility of a spark at the fill opening. [407:4.2.5.3]

42.10.2.2.5.3.1\*

Only metal funnels shall be used. [407:4.2.5.3.1]

42.10.2.2.5.4

Where a hydrant servicer or cart is used for fueling, the hydrant coupler shall be connected to the hydrant system prior to bonding the fuel equipment to the aircraft. [407:4.2.5.4]

42.10.2.2.5.5

Bonding and fueling connections shall be disconnected in the reverse order of connection. [407:4.2.5.5]

42.10.2.2.5.6

Conductive hose shall be used to prevent electrostatic discharge but shall not be used to accomplish required bonding. [407:4.2.5.6]

42.10.2.2.6 Control of Fuel Flow

42.10.2.2.6.1

Fuel flow shall be controlled by use of a deadman control device. [407:4.2.6.1]

42.10.2.2.6.2

The use of any means that defeats the dead-man control shall be prohibited. [407:4.2.6.2]

42.10.2.2.7 Fire Protection

42.10.2.2.7.1\*

During fueling operations, fire extinguishers shall be available on aircraft servicing ramps or aprons, in accordance with NFPA 410. [407:4.2.7.1]

42.10.2.2.7.2\*

Extinguishers shall be kept clear of elements such as ice and snow. [407:4.2.7.2]

42.10.2.2.7.3

Extinguishers located in enclosed compartments shall be readily accessible, and their location shall be marked clearly in letters at least 50 mm (2 in.) high. [407:4.2.7.3]

42.10.2.2.7.4

Fuel servicing personnel shall be trained in the use of the available fire-extinguishing equipment they could be expected to use. (See A.42.10.2.2.2.2.) [407:4.2.7.4]

42.10.2.2.8 Maintenance

42.10.2.2.8.1

Fuel servicing equipment shall be maintained in safe operating condition. [407:4.2.8.1]

42.10.2.2.8.2

Malfunctioning equipment shall be removed from service. [407:4.2.8.2]

42.10.2.2.8.3

Where a valve or electrical device is used for isolation during maintenance or modification of a fuel system, it shall be tagged and locked out. [407:4.2.8.3]

42.10.2.2.8.4

The tag/lock shall not be removed until the operation is completed. [407:4.2.8.4]

42.10.2.2.8.5

All inspection and maintenance activities shall be recorded. [407:4.2.8.5]

42.10.2.2.8.6

Inspection and maintenance records shall be retained for a minimum of 12 months. [407:4.2.8.6]

42.10.2.2.9\* Aircraft Fueling Hose

Any hose found to be defective, in accordance with 42.10.2.2.9.1 through 42.10.2.2.9.4, shall be removed from service. [407:4.2.9]

42.10.2.2.9.1

Suitable records shall be kept of required inspections and hydrostatic tests. [407:4.2.9.1]

42.10.2.2.9.2

Aircraft fueling hose shall be removed from service after 10 years from the date of manufacture. [407:4.2.9.2]

42.10.2.2.9.3

Aircraft fueling hose not placed into service within 2 years of the date of manufacture shall not be used. [407:4.2.9.3]

42.10.2.2.9.4 Daily Inspection

Aircraft fueling hose shall be inspected before use each day. [407:4.2.9.4]

42.10.2.2.9.4.1

The hose shall be extended as it normally would be for fueling. [407:4.2.9.4.1]

42.10.2.2.9.4.2

The hose shall be checked for evidence of any of the following defects:

Blistering

Carcass saturation or separation

Exposure of the reinforcement material

Slippage, misalignment, or leaks at couplings

[407:4.2.9.4.2]

42.10.2.2.9.5 Monthly Inspection

At least once each month the hose shall be completely extended and inspected as required in 42.10.2.2.9.4 and 42.10.2.2.9.5. [407:4.2.9.5]

42.10.2.2.9.5.1\*

The hose couplings and the hose shall be examined for structural weakness or soft spots. [407:4.2.9.5.1]

42.10.2.2.9.5.2

With the hose completely extended, it shall be pressurized to the working pressure of the fueling equipment to which it is attached and checked for defects, such as abnormal twisting or blistering. [407:4.2.9.5.2]

42.10.2.2.9.6 Quarterly Inspection

42.10.2.2.9.6.1

The nozzle screens shall be examined for evidence of hose deterioration. [407:4.2.9.6.1]

42.10.2.2.9.7

Kinks or short loops in fueling hose shall be avoided. [407:4.2.9.7]

42.10.2.2.10\* Lightning

A written procedure shall be established to set the criteria for when and where fueling operations are to be suspended at each airport as approved by the fueling agent and the airport authority. [407:4.2.10]

42.10.2.2.11 Aircraft Fuel Servicing

42.10.2.2.11.1 Location of Aircraft During Fuel Servicing

42.10.2.2.11.1.1

Aircraft fuel servicing shall be performed outdoors. [407:4.2.11.1.1]

42.10.2.2.11.1.2

Aircraft fuel servicing incidental to aircraft fuel system maintenance operations shall comply with the requirements of NFPA 410. [407:4.2.11.1.2]

42.10.2.2.11.1.3\*

Aircraft being fueled shall be positioned so that aircraft fuel system vents or fuel tank openings are not closer than 7.6 m (25 ft) to any terminal building, hangar, service building, or enclosed passenger concourse other than a loading walkway. [407:4.2.11.1.3]

42.10.2.2.11.1.4

Aircraft being fueled shall be positioned so that the vent or tank openings are not closer than 15 m (50 ft) of any combustion and ventilation air intake to any boiler, heater, or incinerator room. [407:4.2.11.1.4]

42.10.2.2.11.1.5

Accessibility to aircraft by emergency fire equipment shall be maintained for aircraft fuel servicing positions. [407:4.2.11.1.5]

42.10.2.2.11.2 Aircraft Occupancy During Fuel Servicing

42.10.2.2.11.2.1

If passengers remain on board an aircraft during fuel servicing, at least one qualified person trained in emergency evacuation procedures shall be in the aircraft at or near a door at which there is a passenger loading walkway, integral stairs that lead downward, or a passenger loading stair or stand. [407:4.2.11.2.1]

42.10.2.2.11.2.1.1

A clear area for emergency evacuation of the aircraft shall be maintained at not less than one additional exit. [407:4.2.11.2.1.1]

42.10.2.2.11.2.1.2

Where fueling operations take place with passengers on board away from the terminal building, and stairways are not provided, such as during inclement weather (diversions), all slides shall be armed and the aircraft rescue and fire fighting (ARFF) services shall be notified to respond in standby position in the vicinity of the fueling activity with at least one vehicle. [407:4.2.11.2.1.2]

42.10.2.2.11.2.1.3

Aircraft operators shall establish specific procedures covering emergency evacuation under such conditions for each type of aircraft they operate. [407:4.2.11.2.1.3]

42.10.2.2.11.2.1.4

All "no smoking" signs shall be displayed in the cabin(s), and the no smoking rule shall be enforced. [407:4.2.11.2.1.4]

42.10.2.2.11.2.2

For each aircraft type, aircraft operators shall determine the areas through which it could be hazardous for boarding or deplaning passengers to pass while the aircraft is being fueled. [407:4.2.11.2.2]

42.10.2.2.11.2.2.1

Controls shall be established so that passengers avoid such areas. [407:4.2.11.2.2.1]

42.10.2.2.12 Fire Hazards on Aircraft Fuel Servicing Ramps

42.10.2.2.12.1\* Electrical Equipment Operated on Aircraft Fuel Servicing Ramps or Aprons

42.10.2.2.12.1.1

Battery chargers on any fueling equipment shall not be connected or disconnected while fuel servicing is performed on an aircraft. [407:4.2.12.1.1]

42.10.2.2.12.1.2\*

Aircraft ground-power generators or other electrical ground-power supplies shall not be connected or disconnected while fuel servicing is performed on the aircraft. [407:4.2.12.1.2]

42.10.2.2.12.1.3

Electric tools or similar tools likely to produce sparks or arcs shall not be used while fuel servicing is performed on an aircraft. [407:4.2.12.1.3]

42.10.2.2.12.1.4

Other than aircraft fuel servicing vehicles, battery-powered vehicles that do not comply with the provisions of this standard shall not be operated within 3 m (10 ft) of fueling equipment or spills. [407:4.2.12.1.4]

42.10.2.2.12.1.5\*

Communication equipment located outside of the cab of fuel servicing vehicles and used during aircraft fuel servicing operations within 3 m (10 ft) of the fill or vent points of aircraft fuel systems shall be listed as intrinsically safe for Class I, Division 1, Group D hazardous (classified) locations in accordance with UL 913. [407:4.2.12.1.5]

42.10.2.2.12.2 Open Flames on Aircraft Fuel Servicing Ramps

42.10.2.2.12.2.1

Entrances to fueling areas shall be posted with "no smoking" signs. [407:4.2.12.2.1]

42.10.2.2.12.2.2

Open flames on aircraft fuel servicing ramps or aprons within 15 m (50 ft) of any aircraft fuel servicing operation or fueling equipment shall be prohibited. [407:4.2.12.2.2]

42.10.2.2.12.2.3

The category of open flames and lighted open flame devices shall include, but shall not be limited to, the following:

Lighted cigarettes, cigars, or pipes

Electronic cigarettes (e.g., personal vaporizers or electronic nicotine delivery systems)

Exposed flame heaters, liquid, solid, or gaseous devices, including portable and wheeled gasoline or kerosene heaters

Heat-producing welding or cutting devices and blowtorches

Flare pots or other open-flame lights

[407:4.2.12.2.3]

42.10.2.2.12.2.4

The authority having jurisdiction can establish other locations where open flames and open-flame devices shall not be permitted. [407:4.2.12.2.4]

42.10.2.2.12.2.5

Personnel shall not carry lighters, matches, or electronic cigarettes on their person while engaged in fuel servicing operations. [407:4.2.12.2.5]

42.10.2.2.12.2.6

Lighters, matches, or electronic cigarettes shall not be permitted on or in fueling equipment. [407:4.2.12.2.6]

42.10.2.2.12.2.7

Equipment performing aircraft servicing functions shall not be positioned within a 3 m (10 ft) radius of aircraft fuel system vent openings. [407:4.2.12.2.7]

42.10.2.2.12.3 Operation of Aircraft Engines and Heaters

42.10.2.2.12.3.1

Fuel servicing shall not be performed on a fixed wing aircraft while an onboard engine is operating, except as permitted by 42.10.2.2.12.3.2 or 42.10.2.2.14. [407:4.2.12.3.1]

42.10.2.2.12.3.2

Aircraft auxiliary power units (APUs) that direct exhaust away from the fueling operation shall be permitted to operate during fuel servicing. [407:4.2.12.3.2]

42.10.2.2.12.3.3

Combustion heaters on aircraft (e.g., wing and tail surface heaters, integral cabin heaters) shall not be operated during fueling operations. [407:4.2.12.3.3]

42.10.2.2.13 Defueling of Aircraft

42.10.2.2.13.1

All requirements of this standard shall apply to defueling operations. [407:4.2.13.1]

42.10.2.2.13.2

Each operator shall establish procedures to prevent the overfilling of the tank vehicle, which is a special hazard when defueling. [407:4.2.13.2]

42.10.2.2.14 Rapid Refueling

42.10.2.2.14.1

Rapid refueling of aircraft shall be limited to the following aircraft types:

Helicopters

Agricultural aircraft actively engaged in aerial application duties

Medical aircraft actively engaged in the transport of medical patients

Fire-fighting and search-and-rescue aircraft actively engaged in emergency operations

[407:4.2.14.1]

42.10.2.2.14.2

Only turbine engine aircraft fueled with JET A or JET A-1 fuels shall be permitted to be fueled while an onboard engine is operating. [407:4.2.14.2]

42.10.2.2.14.3

Aircraft permitted to be fueled while an onboard engine is operating shall have all sources of ignition of potential fuel spills located above the fuel inlet port(s) and above the vents or tank openings, including but not limited to the following:

Engines

Exhausts

Auxiliary power units (APUs)

Combustion-type cabin heater

[407:4.2.14.3]

42.10.2.2.14.4

Aircraft fueling while onboard engines are operating shall be permitted only under the following conditions:

A pilot licensed by the appropriate governmental body shall be at the aircraft controls during the entire fueling operation.

All passengers shall be deboarded to a safe location prior to rapid refueling operations, except as permitted in 42.10.2.2.14.3(3).

Patients on board medical transport aircraft shall be permitted to remain on board the aircraft with medical personnel during rapid refueling operations if, in the opinion of the medical provider, removal from the aircraft would be detrimental to the patient's condition.

Passengers shall not board or deboard during rapid refueling operations.

Only designated personnel, properly trained in rapid refueling operations, shall operate the equipment. Written procedures shall include the safe handling of the fuel and equipment.

All doors, windows, and access points allowing entry to the interior of the aircraft that are adjacent to, or in the immediate vicinity of, the fuel inlet ports shall be closed and shall remain closed during refueling operations.

Fuel shall be permitted to be dispensed by one of the following methods:

Into an open port from approved deadman-type nozzles with a flow rate not to exceed 227 L/min (60 gpm)

Through close-coupled pressure fueling ports

Where fuel is dispensed from fixed piping systems, the hose cabinet shall not extend into the rotor space.

Clearance between aircraft fuel servicing vehicles and rotating components shall be maintained by one of the following methods:

A curb or other approved barrier shall be provided to restrict the fuel servicing vehicle from coming within 3 m (10 ft) of any aircraft rotating components.

Fuel servicing vehicles shall be kept 6 m (20 ft) away from any aircraft rotating components, and a trained person shall direct fuel servicing vehicle approach and departure.

[407:4.2.14.4]

42.10.3 Aviation Fueling Facilities

42.10.3.1 Design and Construction

42.10.3.1.1 General Requirements

42.10.3.1.1.1

Each installation shall be designed and installed in conformity with the requirements of this standard and with any additional fire safety measures deemed necessary by the authority having jurisdiction. [407:5.1.1.1]

42.10.3.1.1.2

The system and each of its components shall be designed for the working pressure of the system. [407:5.1.1.2]

42.10.3.1.1.3

The emergency fuel shutoff system shall be designed and installed as an integral part of the airport fuel system. [407:5.1.1.3]

42.10.3.1.1.4

Operating controls for emergency fuel shutoff of the system shall be located to be readily accessible in the event of an accident or spill. [407:5.1.1.4]

42.10.3.1.1.5

In establishing each aircraft fuel dispensing location, consideration shall be given to the accessibility of the location in an emergency by fire-fighting personnel and equipment. [407:5.1.1.5]

42.10.3.1.1.6 System Design and Approval

42.10.3.1.1.6.1 Design Approval

Work shall not be started on the construction or alteration of an airport fuel system until the design, plans, and specifications have been approved by the authority having jurisdiction. [407:5.1.1.6.1]

42.10.3.1.1.6.2 System Approval

The authority havingjurisdiction shall inspect and approve the completed system before it is put into service. [407:5.1.1.6.2]

42.10.3.1.1.6.3 Hydrostatic Test

42.10.3.1.1.6.3.1

After completion of the installation (including fill and paving), new airport fuel piping systems shall be subjected to a temperature-compensated hydrostatic test pressure equal to 150 percent of the system working pressure for at least 4 hours and shall be proven tight before the system is placed into service. [407:5.1.1.6.3.1]

42.10.3.1.1.6.3.2

For additions or modifications to existing airport fuel piping systems, hydrostatic testing of new piping prior to final tie-in to existing piping shall be permitted, with final closure (tie-in) welds examined in-process in accordance with ASME B31.3. [407:5.1.1.6.3.2]

42.10.3.1.2 Fuel Storage Tanks

42.10.3.1.2.1\*

Fuel storage tanks shall conform to the applicable requirements of NFPA 30. [407:5.1.2.1]

42.10.3.1.2.2

The authority having jurisdiction shall determine the clearances required from runways, taxiways, and other aircraft movement and servicing areas to any aboveground fuel storage structure or fuel transfer equipment, with due recognition given to national and international standards establishing clearances from obstructions. [407:5.1.2.2]

42.10.3.1.3 Pumps and Piping Systems

42.10.3.1.3.1

Underground piping or impact-protected aboveground piping shall be used in the vicinity of aircraft operating areas. [407:5.1.3.1]

42.10.3.1.3.2

Piping shall be laid on firm supports using clean, noncorrosive backfill. [407:5.1.3.2]

42.10.3.1.3.3

Transfer piping located within buildings not specifically designed for the purpose of fuel transfer shall be located within a steel casing of a pressure rating equal to that of the carrier pipe. [407:5.1.3.3]

42.10.3.1.3.3.1

The casing shall extend beyond the building. [407:5.1.3.3.1]

42.10.3.1.3.3.2

The casing shall terminate at a low point(s) with an automatic leak detection system. [407:5.1.3.3.2]

42.10.3.1.3.3.3

The casing shall be capable of being drained to a safe location. [407:5.1.3.3.3]

42.10.3.1.3.4

Piping, valves, and fittings shall be of steel or stainless steel, suitable for aviation fuel service and designed for the working pressure and mechanically and thermally produced structural stresses to which they could be subjected and shall comply with ASME B31.3. [407:5.1.3.4]

42.10.3.1.3.5

Cast-iron, copper, copper alloy, and galvanized steel piping, valves, and fittings shall not be permitted. [407:5.1.3.5]

42.10.3.1.3.6

Ductile iron valves shall be permitted. [407:5.1.3.6]

42.10.3.1.3.7

Aluminum piping, valves, and fittings shall be used only where specifically approved by the authority having jurisdiction. [407:5.1.3.7]

42.10.3.1.3.8

In the selection of pipe, valves, and fittings, the following shall be considered:

Working pressure

Bending and mechanical strength requirements (including settlement)

Internal and external corrosion

Impact stresses

Method of system fabrication and assembly

Location of piping and accessibility for repair or replacement

Exposure to mechanical, atmospheric, or fire damage

Expected period of service and effect of future operations

[407:5.1.3.8]

42.10.3.1.3.9

Gaskets in flanged connections shall resist fire temperatures for a duration comparable to the temperature resistance of the flange and bolts. [407:5.1.3.9]

42.10.3.1.3.10

Flanges and their associated bolts shall be steel or stainless steel. [407:5.1.3.10]

42.10.3.1.3.10.1

Flanges shall be rated to the ANSI pressure class suitable to the fuel system working pressures but in no cases shall be less than Class 150. [407:5.1.3.10.1]

42.10.3.1.3.10.2

Joints shall be designed and installed so that the mechanical strength of the joint will not be impaired if exposed to a fire. [30:27.5.1.2]

42.10.3.1.3.11

Allowances shall be made for thermal expansion and contraction by the use of pipe bends, welded elbows, or other flexible design. [407:5.1.3.11]

42.10.3.1.3.12

Pressure relief valves shall be provided in lines that can be isolated. [407:5.1.3.12]

42.10.3.1.3.13

Welded joints shall be made by qualified welders in accordance with the standards of the American Welding Society and ANSI/ASME B31.3. [407:5.1.3.13]

42.10.3.1.3.14\*

Isolation valves or devices shall be provided to facilitate dismantling portions of the fueling system. [407:5.1.3.14]

42.10.3.1.3.15

Isolation valves shall be capable of being locked closed. [407:5.1.3.15]

42.10.3.1.3.16

Buried flanges and valves shall not be permitted. [407:5.1.3.16]

42.10.3.1.3.17\*

All fueling systems with underground piping shall have cathodic protection to mitigate corrosion. [407:5.1.3.17]

42.10.3.1.3.18

A heat-actuated shutoff valve shall be provided in the piping immediately upstream of loading hoses or swing arm connections. [407:5.1.3.18]

42.10.3.1.4 Hose and Nozzles. (Reserved)

42.10.3.1.5 Bonding. (Reserved)

42.10.3.1.6 Electrical Systems

42.10.3.1.6.1 Electrical Equipment

All electrical equipment and wiring shall comply with the requirements of NFPA 70, Article 515, utilizing the Class I liquids requirements for all applications. [407:5.1.6.1]

42.10.3.1.7 Control of Fuel Flow

42.10.3.1.7.1\* Deadman Controls

42.10.3.1.7.1.1

The valve that controls the flow of fuel to an aircraft or fueling vehicle shall have a deadman control. [407:5.1.7.1.1]

42.10.3.1.7.1.2

The fuel flow control means shall be one of the following:

The hydrant pit valve

At the feed-side of the fueling hose

A separate valve on the fuel piping system

On the hose nozzle for overwing servicing

An electronic control to stop the pump

[407:5.1.7.1.2]

42.10.3.1.7.1.3

Deadman controls shall be designed to preclude defeating their intended purpose. [407:5.1.7.1.3]

42.10.3.1.7.2 Pressure Fuel Servicing System Controls

42.10.3.1.7.2.1

The system shall be designed to minimize surge pressure. [407:5.1.7.2.1]

42.10.3.1.7.2.2\*

The overshoot shall not exceed 5 percent of actual flow rate in L/min (gal/min) at the time the deadman is released. [407:5.1.7.2.2]

42.10.3.1.7.2.3

The control valve shall be located and designed so that it will not be rendered inoperative by a surface accident, power failure, or spill. [407:5.1.7.2.3]

42.10.3.1.7.2.4

The control valve shall be fail-safe by closing completely in the event of control power loss. [407:5.1.7.2.4]

42.10.3.1.7.3\* Hydrant Valves

Hydrant valves shall be designed so that the flow of fuel shall shut off when the hydrant coupler is closed. [407:5.1.7.3]

42.10.3.1.7.3.1

Hydrant valves shall be of the self-closing, dry-break type. [407:5.1.7.3.1]

42.10.3.1.7.4 Flow Control Valves

The flow control valve shall be an integral part of the hydrant valve or coupler. [407:5.1.7.4]

42.10.3.1.7.4.1

The fuel control valve shall be arranged so that it is not rendered inoperative by a surface accident, spill, or malfunction and shall shut off the flow of fuel if the operating energy fails. [407:5.1.7.4.1]

42.10.3.1.7.4.2

The fuel control system shall be designed to minimize overshoot. [407:5.1.7.4.2]

42.10.3.1.7.4.3

The system shall be designed to shut off fuel flow quickly and effectively, even if there is a reduction of pressure downstream of the flow control valve such as could result from a major line or hose break. [407:5.1.7.4.3]

42.10.3.1.7.4.4

A screen shall be provided ahead of the valve to trap foreign material that could interfere with complete closure of the valve. [407:5.1.7.4.4]

42.10.3.1.7.4.5

The hydrant valve that allows the flow of fuel to the aircraft shall have a deadman control. [407:5.1.7.4.5]

42.10.3.1.7.4.6

The use of any means that allows fuel to flow without the operator activating the deadman shall not be permitted. [407:5.1.7.4.6]

42.10.3.1.7.4.7

The deadman control shall be arranged so that the fueling operator can observe the operation while activating the control. [407:5.1.7.4.7]

42.10.3.1.7.4.8

Wireless deadman controls shall be permitted. [407:5.1.7.4.8]

42.10.3.1.7.5\* Fuel Pressure

The pressure of the fuel delivered to the aircraft shall be automatically controlled so that it is not higher than that specified by the manufacturer of the aircraft being serviced. [407:5.1.7.5]

42.10.3.1.8 Filters and Ancillary Equipment

42.10.3.1.8.1

All sections of the filtering system shall have electrical continuity with adjoining piping and equipment. [407:5.1.8.1]

42.10.3.1.8.2

In freezing climates, filter separator sumps and associated piping that could contain water shall be protected to prevent freezing and bursting. [407:5.1.8.2]

42.10.3.1.8.3

Heaters shall be constructed of noncorrosive materials. [407:5.1.8.3]

42.10.3.1.8.4

Piping, valves, meters, filters, air eliminators, connections, outlets, fittings, and other components shall be designed to meet the working pressure requirements of the system. [407:5.1.8.4]

42.10.3.1.9 Emergency Fuel Shutoff Systems

42.10.3.1.9.1

Each tank vehicle loading station shall be provided with an emergency fuel shutoff system, in addition to the deadman control required by 42.10.3.1.7.4. [407:5.1.9.1]

42.10.3.1.9.2

The emergency fuel shutoff system shall shut down the flow of fuel in the entire system or in sections of the system. [407:5.1.9.2]

42.10.3.1.9.3

The emergency fuel shutoff system shall be of a failsafe design. [407:5.1.9.3]

42.10.3.1.9.4\*

The method of fuel transfer (gravity, pumping, or use of hydraulic or inert gas pressure) shall be considered in the design of the emergency fuel shutoff system and the location of the emergency fuel shutoff valve. [407:5.1.9.4]

42.10.3.1.9.5

The emergency fuel shutoff system shall include shutoff stations located outside of probable spill areas and near the route that normally is used to leave the spill area or to reach the fire extinguishers provided for the protection of the area. [407:5.1.9.5]

42.10.3.1.9.6\*

At least one emergency shutoff control station shall be accessible to each fueling vehicle loading position or aircraft fueling position. [407:5.1.9.6]

42.10.3.1.9.7

The emergency fuel shutoff system shall be designed so that operation of a station shuts off fuel flow to all hydrants that have a common exposure. [407:5.1.9.7]

42.10.3.1.9.8

Emergency fuel shutoff systems shall be designed so that they shut off the flow of fuel if the operating power fails. [407:5.1.9.8]

42.10.3.1.9.9

Emergency fuel shutoffs shall not be located beneath piping, pumps, vents, or other components containing fuel or fuel vapors. [407:5.1.9.9]

42.10.3.1.10 Fire Protection

At least one fire extinguisher, with a minimum rating of 80-B:C, shall be provided at each fueling vehicle loading position or rack. [407:5.1.10]

42.10.3.1.11 Marking and Labeling

42.10.3.1.11.1

Emergency fuel shutoff signs shall be located at least 2.1 m (7 ft) above grade, measured to the bottom of the placard. [407:5.1.11.1]

42.10.3.1.11.2

Emergency fuel shutoff signs shall be positioned so that they can be seen readily from a distance of at least 15.2 m (50 ft). [407:5.1.11.2]

42.10.3.1.11.3

Systems provided with impressed current cathodic protection shall have appropriate signs, located at points of entry, warning against separation of units without prior deenergization or without proper jumpers across the sections to be disconnected. [407:5.1.11.3]

42.10.3.1.11.4

Fuel storage tanks shall be labelled in accordance with the requirements of NFPA 704. [407:5.1.11.4]

42.10.3.1.11.5

Fuel transfer piping shall be marked in accordance with EI 1542 as to the product type conveyed through the pipe and the proper direction of flow of the product. [407:5.1.11.5]

42.10.3.1.12 Aircraft Fuel Servicing Vehicle Loading and Unloading Racks

42.10.3.1.12.1

The loading rack shall be equipped with an automatic shutdown system that stops the tank loading operation when the fuel servicing vehicle tank is full. [407:5.1.12.1]

42.10.3.1.12.2

All fuel servicing tank vehicle primary shutdown systems shall be compatible with the system utilized at the loading rack. [407:5.1.12.2]

42.10.3.1.12.3

The automatic secondary shutoff control shall not be used for normal filling control. [407:5.1.12.3]

42.10.3.1.12.4

New and existing loading systems shall comply with 42.10.3.1.12.1 through 42.10.3.1.12.3 within 5 years of the effective date of this edition. [407:5.1.12.4]

42.10.3.1.13 Fuel Servicing Hydrants, Pits, and Cabinets

42.10.3.1.13.1

Fueling hydrants and fueling pits that are recessed below a ramp or apron surface and are subject to vehicle or aircraft traffic shall be fitted with a cover designed to sustain the load of vehicles or aircraft that taxi over all or part of them. [407:5.1.13.1]

42.10.3.1.13.2

Fueling hydrants, cabinets, and pits shall be located at least 15.2 m (50 ft) from any terminal building, hangar, service building, or enclosed passenger concourse (other than loading bridges). [407:5.1.13.2]

42.10.3.2 Operations

42.10.3.2.1\* Security

Access to fuel storage and fuel vehicle loading areas shall be secured. [407:5.2.1]

42.10.3.2.2 Personnel. (Reserved)

42.10.3.2.3 Prevention and Control of Spills. (Reserved)

42.10.3.2.4 Emergency Fuel Shutoff. (Reserved)

42.10.3.2.5 Bonding. (Reserved)

42.10.3.2.6 Control of Fuel Flow

If a wireless deadman control is used, the operator shall be located at the fueling point during the fueling operation. [407:5.2.6]

42.10.3.2.7 Fire Protection

During fueling operations, fire extinguishers shall be available on aircraft servicing ramps or aprons, in accordance with NFPA 410. [407:5.2.7]

42.10.3.2.8 Maintenance. (Reserved)

42.10.3.2.9 Aircraft Fueling Hose. (Reserved)

42.10.4 Airport Fueling Vehicles

42.10.4.1 Design and Construction

42.10.4.1.1 General Requirements

42.10.4.1.1.1

Aircraft fuel servicing tank vehicles that are operated on public roadways shall comply with the requirements of NFPA 385. [407:6.1.1.1]

42.10.4.1.1.2

In addition to any specific requirements in this chapter, only materials safe for use in the service intended and compatible with fuel applications shall be used in the construction of aircraft fuel servicing vehicles and hydrant fuel service carts. [407:6.1.1.2]

42.10.4.1.1.3

Magnesium shall not be used in the construction of any portion of an aircraft fuel servicing vehicle or cart. [407:6.1.1.3]

42.10.4.1.1.4

Trailer connections shall be designed to secure the trailer firmly and to prevent the towed vehicle from swerving from side to side at the speeds anticipated so that the trailer essentially remains in the path of the towing vehicle. [407:6.1.1.4]

42.10.4.1.2 Tanks

42.10.4.1.2.1

Every cargo tank shall be supported by and attached to, or shall be a part of, the tank vehicle upon which it is carried in accordance with NFPA 385. [407:6.1.2.1]

42.10.4.1.2.2

Cargo tanks shall be constructed in accordance with 49 CFR 178.345, DOT 406, or other equivalent standard for international application. [407:6.1.2.2]

42.10.4.1.2.3

Aluminum alloys for high-strength welded construction shall be joined by an inert gas arc welding process using filler metals R-GR40A, E-GR40A (5154 alloy), R-GM50A, and EGM50A (5356 alloy) in accordance with AWS A5.10. [407:6.1.2.3]

42.10.4.1.2.4

Tank outlets shall be of substantial construction. [407:6.1.2.4]

42.10.4.1.2.5

Tank outlets shall be attached securely to the tank. [407:6.1.2.5]

42.10.4.1.2.6 Baffles

Every cargo tank or compartment over 2.3 m (7.5 ft) long shall be provided with baffles, the total number of which shall be such that the distance between any two adjacent baffles, or between any tank head or bulkhead and the baffle closest to it, shall in no case exceed 1.5 m (5 ft). [407:6.1.2.6]

42.10.4.1.2.6.1

The cross-sectional area of each baffle shall be not less than 80 percent of the cross-sectional area of the tank. [407:6.1.2.6.1]

42.10.4.1.2.6.2

The thickness of a baffle shall be not less than that required for the heads and bulkheads of the cargo tank in which it is installed. [407:6.1.2.6.2]

42.10.4.1.2.7

Venting shall be in accordance with 49 CFR, DOT 406. [407:6.1.2.7]

42.10.4.1.2.8

Cargo draw-off valves or faucets projecting beyond the frame of a tank vehicle shall be protected against damage. [407:6.1.2.8]

42.10.4.1.2.9 Fill Openings and Top Flashings

42.10.4.1.2.9.1

Dome covers shall be provided with a forward mounted hinge and self-latching catches and shall be fitted with watertight fuel-resistant seals or gaskets designed to prevent spillage or leakage from overturn and to prevent water entry. [407:6.1.2.9.1]

42.10.4.1.2.9.2

Dome covers shall automatically close and latch with the forward motion of the vehicle. [407:6.1.2.9.2]

42.10.4.1.2.9.3

Drains from top flashing shall divert spilled fuel from possible sources of ignition, including the engine, the engine exhaust system, the electrical equipment, or an auxiliary equipment enclosure. [407:6.1.2.9.3]

42.10.4.1.2.9.4

The tank fill openings shall be protected against overturn damage by a rigid member(s) fixed to the tank and extending a minimum of 25 mm (1 in.) above any dome cover, handle, vent opening, or projection of the unit. [407:6.1.2.9.4]

42.10.4.1.2.9.5

Overturn protection shall be braced adequately to prevent collapse. [407:6.1.2.9.5]

42.10.4.1.2.9.6

Overturn protection shall be designed to channel rainwater, snow, or fuel to the exterior of the cargo tank and away from vehicle exhaust components. [407:6.1.2.9.6]

42.10.4.1.2.10 Tanks for Flammable Liquids Other Than Fuel

Vehicle or cart fuel tanks and containers for other flammable liquids shall be made of metal and shall be designed, constructed, and located in a manner that precludes hazardous arrangements. [407:6.1.2.10]

42.10.4.1.2.10.1

Tanks shall be substantially protected by their location. [407:6.1.2.10.1]

42.10.4.1.2.10.2

Fill pipes shall not project beyond the vehicle profile. [407:6.1.2.10.2]

42.10.4.1.2.10.3

Tanks and containers shall vent away from sources of ignition during filling. [407:6.1.2.10.3]

42.10.4.1.2.10.4

Any arrangement not protected by location shall be listed for such use. [407:6.1.2.10.4]

42.10.4.1.2.10.5

The fuel tank arrangement shall allow for drainage without the tank's removal from its mountings. [407:6.1.2.10.5]

42.10.4.1.2.11 Tests

Cargo tanks, at the time of manufacture, shall be tested by a minimum air or hydrostatic pressure of 24.4 kg/m2 (5 psi) applied to the whole tank (or each compartment thereof if the tanks are compartmented) for a period of at least 5 minutes. [407:6.1.2.11]

42.10.4.1.2.11.1

If the test is by air pressure, the entire exterior surface of all joints shall be coated with a solution of soap and water, heavy oil, or other substance that causes foaming or bubbling that indicates the presence of leaks. [407:6.1.2.11.1]

42.10.4.1.2.11.2

If the test is by hydrostatic pressure, it shall be gauged at the top of the tank, and the tank shall be inspected at the joints for the issuance of liquid to indicate leaks. [407:6.1.2.11.2]

42.10.4.1.2.11.3

Any leakage discovered by either of the methods described in 42.10.4.1.2.11.1 and 42.10.4.1.2.11.2, or by any other method, shall be considered evidence of failure to meet these requirements. [407:6.1.2.11.3]

42.10.4.1.3 Pumps and Piping System

42.10.4.1.3.1

All portions of the flammable liquid feed system shall be constructed and located to minimize the fire hazard. [407:6.1.3.1]

42.10.4.1.3.2

Piping and plumbing shall be made of materials not adversely affected by the fluid or by other materials likely to be encountered. [407:6.1.3.2]

42.10.4.1.3.3

Piping and plumbing shall be of adequate strength for the purpose. [407:6.1.3.3]

42.10.4.1.3.4

Piping and plumbing shall be secured to avoid chafing or undue vibration. [407:6.1.3.4]

42.10.4.1.3.5

Piping and plumbing shall be supported adequately. [407:6.1.3.5]

42.10.4.1.3.6

Product piping shall be metal and rated for the system working pressure or at least 1030 kPa (150 psi), whichever is greater. [407:6.1.3.6]

42.10.4.1.3.7

Except as provided in 42.10.4.1.3.8, all joints shall be welded. [407:6.1.3.7]

42.10.4.1.3.8

Flanged connections or approved couplings shall be provided to avoid the need for cutting and welding where components are serviced or replaced. [407:6.1.3.8]

42.10.4.1.3.9

Gaskets in flanged connections shall be of a material and design that resist fire exposure for a time comparable to the flange and bolts. [407:6.1.3.9]

42.10.4.1.3.10

Gravity feed systems shall not be used. [407:6.1.3.10]

42.10.4.1.3.11

At the time of manufacture, the section of the fuel dispensing system that is under pressure during service shall be subjected to a hydrostatic test pressure equal to 150 percent of the working pressure of the system for at least 30 minutes and shall be proven tight before it is placed in service. [407:6.1.3.11]

42.10.4.1.3.11.1

Hose connections shall be permitted to be plugged during this test. [407:6.1.3.11.1]

42.10.4.1.3.12 Loading System

42.10.4.1.3.12.1 Top Loading

42.10.4.1.3.12.1.1

Drop tubes shall be used. [407:6.1.3.12.1.1]

42.10.4.1.3.12.1.2

Splash filling shall be prohibited. [407:6.1.3.12.1.2]

42.10.4.1.3.12.1.3

Drop tubes used in top loading or overhead loading of tank vehicles shall be designed to minimize turbulence. [407:6.1.3.12.1.3]

42.10.4.1.3.12.1.4

Drop tubes shall be metallic. [407:6.1.3.12.1.4]

42.10.4.1.3.12.1.5

Drop tubes shall extend to the bottom of the tank or to the inside of the sump to maintain submerged loading and to avoid splashing of the fuel. [407:6.1.3.12.1.5]

42.10.4.1.3.12.2 Bottom Loading

42.10.4.1.3.12.2.1

The bottom-loading connection of a tank truck shall be a dry-break coupler that cannot be opened until it is engaged to the vehicle tank adapter. [407:6.1.3.12.2.1]

42.10.4.1.3.12.2.2

It shall not be possible to disconnect the hose coupler from the tank vehicle until the coupler valve is fully closed. [407:6.1.3.12.2.2]

42.10.4.1.3.12.2.3\*

The bottom loading fitting of the tank vehicle shall be a spring-loaded check valve that remains in a closed position until opened by connecting the coupler. [407:6.1.3.12.2.3]

42.10.4.1.3.12.2.4

A float-actuated shutoff or other automatic sensing device shall be provided to close the bottom-loading valve when the tank is filled. [407:6.1.3.12.2.4]

42.10.4.1.3.12.2.5

Any liquid bled from a sensing device during loading shall be piped to the bottom of the cargo tank. [407:6.1.3.12.2.5]

42.10.4.1.3.12.2.6

The fill pipe and valving on bottom-loaded tank vehicles shall be arranged to prevent fuel spray and turbulence in the cargo tank. [407:6.1.3.12.2.6]

42.10.4.1.3.12.2.7

The cargo tank vehicle shall be equipped with an automatic primary shutdown system that stops the tank loading operation when the tank is full, unless an automatic shutdown is provided on the loading rack in accordance with 42.10.3.1.2.1. [407:6.1.3.12.2.7]

42.10.4.1.3.12.2.8

The cargo tank vehicle shall be equipped with an automatic secondary shutdown system that stops the tank loading operation when the tank is full. [407:6.1.3.12.2.8]

42.10.4.1.3.12.2.9

The automatic secondary shutoff control shall not be used for normal filling control. [407:6.1.3.12.2.9]

42.10.4.1.3.13

Each outlet valve shall be provided with a fusible device that causes the valve to close automatically in case of fire. [407:6.1.3.13]

42.10.4.1.3.14

A shear section shall be provided between shutoff valve seats and discharge outlets that breaks under strain, unless the discharge piping is arranged to afford the same protection and leave the shutoff valve seat intact. [407:6.1.3.14]

42.10.4.1.3.15

Openings in cargo tank compartments that are connected to pipe or tubing shall be fitted with a spring-loaded check valve, a self-closing valve, or a similar device to prevent the accidental discharge of fuel in case of equipment malfunction or line breakage. [407:6.1.3.15]

42.10.4.1.3.15.1

Unless the valves required in 42.10.4.1.3.15 are located inside the tank, they shall be equipped with a shear section as described in 42.10.4.1.3.14. [407:6.1.3.15.1]

42.10.4.1.3.16

The operating mechanism for each tank outlet valve shall be adjacent to the fuel delivery system operating controls. [407:6.1.3.16]

42.10.4.1.3.16.1

The operating mechanism for each tank outlet valve shall be arranged so that the outlet valve(s) can be closed simultaneously and instantly in the event of a fire or other emergency. [407:6.1.3.16.1]

42.10.4.1.3.16.2

A means shall be provided to assure proper operation. [407:6.1.3.16.2]

42.10.4.1.4 Hose and Nozzles. (Reserved)

42.10.4.1.5 Bonding

42.10.4.1.5.1

All metallic components and vehicle or cart chassis shall be electrically bonded to prevent a difference in their electrostatic potential. [407:6.1.5.1]

42.10.4.1.5.2

Such bonding shall be inherent to the installation or by physical application of a suitable bonding mechanism. [407:6.1.5.2]

42.10.4.1.5.3

A provision shall be provided on the vehicle to bond the tank to a fill pipe or loading rack as specified in 42.10.4.2.11.10.1. [407:6.1.5.3]

42.10.4.1.5.4

Cables shall be provided on the vehicle or cart to allow the bonding operations specified in 42.10.2.2.5. [407:6.1.5.4]

42.10.4.1.6 Electrical System

42.10.4.1.6.1 Battery Compartments

Batteries that are not in engine compartments shall be securely mounted in compartments to prevent accidental arcing. [407:6.1.6.1]

42.10.4.1.6.1.1

The compartment shall be separate from fueling equipment. [407:6.1.6.1.1]

42.10.4.1.6.1.2

Suitable shielding shall be provided to drain possible fuel spillage or leakage away from the compartment. [407:6.1.6.1.2]

42.10.4.1.6.1.3

The compartment shall be provided with a vent at the top of the compartment. [407:6.1.6.1.3]

42.10.4.1.6.2 Wiring

Wiring shall be of adequate size to provide the required current-carrying capacity and mechanical strength. [407:6.1.6.2]

42.10.4.1.6.2.1

Wiring shall be installed to provide protection from physical damage and from contact with spilled fuel either by its location or by enclosing it in metal conduit or other oil-resistant protective covering. [407:6.1.6.2.1]

42.10.4.1.6.2.2

All circuits shall have overcurrent protection. [407:6.1.6.2.2]

42.10.4.1.6.2.3

Junction boxes shall be weatherproofed. [407:6.1.6.2.3]

42.10.4.1.6.2.4

The vehicle shall be equipped with a battery disconnect switch. [407:6.1.6.2.4]

42.10.4.1.6.3

Spark plugs and other exposed terminal connections shall be insulated to prevent sparking in the event of contact with conductive materials. [407:6.1.6.3]

42.10.4.1.6.4\*

Motors, alternators, generators, and their associated control equipment located outside of the engine compartment or vehicle cab shall be of a type listed for use in accordance with NFPA 70, Class I, Division 1, Group D locations. [407:6.1.6.4]

42.10.4.1.6.5

Electrical equipment and wiring located within a closed compartment shall be of a type listed for use in accordance with NFPA 70, Class I, Division 1, Group D locations. [407:6.1.6.5]

42.10.4.1.6.6

Lamps, switching devices, and electronic controls, other than those covered in 42.10.4.1.6.4 and 42.10.4.1.6.5, shall be of the enclosed, gasketed, weatherproof type. [407:6.1.6.6]

42.10.4.1.6.7

Other electrical components not covered in 42.10.4.1.6.4 through 42.10.4.1.6.6 shall be of a type listed for use in accordance with NFPA 70, Class I, Division 2, Group D locations. [407:6.1.6.7]

42.10.4.1.6.8

Electronic equipment shall not be installed in compartments with other equipment that can produce flammable vapors, unless permitted by NFPA 70. [407:6.1.6.8]

42.10.4.1.6.9 Tractor Trailer Wiring

Electrical service wiring between a tractor and trailer shall be designed for heavy-duty service. [407:6.1.6.9]

42.10.4.1.6.9.1

The connector shall be of the positiveengaging type. [407:6.1.6.9.1]

42.10.4.1.6.9.2

The trailer receptacle shall be mounted securely. [407:6.1.6.9.2]

42.10.4.1.7 Control of Fuel Flow

42.10.4.1.7.1\*

The valve that controls the flow of fuel to an aircraft shall have a deadman control. [407:6.1.7.1]

42.10.4.1.7.2

The fuel flow control valve shall be one of the following:

The hydrant pit valve

At the tank outlet on a tank vehicle

A separate valve on the tank vehicle

On the hose nozzle for overwing servicing

[407:6.1.7.2]

42.10.4.1.7.3

Deadman controls shall be designed to preclude defeating their intended purpose. [407:6.1.7.3]

42.10.4.1.7.4 Pressure Fuel Servicing System Controls

42.10.4.1.7.4.1

The system shall be designed to minimize surge pressure. [407:6.1.7.4.1]

42.10.4.1.7.4.2\*

The overshoot shall not exceed 5 percent of actual flow rate in L/min (gal/min) at the time the deadman is released. [407:6.1.7.4.2]

42.10.4.1.7.4.3

The control valve shall be located and designed so that it will not be rendered inoperative by a surface accident, power failure, or spill. [407:6.1.7.4.3]

42.10.4.1.7.4.4

The control valve shall be fail-safe by closing completely in the event of control power loss. [407:6.1.7.4.4]

42.10.4.1.7.5

On tank full trailer or tank semitrailer vehicles, the use of a pump in the tractor unit with flexible connections to the trailer shall be prohibited unless one of the following conditions exists:

Flexible connections are arranged above the liquid level of the tank in order to prevent gravity or siphon discharge in case of a break in the connection or piping.

The cargo tank discharge valves required by 42.10.4.1.7.1 are arranged to be normally closed and to open only when the brakes are set and the pump is engaged.

[407:6.1.7.5]

42.10.4.1.7.6 Air Elimination

Aircraft fuel servicing tank vehicles having a positive displacement product pump shall be equipped with a product tank low-level shutdown system that prevents air from being ingested into the fueling system. [407:6.1.7.6]

42.10.4.1.8 Filters and Ancillary Equipment

42.10.4.1.8.1 Cabinets

42.10.4.1.8.1.1

All cabinets, other than those housing electronic equipment, shall be vented to prevent the accumulation of fuel vapors. (See 42.10.4.1.6.) [407:6.1.8.1.1]

42.10.4.1.8.1.2

All cabinets, other than those housing electronic equipment, shall be constructed of noncombustible materials.(See 42.10.4.1.6.) [407:6.1.8.1.2]

42.10.4.1.8.2 Product Recovery Tanks

The refueling system product recovery tank shall be equipped with a control that shuts down the vehicle's fuel dispensing system when the refueling system product recovery tank is three-quarters full. [407:6.1.8.2]

42.10.4.1.9 Emergency Fuel Shutoff Systems

42.10.4.1.9.1

The vehicle shall have at least two emergency shutoff controls, one mounted on each side of the vehicle. [407:6.1.9.1]

42.10.4.1.9.2

The emergency fuel shutoff controls shall be quick-acting to close the outlet valve in case of emergency. [407:6.1.9.2]

42.10.4.1.9.3

The emergency fuel shutoff controls shall be remote from the fill openings and discharge outlets and shall be operable from a ground level standing position. [407:6.1.9.3]

42.10.4.1.9.4

All vehicles or carts equipped with a top deck or elevating platform shall have an additional emergency shutoff control operable from the deck or platform. [407:6.1.9.4]

42.10.4.1.10 Fire Protection

42.10.4.1.10.1

Each aircraft fuel servicing tank vehicle shall have two listed fire extinguishers, each having a rating of at least 80-B:C, with one extinguisher mounted on each side of the vehicle. [407:6.1.10.1]

42.10.4.1.10.2

One listed fire extinguisher having a rating of at least 80-B:C shall be installed on each hydrant fuel servicing vehicle or cart. [407:6.1.10.2]

42.10.4.1.10.3

Extinguishers shall be readily accessible from the ground. [407:6.1.10.3]

42.10.4.1.10.4

The area of the paneling or tank adjacent to or immediately behind the extinguisher(s) on fueling vehicles or carts shall be painted a color contrasting with that of the extinguisher. [407:6.1.10.4]

42.10.4.1.10.5

Extinguishers shall be kept clear of elements such as ice and snow. [407:6.1.10.5]

42.10.4.1.10.6

Extinguishers located in enclosed compartments shall be readily accessible. [407:6.1.10.6]

42.10.4.1.10.7

The locations of extinguishers in enclosed compartments shall be marked clearly in letters of a contrasting color at least 50 mm (2 in.) high. [407:6.1.10.7]

42.10.4.1.10.8 Smoking Equipment

42.10.4.1.10.8.1\*

Smoking equipment, such as cigarette lighter elements and ashtrays, shall not be provided. [407:6.1.10.8.1]

42.10.4.1.10.8.2

If a vehicle includes smoking equipment, it shall be removed or rendered inoperable. [407:6.1.10.8.2]

42.10.4.1.10.8.3

Subsection 42.10.4.1.10.8.2 shall be retroactive to existing vehicles. [407:6.1.10.8.3]

42.10.4.1.11 Marking and Labeling

42.10.4.1.11.1

Aircraft fueling vehicles shall be marked with the name of the operator or the responsible organization. [407:6.1.11.1]

42.10.4.1.11.2

The marking shall be approved, legible signs on both sides of the exterior of the vehicle. [407:6.1.11.2]

42.10.4.1.11.3 Signage

Each aircraft fuel servicing vehicle or cart shall have a signage viewable from all sides of the vehicle. [407:6.1.11.3]

42.10.4.1.11.3.1

Signs shall have letters at least 75 mm (3 in.) high. [407:6.1.11.3.1]

42.10.4.1.11.3.2

Signs shall be of a color contrasting sharply with the sign background for visibility. [407:6.1.11.3.2]

42.10.4.1.11.3.3

The words "FLAMMABLE," "NO SMOKING," and the name of the product carried, such as JET A, JET B, GASOLINE, or AVGAS, shall appear on each sign. [407:6.1.11.3.3]

42.10.4.1.11.4 Emergency Fuel Shutoff Signs

42.10.4.1.11.4.1

Each emergency fuel shutoff station location shall be placarded EMERGENCY FUEL SHUTOFF in letters at least 50 mm (2 in.) high. [407:6.1.11.4]

42.10.4.1.11.4.2

The method of operation shall be indicated by an arrow or by the word PUSH or PULL, as appropriate. [407:6.1.11.4.2]

42.10.4.1.11.4.3

Any action necessary to gain access to the shutoff device (e.g., BREAK GLASS) shall be shown clearly. [407:6.1.11.4.3]

42.10.4.1.11.4.4

Lettering shall be of a color contrasting sharply with the placard background for visibility. [407:6.1.11.4.4]

42.10.4.1.11.4.5

Placards shall be weather resistant. [407:6.1.11.4.5]

42.10.4.1.11.5

A "NO SMOKING" sign shall be posted prominently in the cab of every aircraft fuel servicing vehicle. [407:6.1.11.5]

42.10.4.1.11.6

Hazardous material placards meeting the requirements of 49 CFR 172.504 or equivalent shall be displayed on all four sides of fuel servicing tank vehicles. [407:6.1.11.6]

42.10.4.1.12 Drive Train

42.10.4.1.12.1

Propulsion or power engine equipment shall be in a compartment housing that shall minimize the hazard of fire in the event of leakage or spillage of fuel during the servicing of an aircraft. [407:6.1.12.1]

42.10.4.1.12.2

The engine air intake shall retain the manufacturer's configuration to prevent the emission of flame in case of backfiring. [407:6.1.12.2]

42.10.4.1.12.3

Where provided, the sediment bowl in the fuel supply line shall be of steel or material of equivalent fire resistance. [407:6.1.12.3]

42.10.4.1.12.4

Full trailers and semitrailers, except tow carts with a gross vehicle weight rating (GVWR) under 1360 kg (3000 lb), shall be equipped with service brakes on all wheels. [407:6.1.12.4]

42.10.4.1.12.5

All full trailers and semitrailers, including tow carts with a GVWR under 1360 kg (3000 lb), shall be equipped with parking brakes. [407:6.1.12.5]

42.10.4.1.12.6

Self-propelled aircraft fuel servicing vehicles shall have an integral system or device that prevents the vehicle from being moved unless all of the following conditions are met:

All fueling nozzles and hydrant couplers are properly stowed.

All mechanical lifts are lowered to their stowed position.

Bottom-loading couplers have been disconnected from the vehicle.

[407:6.1.12.6]

42.10.4.1.12.7

The vehicle shall have a means to override the system or device required by 42.10.4.1.12.6 so that the vehicle can be moved during an emergency. [407:6.1.12.7]

42.10.4.1.12.7.1

The override control shall be clearly marked and accessible. [407:6.1.12.7.1]

42.10.4.1.12.7.2

A light to indicate activation of the override shall be located in the cabin and visible outside. [407:6.1.12.7.2]

42.10.4.1.12.7.3

The override control shall be secured in the normal position with a breakaway seal. [407:6.1.12.7.3]

42.10.4.1.12.7.4

The override control shall deactivate the fueling system. [407:6.1.12.7.4]

42.10.4.1.13 Exhaust System

42.10.4.1.13.1\*

The engine exhaust system shall be designed, located, and installed to minimize the hazard of fire in the event of any of the following:

Leakage of fuel from the vehicle or cart (where applicable) fuel tank or fuel system

Leakage from the fuel dispensing system of the vehicle or cart

Spillage or overflow of fuel from the vehicle or cart (if applicable) fuel tank or the cargo tank

Spillage of fuel during the servicing of an aircraft

[407:6.1.13.1]

42.10.4.1.13.2

Exhaust system components shall be secured and located clear of components carrying flammable liquids and separated from any combustible materials used in the construction of the vehicle. [407:6.1.13.2]

42.10.4.1.13.3

Suitable shielding shall be provided to drain possible fuel spillage or leakage away from exhaust system components safely. [407:6.1.13.3]

42.10.4.1.13.3.1

Diesel particulate filter (DPF) regeneration system piping shall be shielded from the engine discharge manifold to the outlet at the tailpipe. [407:6.1.13.3.1]

42.10.4.1.13.3.2

DPF regeneration—equipped vehicles shall have a listed diffuser installed at the outlet of the exhaust tailpipe. [407:6.1.13.3.2]

42.10.4.1.13.4

Exhaust gases shall not be discharged where they could ignite fuel vapors that could be released during normal operations or by accidental spillage or by leakage of fuel. [407:6.1.13.4]

42.10.4.1.13.4.1

DPF regeneration—equipped vehicles shall have a lockout mode that will prevent automatic regeneration when these vehicles are operated within 30 m (100 ft) of aircraft parking areas. [407:6.1.13.4.1]

42.10.4.1.13.5

A muffler (or silencer) cutout shall not be provided. [407:6.1.13.5]

42.10.4.1.13.6

Carbureted gasoline-powered engines on fuel servicing vehicles shall be provided with flame- and spark-arresting exhaust systems. [407:6.1.13.6]

42.10.4.1.13.7\*

Non-turbo-charged diesel engines on fuel servicing vehicles shall be equipped with flame- and spark-arresting exhaust systems. [407:6.1.13.7]

42.10.4.2 Operations

42.10.4.2.1 Security

42.10.4.2.1.1 Parking of Aircraft Fuel Servicing Tank Vehicles

Parking areas for unattended aircraft fuel servicing tank vehicles shall be arranged to provide the following:

Dispersal of the vehicles in the event of an emergency

A minimum of 3 m (10 ft) of clear space between parked vehicles for accessibility for fire control purposes

Prevention of any leakage from draining to an adjacent building or storm drain that is not suitably designed to handle fuel

A minimum of 15 m (50 ft) from any parked aircraft and buildings other than maintenance facilities and garages for fuel servicing tank vehicles

[407:6.2.1.1]

42.10.4.2.1.2 Parking of Aircraft Fuel Servicing Hydrant Vehicles and Carts

Parking areas for unattended aircraft fuel servicing hydrant vehicles or carts shall be arranged to provide the following:

Dispersal of the vehicles in the event of an emergency

Prevention of any leakage from draining to an adjacent building or storm drain that is not suitably designed to handle fuel

[407:6.2.1.2]

42.10.4.2.1.3\*

The authority having jurisdiction shall determine the suitability of tunnels, enclosed roadways, or other limited access areas for use by fuel servicing vehicles. [407:6.2.1.3]

42.10.4.2.2 Training. (Reserved)

42.10.4.2.3 Prevention and Control of Spills. (Reserved)

42.10.4.2.4 Emergency Fuel Shutoff. (Reserved)

42.10.4.2.5 Bonding. (Reserved)

42.10.4.2.6 Control of Fuel Flow

42.10.4.2.6.1

The fueling operator shall monitor the fueling operation. [407:6.2.6.1]

42.10.4.2.6.2

During overwing fueling, the operator shall monitor the fill port. [407:6.2.6.2]

42.10.4.2.7 Fire Protection. (Reserved)

42.10.4.2.8 Maintenance

42.10.4.2.8.1

Aircraft fuel servicing vehicles or carts shall not be operated unless they are in proper repair and free of accumulations of grease, oil, or other combustibles. [407:6.2.8.1]

42.10.4.2.8.2

Leaking vehicles or carts shall be removed from service, defueled, and parked in a safe area until repaired. [407:6.2.8.2]

42.10.4.2.8.3

Maintenance and servicing of aircraft fuel servicing vehicles and carts shall be performed outdoors or in a building approved for the purpose. [407:6.2.8.3]

42.10.4.2.8.4

At least monthly the operator shall perform a check to ensure complete closure of the bottom-loading valve on the tank vehicle. [407:6.2.8.4]

42.10.4.2.9 Aircraft Fueling Hose. (Reserved)

42.10.4.2.10 Exhaust System

42.10.4.2.10.1

All vehicles that have engines equipped with an exhaust after-treatment device, such as a DPF, that requires the filter to be cleaned at high temperature (regenerated) while installed on the vehicle shall meet the requirements of 42.10.4.2.10.2 through 42.10.4.2.10.10. [407:6.2.10.1]

42.10.4.2.10.2

DPF regeneration shall be performed only in area(s) designated by the authority having jurisdiction. [407:6.2.10.2]

42.10.4.2.10.3

DPF regeneration shall not be performed within 30 m (100 ft) of any aircraft refueling operations. [407:6.2.10.3]

42.10.4.2.10.4\* Vehicle Regeneration Area

42.10.4.2.10.4.1

The immediate area surrounding the DPF exhaust outlet shall be concrete or other high temperature—resistant material and shall be clear of any grass, soil, or flammable materials. [407:6.2.10.4.1]

42.10.4.2.10.4.2

The area shall be in a remote location that is a minimum of 30 m (100 ft) from the nearest aircraft parking location, airport terminal, or flammable storage or a minimum of 15 m (50 ft) from any other building. [407:6.2.10.4.2]

42.10.4.2.10.4.3

The area shall be clearly marked with a minimum 61 cm by 30 cm (2 ft by 1 ft) sign reading "Vehicle DPF Regeneration Area," which shall have letters at least 75 mm (3 in.) high and shall be of a color contrasting sharply with the sign background for visibility. [407:6.2.10.4.3]

42.10.4.2.10.5

The regeneration cycle shall be performed only by trained personnel, who shall remain with the vehicle until the regeneration cycle is complete. [407:6.2.10.5]

42.10.4.2.10.6

The vehicle shall be visually inspected for any signs of fluid leaks under or around the vehicle before regeneration is initiated. [407:6.2.10.6]

42.10.4.2.10.7

DPF regeneration shall not be initiated if there are any signs of any fluid leaks on or beneath the vehicle. [407:6.2.10.7]

42.10.4.2.10.8

Once a regeneration cycle is started, it shall be completed without interruption. [407:6.2.10.8]

42.10.4.2.10.9

After the regeneration process is successfully completed, the vehicle shall be permitted to return to normal service. [407:6.2.10.9]

42.10.4.2.10.10

Problems occurring during the regeneration cycle shall be corrected prior to the vehicle returning to normal service. [407:6.2.10.10]

42.10.4.2.10.11

Aircraft refueling operations shall not be initiated if the regenerative system indicates regeneration is required. [407:6.2.10.11]

42.10.4.2.11 Loading and Unloading

42.10.4.2.11.1

Aircraft fuel servicing tank vehicles shall be loaded only at an approved loading rack. [407:6.2.11.1]

42.10.4.2.11.2

Aircraft fuel servicing tank vehicles shall not be loaded from a hydrant pit, unless permitted by the authority having jurisdiction under emergency circumstances. [407:6.2.11.2]

42.10.4.2.11.3

Filling of the vehicle cargo tank shall be under the observation and control of a qualified and authorized operator at all times. [407:6.2.11.3]

42.10.4.2.11.4

The required deadman and automatic overfill controls shall be in normal operating condition during the filling operation. [407:6.2.11.4]

42.10.4.2.11.5

The controls shall not be blocked open or otherwise bypassed. [407:6.2.11.5]

42.10.4.2.11.6

The engine of the tank vehicle shall be shut off before starting to fill the tank. [407:6.2.11.6]

42.10.4.2.11.7

To prevent leakage or overflow from expansion of the contents due to a rise in atmospheric temperature or direct exposure to the sun, no cargo tank or compartment shall be loaded to the point where it is liquid full. [407:6.2.11.7]

42.10.4.2.11.7.1

No cargo tank or compartment shall be loaded above the rated net capacity, as specified by the manufacturer's data plate. [407:6.2.11.7.1]

42.10.4.2.11.7.2

Space for thermal expansion, in no case less than 3 percent of the tank volume, shall be provided to prevent leakage. [407:6.2.11.7.2]

42.10.4.2.11.8

The driver, operator, or attendant of any tank vehicle shall not remain in the vehicle but shall not leave the vehicle unattended during the loading or unloading process be considered to be a part of the tank vehicle. [407:6.2.11.8]

42.10.4.2.11.8.1

Delivery hose, when attached to a tank vehicle, shall be considered to be a part of the tank vehicle. [407:6.2.11.8.1]

42.10.4.2.11.9

No fuel shall be transferred to or from any tank vehicle until the parking brake and wheel chocks have been set to prevent motion of the vehicle. [407:6.2.11.9]

42.10.4.2.11.10 Top Loading

42.10.4.2.11.10.1

Where loading tank trucks through open domes, a bond shall be established between the loading piping and the cargo tank to equalize potentials. [407:6.2.11.10.1]

42.10.4.2.11.10.2

The bond connection shall be made before the dome is opened and shall be removed only after the dome is closed. [407:6.2.11.10.2]

42.10.4.2.11.10.3

Drop tubes attached to loading assemblies extending into the vehicle tank shall extend to the bottom of the tank and shall be maintained in that position until the tank is loaded to provide submerged loading and avoid splashing or free falling of fuel through the tank atmosphere. [407:6.2.11.10.3]

42.10.4.2.11.10.4

Splash filling shall be prohibited. [407:6.2.11.10.4]

42.10.4.2.11.10.5

The flow rate into the tanks shall not exceed 25 percent of the maximum flow until the outlet is fully covered. [407:6.2.11.10.5]

42.10.4.2.11.10.6

Fixed drop tubes permanently mounted in the vehicle tank shall extend to the bottom of the tank or to the inside of the sump to maintain submerged loading and to avoid splashing of the fuel. [407:6.2.11.10.6]

42.10.4.2.11.10.7

The level in the tank shall be visually monitored at all times during top loading. [407:6.2.11.10.7]

42.10.4.2.11.11 Bottom Loading

42.10.4.2.11.11.1

A bonding connection shall be made between the cargo tank and the loading rack before any fuel connections are made and shall remain in place throughout the loading operation. [407:6.2.11.11.1]

42.10.4.2.11.11.2

The operator shall initiate fuel flow by means of a dead-man control device. [407:6.2.11.11.2]

42.10.4.2.11.11.3

The operator shall ensure that the automatic high-level shutoff system is functioning properly for each compartment shortly after flow has been initiated. [407:6.2.11.11.3]

42.10.4.2.12 Positioning of Aircraft Fuel Servicing Vehicles and Carts During Fueling

42.10.4.2.12.1

Aircraft fuel servicing vehicles and carts shall be positioned so that a clear path of egress from the aircraft for fuel servicing vehicles shall be maintained. [407:6.2.12.1]

42.10.4.2.12.2

The propulsion or pumping engine of aircraft fuel servicing vehicles or carts shall not be positioned under the wing of the aircraft during overwing fueling or where aircraft fuel system vents are located on the upper wing surface. [407:6.2.12.2]

42.10.4.2.12.3

Aircraft fuel servicing vehicles or carts shall not be positioned within a 3 m (10 ft) radius of aircraft fuel system vent openings. [407:6.2.12.3]

42.10.4.2.12.4

Parking brakes and chocks shall be set on all fuel servicing vehicles or carts before operators begin the fueling operation. [407:6.2.12.4]

42.10.4.2.12.5

During overwing aircraft fuel servicing where aircraft fuel system vents are located on the upper wing surface, equipment shall not be positioned under the trailing edge of the wing. [407:6.2.12.5]

42.10.5 Rooftop Heliports

42.10.5.1 Design and Construction

42.10.5.1.1 General Requirements

42.10.5.1.1.1 System Design and Approval

42.10.5.1.1.1.1

Fueling on rooftop heliports shall be permitted only where approved by the authority having jurisdiction. [407:7.1.1.1.1]

42.10.5.1.1.1.2

In addition to the special requirements in this chapter, the heliport shall comply with the requirements of NFPA418. [407:7.1.1.1.2]

42.10.5.1.1.1.3

Facilities for dispensing fuel with a flash point below 37.8°C (100°F) shall not be permitted at any rooftop heliport. [407:7.1.1.1.3]

42.10.5.1.1.1.4

In addition to the special requirements of this chapter, the fuel storage, piping, and dispensing system shall comply with the requirements of NFPA 30 and with applicable portions of this standard. [407:7.1.1.1.4]

42.10.5.1.1.1.5

The entire system shall be designed so that no part of the system is subjected to pressure above its working pressure. [407:7.1.1.1.5]

42.10.5.1.2 Fuel Storage Tanks

42.10.5.1.2.1

Fuel storage tanks and components shall comply with the requirements of NFPA 30. [407:7.1.2.1]

42.10.5.1.2.2

The fuel storage system shall be located at or below ground level. [407:7.1.2.2]

42.10.5.1.3 Pumps and Piping Systems

42.10.5.1.3.1

Pumps and piping systems shall comply with the requirements of NFPA 30. [407:7.1.3.1]

42.10.5.1.3.2

Pumps shall be located at or below ground level. [407:7.1.3.2]

42.10.5.1.3.3

Relay pumping shall not be permitted. [407:7.1.3.3]

42.10.5.1.3.4

Pumps installed outside of buildings shall be located not less than 1.5 m (5 ft) from any building opening. [407:7.1.3.4]

42.10.5.1.3.5

Pumps shall be anchored and protected against physical damage from collision. [407:7.1.3.5]

42.10.5.1.3.6

Pumps installed within a building shall be in a separate room with no opening into other portions of the building. [407:7.1.3.6]

42.10.5.1.3.7

The pump room shall be adequately ventilated. [407:7.1.3.7]

42.10.5.1.3.8

Electrical wiring and equipment in pump rooms shall conform to the requirements of NFPA 70, Article 515. [407:7.1.3.8]

42.10.5.1.3.9

Piping above grade shall be steel and, unless otherwise approved by the authority having jurisdiction, shall be suitably cased or shall be installed in a duct or chase. [407:7.1.3.9]

42.10.5.1.3.9.1

Such piping duct or chase shall be constructed so that a piping failure does not result in the entry of fuel liquid or vapor entering the building. [407:7.1.3.9.1]

42.10.5.1.3.9.2

All pipe casings, ducts, and chases shall be drained. [407:7.1.3.9.2]

42.10.5.1.3.10

Piping shall be anchored and shall be protected against physical damage for a height of at least 2.4 m (8 ft) above the ground. [407:7.1.3.10]

42.10.5.1.3.11

An isolation valve shall be installed on the suction and discharge piping of each pump. [407:7.1.3.11]

42.10.5.1.3.12

A check valve shall be installed at the base of each fuel piping riser to automatically prevent the reverse flow of the fuel into the pump room in the event of pump seal failure, pipe failure, or other malfunction. [407:7.1.3.12]

42.10.5.1.3.13

Piping within buildings shall comply with 42.10.3.1.3.3. [407:7.1.3.13]

42.10.5.1.4 Hose and Nozzles. (Reserved)

42.10.5.1.5 Electrostatic Bonding. (Reserved)

42.10.5.1.6 Electrical Systems. (Reserved)

42.10.5.1.7 Control of Fuel Flow. (Reserved)

42.10.5.1.8 Filters and Ancillary Equipment. (Reserved)

42.10.5.1.9 Emergency Fuel Shutoff Systems

42.10.5.1.9.1

At least two emergency fuel shutoff stations located on opposite sides of the heliport at exitways or at similar locations shall be provided. [407:7.1.9.1]

42.10.5.1.9.2

An additional emergency fuel shutoff station shall be located at ground level and shall be located at least 3 m (10 ft) from the pump but no further than 6 m (20 ft). [407:7.1.9.2]

42.10.5.1.10 Fire Protection

Fire protection shall conform to the requirements of NFPA 418. [407:7.1.10]

42.10.5.1.11 Marking and Labeling. (Reserved)

42.10.5.2 Operations

42.10.5.2.1 Security. (Reserved)

42.10.5.2.2 Personnel

All heliport personnel shall be trained in the use of the available fire extinguishers and fixed extinguishing systems. [407:7.2.2]

42.10.5.2.3 Prevention and Control of Spills. (Reserved)

42.10.5.2.4 Emergency Fuel Shutoff

All heliport personnel shall be trained in the operation of emergency fuel shutoff controls. [407:7.2.4]

42.10.5.2.5 Bonding. (Reserved)

42.10.5.2.6 Monitoring of Fuel Flow. (Reserved)

42.10.5.2.7 Fire Protection. (Reserved)

42.10.5.2.8 Maintenance. (Reserved)

42.10.5.2.9 Aircraft Fueling Hose. (Reserved)

42.10.6 Self-Service Aircraft Fueling

42.10.6.1 Design and Construction

42.10.6.1.1 General Requirements

42.10.6.1.1.1 System Design and Approval

Self-service fueling shall be permitted, subject to the approval of the authority having jurisdiction. [407:8.1.1.1]

42.10.6.1.1.2

Dispensing devices shall be located on an island to protect against collision damage or shall be protected with pipe bollards or other approved protection. [407:8.1.1.2]

42.10.6.1.2 Fuel Storage Tanks

In addition to the special requirements of this chapter, the fuel storage system shall comply with the requirements of NFPA 30. [407:8.1.2]

42.10.6.1.3 Pumps and Piping Systems

42.10.6.1.3.1

In addition to the special requirements of this chapter, the piping and dispensing system shall comply with the requirements of NFPA 30. [407:8.1.3.1]

42.10.6.1.3.2

Listed or approved dispensing devices shall be used. [407:8.1.3.2]

42.10.6.1.4 Hose and Nozzles. (Reserved)

42.10.6.1.5 Electrostatic Bonding. (Reserved)

42.10.6.1.6 Electrical Systems. (Reserved)

42.10.6.1.7 Control of Fuel Flow. (Reserved)

42.10.6.1.8 Filters and Ancillary Equipment. (Reserved)

42.10.6.1.9 Emergency Fuel Shutoff Systems

42.10.6.1.9.1

The controls shall be designed to allow only authorized personnel to reset the system after an emergency fuel shutoff. [407:8.1.9.1]

42.10.6.1.9.2

The emergency fuel shutoff controls shall be installed in a location acceptable to the authority having jurisdiction and shall be more than 6 m (20 ft) but less than 30 m (100 ft) from the dispensers. [407:8.1.9.2]

42.10.6.1.9.3

A clearly identified means to notify the fire department shall be provided and shall be located in the immediate vicinity of each emergency fuel shutoff control. [407:8.1.9.3.]

42.10.6.1.9.4

Dispensing devices shall have a listed or approved emergency shutoff valve, incorporating a fusible link or other thermally actuated device designed to close automatically in case of fire. [407:8.1.9.4]

42.10.6.1.9.5

The emergency shutoff valve also shall incorporate a shear section that automatically shuts off the flow of fuel due to severe impact. [407:8.1.9.5]

42.10.6.1.9.6

The emergency shutoff valve shall be rigidly mounted at the base of the dispenser in accordance with the manufacturer's instructions. [407:8.1.9.6]

42.10.6.1.10 Fire Protection

42.10.6.1.10.1

Each facility shall have a minimum of one fire extinguisher with a rating of at least 80-B:C located at the dispenser. [407:8.1.10.1]

42.10.6.1.10.2

At least one fire extinguisher with a rating of at least 80-B:C shall be provided at each emergency fuel shutoff control. [407:8.1.10.2]

42.10.6.1.11 Marking and Labeling

42.10.6.1.11.1

Emergency instructions shall be conspicuously posted in the dispensing area and at the emergency fuel shutoff control. [407:8.1.11.1]

42.10.6.1.11.2

Emergency instructions shall incorporate the following or equivalent wording:

EMERGENCY INSTRUCTIONS IN CASE OF FIRE OR SPILL

(1) Use emergency fuel shutoff.

(2) Report accident by calling (specify local fire emergency reporting number) on phone.

(3) Report address of site (list address of site here).

[407:8.1.11.2]

42.10.6.1.11.3 Operating Instructions

Operating instructions shall be posted. [407:8.1.11.3]

42.10.6.1.11.4

The operating instructions shall include the following:

Proper operation and use of all equipment

Correct bonding procedures

Procedures to be employed to dispense fuel safely

Location and use of the emergency fuel shutoff controls

Procedures to be used in the event of an emergency

[407:8.1.11.4]

42.10.6.2 Operations

42.10.6.2.1 Security

Access to dispensing equipment shall be controlled by means of mechanical or electronic devices designed to resist tampering and to prevent access or use by unauthorized persons. [407:8.2.1]

42.10.6.2.2 Training. (Reserved)

42.10.6.2.3 Prevention and Control of Spills. (Reserved)

42.10.6.2.4 Emergency Fuel Shutoff. (Reserved)

42.10.6.2.5 Bonding. (Reserved)

42.10.6.2.6 Monitoring of Fuel Flow. (Reserved)

42.10.6.2.7 Fire Protection. (Reserved)

42.10.6.2.8 Maintenance. (Reserved)

42.10.6.2.9 Occupancy

The aircraft shall not be occupied during self-service fueling. [407:8.2.9]

42.11 Alternate Fuels

42.11.1 Compressed Natural Gas (CNG) Vehicular Fuel Systems

The design and installation of CNG engine fuel systems on vehicles of all types shall comply with NFPA 52, Vehicular Gaseous Fuel Systems Code, and Section 42.11.

42.11.1.1\* Scope

42.11.1.1.1

Section 42.11 shall apply to the design, installation, operation, and maintenance of compressed natural gas (CNG) and liquefied natural gas (LNG) engine fuel systems on vehicles of all types and for fueling vehicle (dispensing) systems and facilities, and associated storage, including the following:

Original equipment manufacturers (OEMs)

Final-stage vehicle integrator/manufacturer (FSVIM)

Vehicle fueling (dispensing) systems

[52:1.1.1]

42.11.1.1.2

Section 42.11 shall apply to the design, installation, operation, and maintenance of LNG engine fuel systems on vehicles of all types, to their associated fueling (dispensing) facilities, and to LNG-to-CNG facilities with LNG storage in ASME containers of 100,000 gal (379 m3) or less. [52:1.1.2]

42.11.1.1.3\*

This section and NFPA 52 shall not apply to those aspects of vehicles and fuel supply containers that are covered by federal motor vehicle safety standards (FMVSSs). [52:1.1.3]

42.11.1.1.4

Section 42.11 shall include marine, highway, rail, off-road, and industrial vehicles. [52:1.1.4]

42.11.2 Liquefied Petroleum Gas (LP-Gas)

42.11.2.1

Fuel dispensing facilities for vehicles using LP-Gas shall comply with NFPA 58 and 42.11.2.

42.11.2.2 Scope

42.11.2.2.1\*

Chapter 11 of NFPA 58 applies to engine fuel systems installed on mobile and nonstationary engines and offroad vehicles using LP-Gas in internal combustion engines, including containers, container appurtenances, carburetion equipment, piping, hose and fittings, and their installation. [58:11.1.1]

42.11.2.2.2\*

Chapter 11 of NFPA 58 applies to the installation of fuel systems supplying engines used to propel motorized vehicles as defined in 42.11.2.2.1. [58:11.1.3]

42.11.2.2.3

Chapter 11 of NFPA 58 applies to garaging of vehicles where such systems are installed. [58:11.1.4]

42.11.2.3 Training

Each person engaged in installing, repairing, filling, or otherwise servicing an LP-Gas engine fuel system shall be trained in accordance with Section 4.4 of NFPA 58. [58:11.2]

42.11.2.4 Industrial (And Forklift) Trucks Powered by LP-Gas

42.11.2.4.1 Scope

Paragraph 42.11.2.4 applies to LP-Gas installation on industrial trucks (including forklift trucks), both to propel them and to provide the energy for their materials-handling attachments. [58:11.11.1]

42.11.2.4.2 Operations

The operation of industrial trucks (including forklift trucks) powered by LP-Gas engine fuel systems shall comply with 42.11.2.4.2.1 through 42.11.2.4.2.3. [58:11.11.4]

42.11.2.4.2.1

Industrial trucks shall be refueled outdoors. [58:11.11.4.1]

42.11.2.4.2.2

Where cylinders are exchanged indoors, the fuel piping system shall be equipped to minimize the release of fuel when cylinders are exchanged, in accordance with either of the following:

Using an approved quick-closing coupling in the fuel line

Closing the shutoff valve at the fuel cylinder and allowing the engine to run until the fuel in the line is exhausted

[58:11.11.4.2]

42.11.2.4.2.3

Where LP-Gas-fueled industrial trucks are used in buildings or structures, the following shall apply:

The number of fuel cylinders on such a truck shall not exceed two.

The use of industrial trucks in buildings frequented by the public, including those times when such buildings are occupied by the public, shall require the approval of the AHJ.

The total water capacity of the fuel cylinders on an individual truck shall not exceed 105 lb (48 kg) [nominal 45 lb (20 kg) propane capacity].

Trucks shall not be parked and left unattended in areas occupied by or frequented by the public without the approval of the AHJ. If left unattended with approval, the cylinder shutoff valve shall be closed.

In no case shall trucks be parked and left unattended in areas of excessive heat or near sources of ignition.

[58:11.11.4.3]

42.11.2.4.2.4

All cylinders used in industrial truck service (including forklift truck cylinders) shall have the cylinder pressure relief valve replaced in accordance with 5.9.2.14 of NFPA 58. [58:11.11.4.4]

42.11.2.5 General Provisions for Vehicles Having Engines Mounted on Them (Including Floor Maintenance Machines)

42.11.2.5.1 Scope

42.11.2.5.1.1

Paragraph 42.11.2.5 applies to the installation of equipment on vehicles that supply LP-Gas as a fuel for engines installed on these vehicles. [58:11.12.1.1]

42.11.2.5.1.2

Vehicles include floor maintenance and any other portable mobile unit, whether the engine is used to propel the vehicle or is mounted on it for other purposes. [58:11.12.1.2]

42.11.2.5.2 General Requirements

42.11.2.5.2.1

Industrial trucks (including forklift trucks) and other engines on vehicles operating in buildings other than those used exclusively to house engines shall have an approved automatic shutoff valve installed in the fuel system. [58:11.12.2.1]

42.11.2.5.2.2

The source of air for combustion shall be isolated from the driver and passenger compartment, ventilating system, or air-conditioning system on the vehicle. [58:11.12.2.2]

42.11.2.5.2.3

Non-self-propelled floor maintenance machinery (floor polishers, scrubbers, buffers) and other similar portable equipment shall be listed. [58:11.12.2.3]

42.11.2.5.2.3.1

A label shall be affixed to the machinery or equipment, with the label facing the operator, with the text denoting that the cylinder or portion of the machinery or equipment containing the cylinder shall be stored in accordance with Chapter 8 of NFPA 58. [58:11.12.2.3(A)]

42.11.2.5.2.3.2

The use of floor maintenance machines in buildings frequented by the public, including the times when such buildings are occupied by the public, shall require the approval of the AHJ. [58:11.12.2.3 (B)]

42.11.2.6 Garaging of Vehicles

Where vehicles with LP-Gas engine fuel systems mounted on them, and general-purpose vehicles propelled by LP-Gas engines, are stored or serviced inside garages, the following conditions shall apply:

The fuel system shall be leak-free.

The container shall not be filled beyond the limits specified in Chapter 7 of NFPA 58.

The container shutoff valve shall be closed when the vehicle or the engine is being repaired, except when the engine is required to operate. Containers equipped with an automatic shutoff valve as specified in 11.4.1.7 of NFPA 58 satisfy this requirement.

The vehicle shall not be parked near sources of heat, open flames, or similar sources of ignition or near inadequately ventilated pits.

[58:11.14]

42.11.3\* Liquefied Natural Gas (LNG)

Fuel dispensing facilities for marine, highway, rail, off-road, and industrial vehicles using LNG and LNG storage in ASME containers of 70,000 gal (265 m3) or less shall comply with NFPA 52.

42.12 On-Demand Mobile Fueling

42.12.1\* Scope

Section 42.12 shall apply to the retail practice of mobile fueling of motor vehicles while the motor vehicle being fueled is parked. [30A:14.1]

42.12.1.1

Section 42.12 shall not apply to the following:

Refueling from tank vehicles at commercial, industrial, governmental, or manufacturing establishments in accordance with 42.7.6

Fueling from portable containers in cases of an emergency or for personal use

[30A:14.1.1]

42.12.1.2 Dispensing Class I and Class II Liquids for On-Demand Mobile Fueling

42.12.1.2.1

The dispensing of Class I and Class II liquids from a mobile fueling vehicle or metal safety cans into the fuel tank of a motor vehicle shall be permitted only if all of the requirements of 42.12.2 through 42.12.4have been met. [30A:14.1.2.1]

42.12.1.2.2

The dispensing of all other motor fuels from mobile refueling vehicles into the fuel tanks of a motor vehicle shall be permitted only if the following requirements are met:

Completion of a risk assessment and operating plan addressing the identified hazards

Approval of the AHJ

[30A:14.1.2.2]

42.12.2 Approvals and Mobile Fueling Locations

42.12.2.1

Mobile fueling operations shall not be conducted unless approved by the AHJ and the owner of the property on which the fueling will occur. [30A:14.2.1]

42.12.2.2

Mobile fueling operations shall occur only at approved locations. [30A:14.2.2]

42.12.2.3\* Safety and Emergency Response Plan

42.12.2.3.1

The AHJ shall be permitted to require a safety and emergency response plan for locations where mobile fueling is authorized. [30A:14.2.3.1]

42.12.2.3.2

When required, the safety and emergency response plan shall be available on each mobile fueling vehicle. [30A:14.2.3.2]

42.12.2.4 Training

42.12.2.4.1\*

Mobile fueling vehicle operators shall possess evidence of training on proper fueling procedures and the safety and emergency response plan. [30A:14.2.4.1]

42.12.2.4.2

The vehicle operator training shall be approved by the AHJ. [30A:14.2.4.2]

42.12.2.5

Mobile fueling shall not take place within 25 ft (7.6 m) of buildings, property lines, or combustible storage. [30A:14.2.5]

42.12.2.6

An approved storm drain cover or equivalent method that will prevent any fuel from reaching the drain shall be used when mobile fueling occurs within 25 ft (7.6 m) of a storm drain. [30A:14.2.6]

42.12.2.7

Mobile fueling shall be prohibited in buildings and in covered parking structures. [30A:14.2.7]

42.12.2.8

Mobile fueling operations shall be prohibited on public streets and public ways unless approved by the AHJ. [30A:14.2.8]

42.12.2.9\*

Where approved by the AHJ, mobile fueling operations conducted on public streets and public ways shall comply with Section 42.12 and the following:

The dispensing hose shall not cross an active traffic lane or vehicle pathway.

\* The mobile fueling vehicle and the dispensing hose shall not encumber a marked pedestrian crossing or bicycle lane or obstruct a pedestrian walkway.

The mobile fueling vehicle's hazard warning signal and flashers shall be activated during dispensing operations.

The AHJ shall be authorized to specify time-of-day and day-of-week limitations on mobile fueling operations.

[30A:14.2.9]

42.12.3 Mobile Fueling Vehicles and Equipment

42.12.3.1\*

Mobile fueling vehicles shall comply with all applicable local, state, and federal requirements and shall be one of the following:

A tank vehicle complying with NFPA 385 with chassis-mounted tanks that do not exceed an aggregate capacity of 1200 gal (4542 L).

A vehicle with chassis-mounted tanks, each of which does not exceed 110 gal (415 L), that does not exceed an aggregate capacity of 1200 gal (4542 L).

A vehicle that carries a maximum of 60 gal (227 L) of motor fuel in listed metal safety cans not to exceed 5.3 gal (20 L) in capacity.

[30A:14.3.1]

42.12.3.2

Dispensing hose assemblies shall be listed and the hose shall not exceed 50 ft (15 m) in length. [30A:14.3.2]

42.12.3.3

A listed breakaway device shall be provided at the nozzle. [30A:14.3.3]

42.12.3.4

Dispensing nozzles shall be a listed, automatic closing-type with a latch-open device. [30A:14.3.4]

42.12.3.5

A listed fuel shutoff switch and a listed shutoff valve assembly shall be provided on the delivery vehicle. [30A:14.3.5]

42.12.3.6

The pump shall be listed to UL 79, Power-Operated Pumps for Petroleum Dispensing Products. [30A:14.3.6]

42.12.3.7

The meter shall be listed to UL 25, Meters for Flammable and Combustible Liquids and LP-Gas. [30A:14.3.7

42.12.3.8

Mobile fueling vehicles shall be provided with at least one fire extinguisher selected, installed, inspected, and maintained as required by NFPA 10. [30A:14.3.8]

42.12.3.8.1

The extinguisher shall be a minimum 10 lb (4.54 kg) ABC dry chemical agent-type and shall also be rated with an agent discharge rate of 1 lb/sec (0.45 kg/sec) or greater. [30A:14.3.8.1]

42.12.3.9

Mobile fueling vehicles shall be provided with a minimum 5 gal (18.9 L) spill kit designed to promptly and safely mitigate and dispose of leakage or spills. [30A:14.3.9]

42.12.3.10

NO SMOKING signs shall be prominently displayed on the mobile fueling vehicle. [30A:14.3.10]

42.12.3.11

The mobile fueling vehicles shall be fitted with 360-degree retro reflective tape or markings in compliance with 49 CFR 571.108, Lamps, Reflective Devices, and Associated Equipment. [30A:14.3.11]

42.12.4 Operations

42.12.4.1

Nighttime deliveries shall only be made in areas deemed adequately lighted by the AHJ. The source of lighting shall be permitted to originate from the mobile fueling vehicle. [30A:14.4.1]

42.12.4.2

The mobile fueling vehicle's hazard warning signal and flashers shall be activated during dispensing operations. [30A:14.4.2]

42.12.4.3

Safety cones or barriers shall be employed to protect the vehicle fueling area. [30A:14.4.3]

42.12.4.4

Expansion space shall be left in each motor vehicle fuel tank to prevent overflow in the event of temperature increase. [30A:14.4.4]

42.12.4.5\*

A means for bonding the mobile fueling vehicle to the motor vehicle shall be provided. Such bonding means shall be employed during fueling operations. [30A:14.4.5]

42.12.4.6

Sources of ignition shall be controlled in accordance with 42.7.2.6.1. [30A:14.4.6]

42.12.4.7

Mobile fueling vehicles shall be constantly attended during fueling operations. [30A:14.4.7]

42.12.4.8

Mobile fueling vehicles shall not obstruct emergency vehicle access roads. [30A:14.4.8]

42.12.4.9

Mobile fueling vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose. [30A:14.4.9]

42.12.4.10 Inspection Program

42.12.4.10.1

The mobile fueling operator shall have in place an approved vehicle inspection program. [30:14.4.10.1]

42.12.4.10.2

Vehicles shall be inspected prior to each shift with records available to the AHJ upon request. [30:14.4.10.2]

42.12.4.11 Operations Using Metal Safety Cans

42.12.4.11.1

All metal safety cans shall be listed. [30A:14.4.11.1]

42.12.4.11.2

Metal shall be secured to the mobile fueling vehicle except when in use. [30A:14.4.11.2]

42.12.4.11.3

The AHJ shall be permitted to require additional measures in the handling of approved metal safety cans for refueling. [30A:14.4.11.3]